

Precision Ball Screw Assemblies

R310EN 3301 (2008.07)

The Drive & Control Company

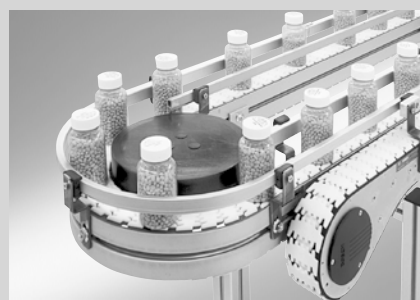
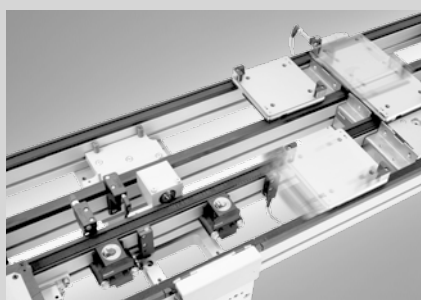
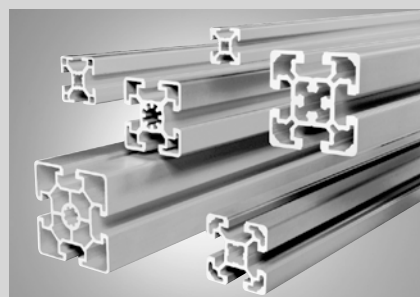
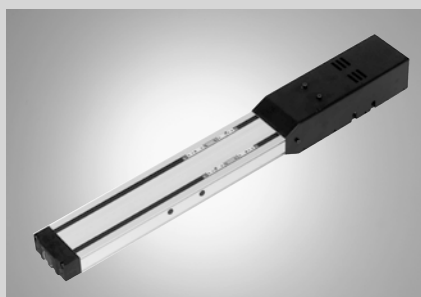
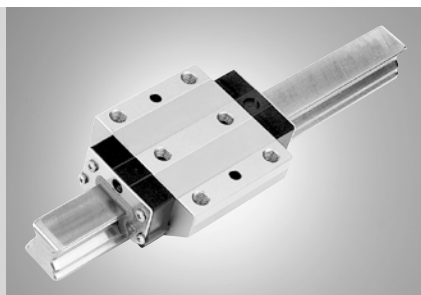


Linear Motion and Assembly Technologies

Ball Rail Systems
Roller Rail Systems
Linear Bushings and Shafts

Ball Screw Drives
Linear Motion Systems

Basic Mechanical Elements
Manual Production Systems
Transfer Systems

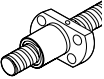
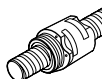
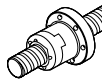
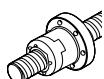
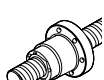
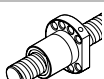
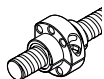
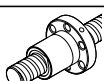
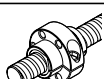
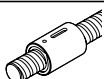
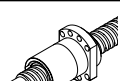
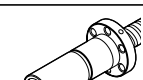



Precision Ball Screw Assemblies

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Product Overview

Nuts and Nut Housings



Nuts		Page
Miniature series		
Miniature single nut with flange FEM-E-B		22
ECO series		
Screw-in nut ZEV-E-S		24
Single nut with flange and recirculation caps FBZ-E-S		26
Single nut with flange and recirculation caps FSZ-E-S		28
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Single nut with flange and recirculation caps FEP-E-S		30
Standard series		
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Adjustable-preload single nut DIN 69 051, Part 5 SEM-E-C		34
Single nut with flange FEM-E-S		36
Adjustable-preload single nut SEM-E-S		38
Cylindrical single nut ZEM-E-S		40
2-start single nut with flange FED-E-B		42
Double nut with flange DIN 69 051, Part 5 FDM-E-C		44
Double nut with flange FDM-E-S		46

Diameter d_0	Lead P				
	1	2	2.5	5	10
6					
8					
12					

Diameter d_0	Lead P	
	5	10
12		
16		
20		
25		
32		

  Screw-in nut


Diameter d_0	Lead P		
	5	10	20
20			
25			
32			
40			

 Single nut with flange
FBZ-E-S
 Single nut with flange
FSZ-E-S


Diameter d_0	Lead P		
	25	32	40
20			
25			
32			

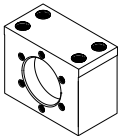
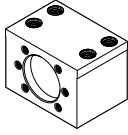
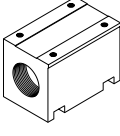
Diameter d_0	Lead P								
	2.5	5	10	12	16	20	25	32	40
8									
12									
16									
20									
25									
32									
40									
50									
63									
80									

 Single nut

 Double nut

Diameter d_0	Lead P		
	20	25	40
40			
50			
63			

 2-start single nut with flange FED-E-B

Nut housings		Page
MGS for Standard series FEM-E-S FDM-E-S SEM-E-S FEP-E-S		48
MGD for Standard series FEM-E-C FDM-E-C SEM-E-C		50
MGA-Z for cylindrical single nut ZEM-E-S		52

		Lead P									
		2.5	5	10	12	16	20	25	32	40	
Diameter d ₀	16										
	20										
	25										
	32										
	40										
	50										
	63										
	80										

MGD

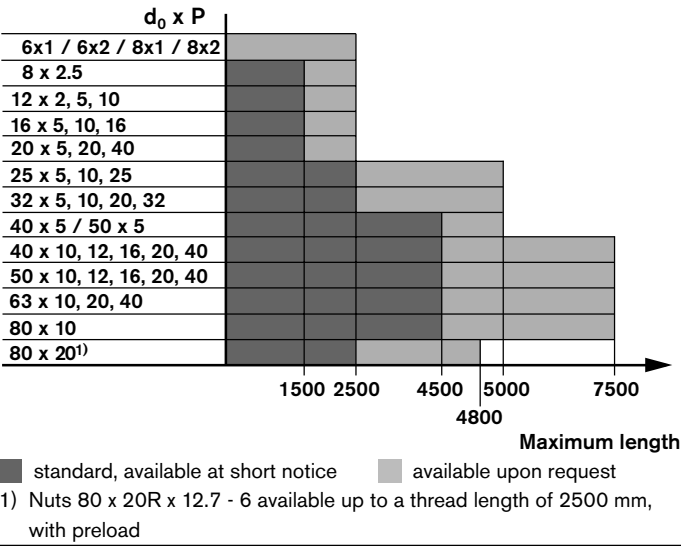
MGS

		Lead P									
		2.5	5	10	12	16	20	25	32	40	
Diameter d ₀	16										
	20										
	25										
	32										
	40										
	50										
	63										
	80										

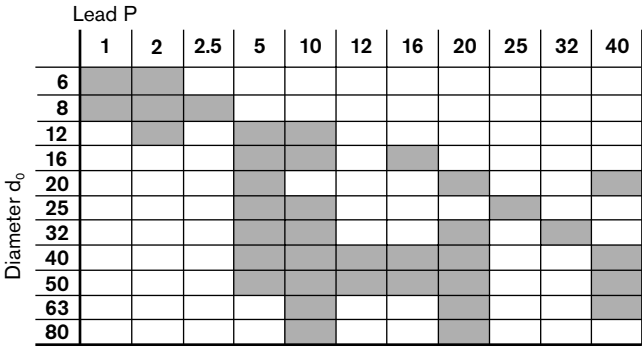
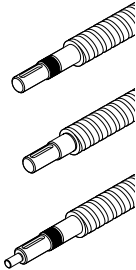
MGA-Z

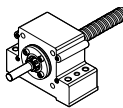
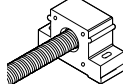
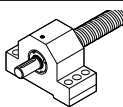
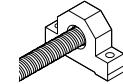
Screws, Bearings and Accessories

Screws	Page
Precision-rolled screw SN-R	54
Tolerance grades	
T5, T7, T9	
T3 available upon request	
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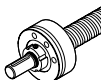
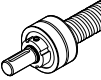
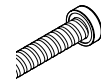
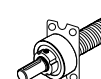
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SEC-L		84
SEB-F		86
SEB-L		88

Diameter d_0	Lead P										
	1	2	2.5	5	10	12	16	20	25	32	40
6											
8											
12											
16											
20											
25											
32											
40											

■ SEC-F / SEC-L ■ SEB-F / SEB-L




Bearings		Page
LAF		90
LAN		92
LAD		94
LAL		96

Diameter d_0	Lead P										
	1	2	2.5	5	10	12	16	20	25	32	40
6											
8											
12											
16											
20											
25											
32											
40											
50											
63											
80											

■ LAF ■ LAN / LAD

Diameter d_0	Lead P				
	1	2	2.5	5	10
6					
8					
12					
16					
20					
25					
32					

■ LAL

Single parts		Page
Slotted nut NMA, NMZ		98
NMG		99
Housing nut GWR		99

Definition of Precision Ball Screw Assembly

DIN 69 051, Part 1 defines a ball screw as follows:

An assembly comprising a ball screw shaft and a ball nut and which is capable of converting rotary motion into linear motion and vice versa. The rolling elements of the assembly are balls.

As simple as it is to describe the elementary function of a precision ball screw assembly, in practice you are faced with a variety of types and applications.

A new nut series, new sizes in right-hand and left-hand versions, as well as a new nut housing as an accessory have increased the scope of the catalog still further.

Rexroth Precision Ball Screw Assemblies provide technical designers with diverse solutions for positioning and transport tasks with driven screws or also with driven nuts.

With Rexroth, you can be sure of finding products tailored to special applications and uses.

Here are some examples:

- ECO series: the low-cost solution through to the medium size range in the form of screw-in nut or single nut with flange
- Speed series: maximum linear speeds with simultaneous high load rating and short nut length

The latest 2008 additions to the product range:

- 2-start single nut with flange FED-E-B, provides a distinct increase in the dynamic and static load ratings as a result of two separate ball tracks.
- Single nut with flange, FEM-E-S, left-hand version in several sizes; also available in the size 20x10R
- Nut housing MAG-Z for the cylindrical nut

The nuts with flanges from the Standard series are available in versions with either Rexroth or DIN mounting dimensions. The related standards (DIN 69 051 and ISO 3408) are therefore fully supported by Rexroth.

In order to make it easier for customers to decide between particular series and/or sizes in terms of delivery time as well, we have introduced A, B and C categories for nuts.

Each individual ball nut part number is assigned to a particular category. Category A parts are always stocked in the quantities of average demand. Certain stocks of Category B parts are also kept, but customers should inquire about the availability of these parts. Category C parts are exclusively made to order.

Almost all single nuts in the version with backlash can be easily mounted on the screw by the customer, especially during servicing. In addition, the adjustable-preload single nut of the Standard series allows the customer to perform preload adjustment in-house.

Matching nut housings for the Standard series and several types of end bearings are also stocked.

Precision-rolled screws

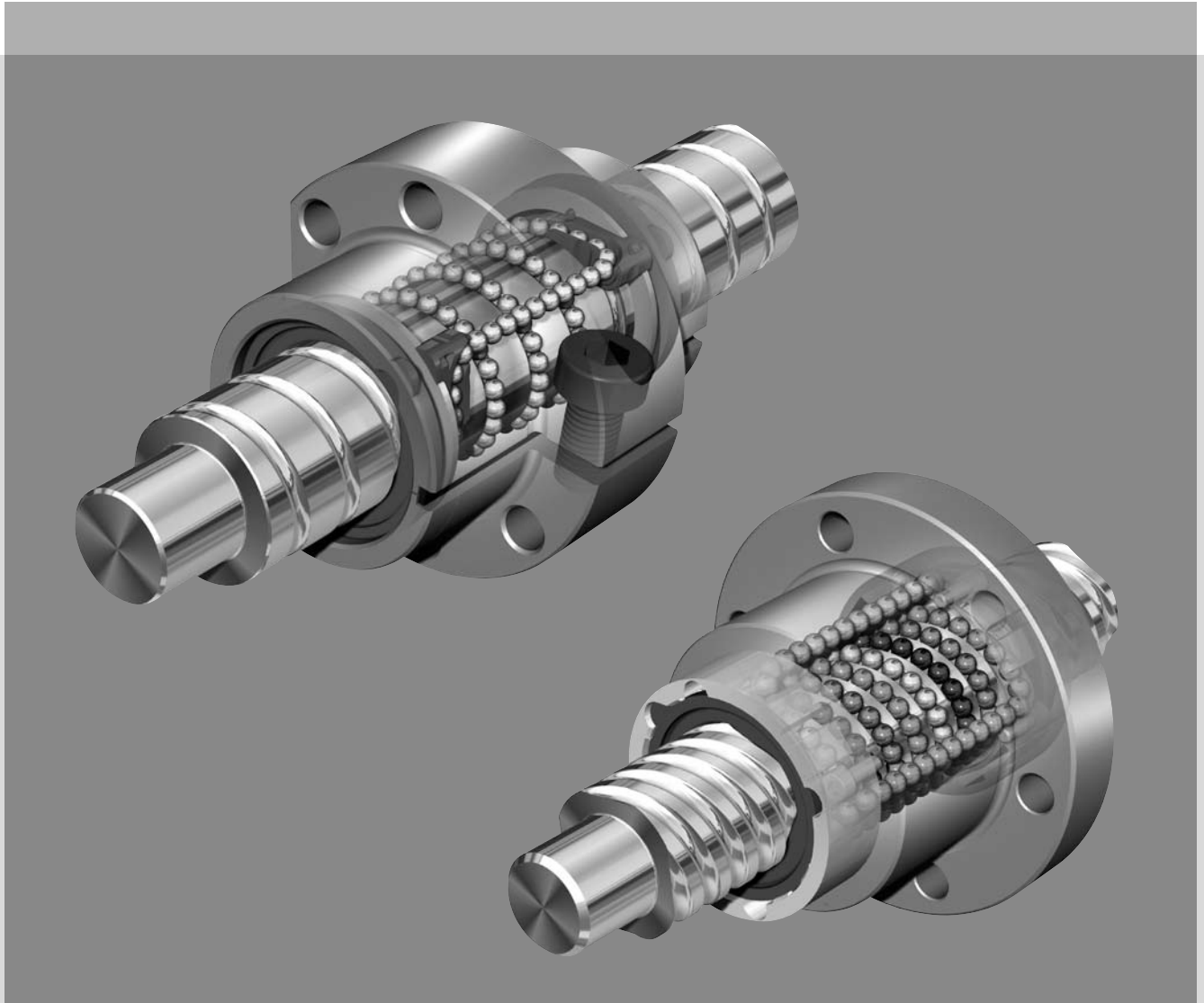
Precision-rolled screws in a variety of sizes and of unequalled quality have long been an essential part of our product range. Our comprehensive, worldwide stocks guarantee fast response times in every location. Availability is one advantage, low prices another. Every nut featured in this catalog can be combined with the precision-rolled screws.

Precision-rolled screws can also be supplied without ball nuts to allow customers to machine the screw ends on their own facilities. Since hard machining has meantime become an established method, we no longer anneal the screw ends, a process which was previously necessary but which lowers the quality of the material. For special servicing cases, please consult us.

WINKGT calculation software

The WINKGT calculation software for designing and calculating precision ball screw assemblies for the operating system Windows 95 through XP is available on CD-ROM. This makes it very easy for you to perform your own technical calculations.

Alternatively, you can arrange for Rexroth to produce a technical design calculation on your behalf by completing and returning the "Design Calculation Service Form" at the end of the catalog. For the simplified creation of drawings of our precision ball screw assemblies as a CAD file, see the section headed "Inquiries and Orders" and the "Inquiry/Order" form at the end of the catalog.



Advantages

- Smooth operation due to the design of the internal recirculation and optimal lift-off of balls from the raceway
- High load rating due to large number of balls
- Short nut length
- No protruding parts, nut is easily mounted
- Smooth outer shell
- Effective, wiping sealing
- Large range of series available ex stock
- Adjustable-preload single nut

Precision Ball Screw Assemblies with Driven Screws

End bearings

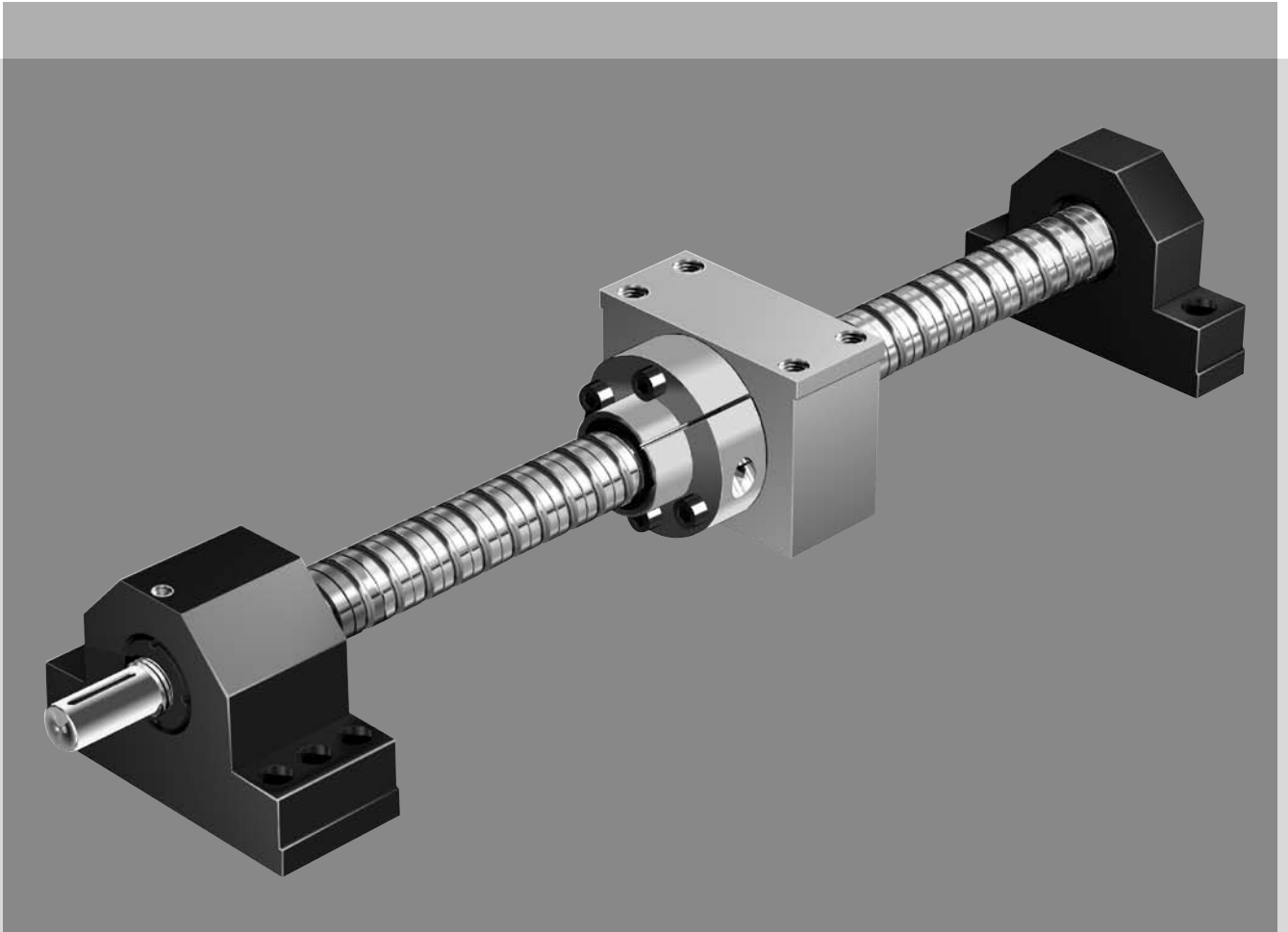
Rexroth precision ball screw assemblies are available with steel or aluminum pillow block units or bearing units complete with matching slotted nuts.

Rexroth precision pillow block units enable:

- Easy installation due to the variable fixture options and reference edges
- Use of premachined pin holes provides increased mounting accuracy

Nut housings

Rexroth nut housings for various flanged nuts and the cylindrical single nut ZEM-E-S complete the ready-to-install Rexroth product range.

**Advantages**

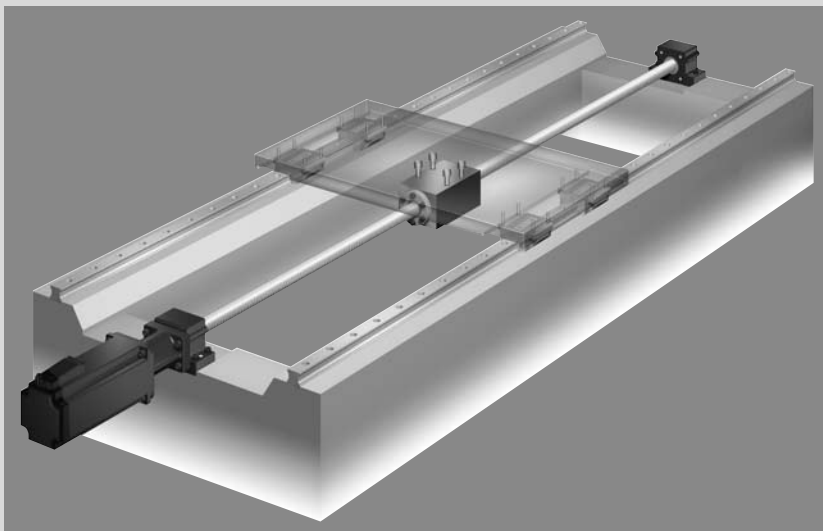
- High axial load capacity
- High dynamics
- High rigidity
- Low friction
- Available from stock in many versions and sizes
- Nut housing with reference edge (both sides)

Precision Ball Screw Assemblies for All Applications

Drive units

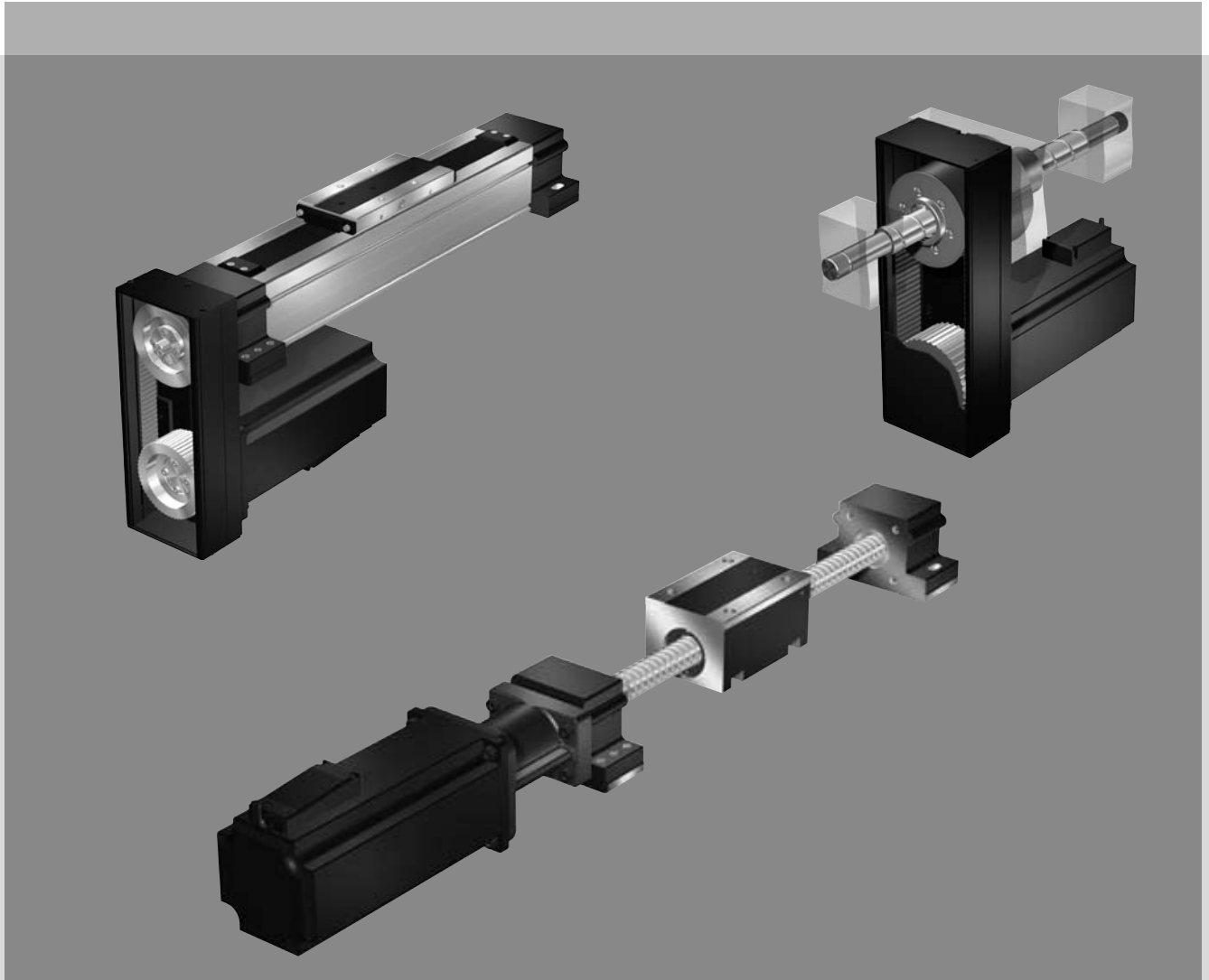
You will find further system solutions in our catalog on Rexroth Drive Units. This catalog contains precision ball screw assemblies with a protecting housing, including versions with integrated screw supports, driven nuts with side drive timing belt and the matching AC servo motors.

To perform particularly demanding positioning tasks we have developed the Integrated Measuring System for Ball Rail and Roller Rail Systems (Catalog R310EN 2350). The linear measuring system in the rail then replaces the positioning information in the ball screw. This way we are able to achieve a maximum of flexibility in design and a maximum of precision in operation.

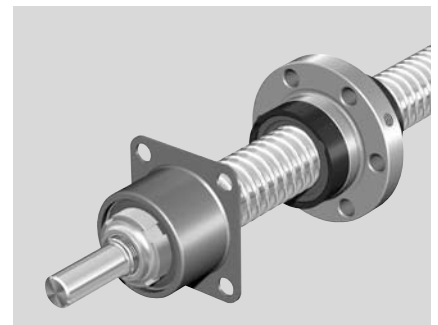


Available Precision Ball Screw Assembly catalogs

R310EN 3301	Precision Ball Screw Assemblies
R310EN 3304	Drive Units
R310EN 3312	Precision Ball Screw Assemblies, Miniature Series
R310EN 3314	eLINE Ball Screw Assemblies



You will find complete ball screw assemblies up to a screw diameter of $d_0 = 12$ mm for miniature applications in the catalog "Rexroth Precision Ball Screw Assemblies – Miniature Series".



In the catalog "eLINE Ball Screw Assemblies", you will find particularly economical ball screw assemblies, the performance data of which is almost equal to that of the high-end components.

Application Examples

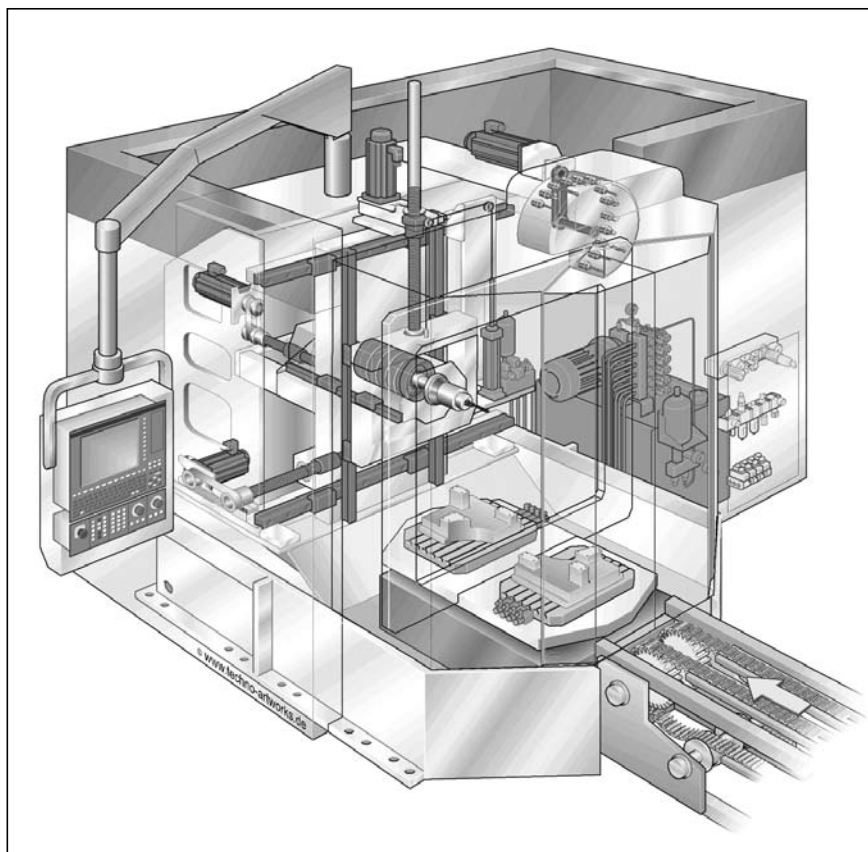
Application Examples

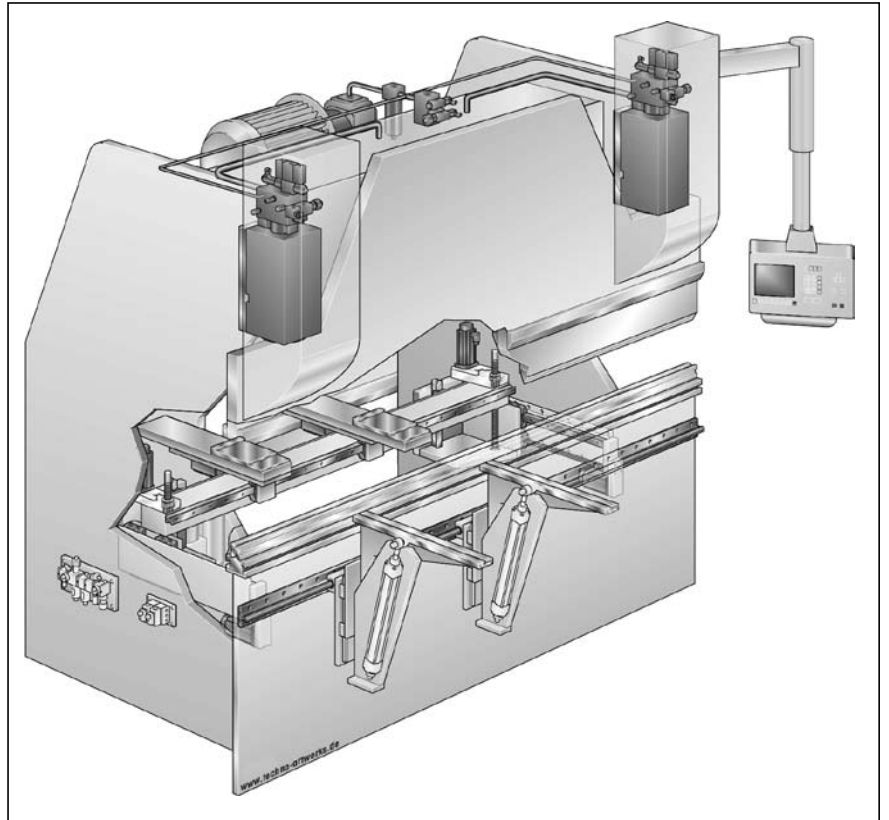
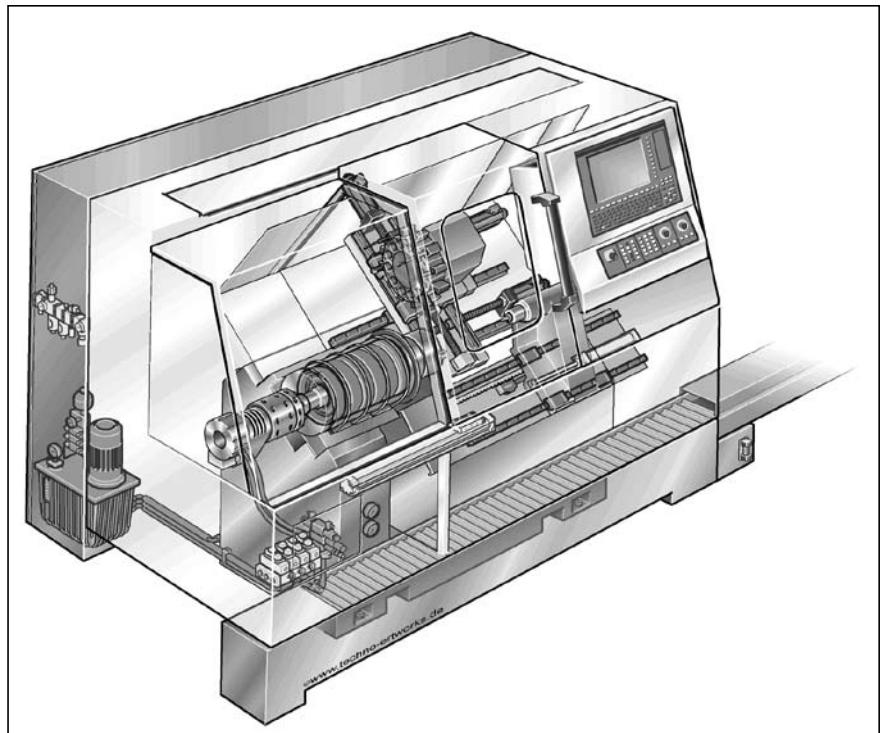
Rexroth Precision Ball Screw Assemblies have been successfully implemented worldwide in the following areas:

- Cutting machine tools
- Forming machine tools
- Automation and handling
- Woodworking
- Electrical and electronics
- Printing and paper
- Injection molding machines
- Food and packaging industry
- Medical equipment
- Textile industry
- etc.

Machining center

Vertical axis with driven nut



Press brake**Lathe**

Inquiries and Orders

Inquiries and Orders

All nuts, screws and end machining details can now be defined with the order code (up to screw diameter 80 mm) as a complete precision ball screw assembly. We have taken account of all former selection criteria as well as adding new ones. The diversity of possible combinations is limitless.

Attention is focused in particular on the definition of end machining details. For many design versions there is a prepared definition, providing you with a suitable solution for practically every application.

If you wish to send us an inquiry, simply complete the form at the end of this catalog. If no drawing is available, please specify your wishes using the variable order code. You will find a summary of the options on page 19.

Should you already have a drawing available as a CAD file in Pro/E, AutoCAD, STEP or DXF, you can send us the data by e-mail to screws.brl@boschrexroth.de.

If the drawing exists on paper only, you can, of course, send it to us by conventional mail.

Each customer-specific precision ball screw assembly is issued with an ID number when an order is placed. If you have any subsequent queries, you need only quote this ID number.

Using the ordering data from the cata-log, you can also easily generate a drawing in AutoCAD format via the functionality provided on our website. A guided dialogue is provided for data input so as to avoid typing errors, and all data selected can be checked within a few minutes against the drawing that has been generated. This drawing can then be used directly by our production departments, which accelerates order processing and delivery. The drawing generation functionality can be used without registering with us or entering a password or customer number. To access this functionality, visit http://www.boschrexroth.com/ball_screws.

From there, you can access the on-line catalog via the link "CAD files: Select individual types" in the right navigation bar. The menu "Ball screw assemblies" on the left brings you to the desired goal.

Data can be input in two ways. In the default mode, "Configuration of options", the dialog is supported by meaningful default settings to minimize input errors. The "Expert configuration" mode allows much more rapid input of data, but requires a certain amount of experience. When the dialogue is completed, a click on the "CAD-Model" button leads to a further dialog box asking for input of the e-mail address for electronic transmission of the drawing to the user.

Registered customers based in Germany can use further eShop functions such as the shopping cart, the inquiry list and order status and can receive direct offers for the inquired precision ball screw assemblies or check the delivery status of current orders.

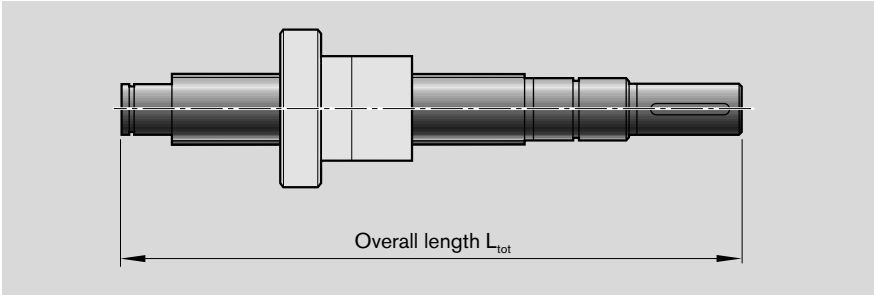


The ordering data given on page 20 covers all the parameters of a precision ball screw assembly. Once you have defined the nominal diameter and lead and entered the total length, the functionality guides you through a succession of dialog boxes allowing you to select the desired options.

Nominal diameters, leads

		Lead P										
		1	2	2,5	5	10	12	16	20	25	32	40
Nominal diameter d_o	6											
	8											
	12											
	16											
	20											
	25											
	32											
	40											
	50											
	63											
	80											

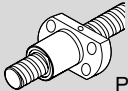
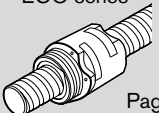
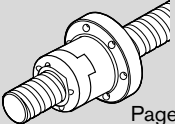
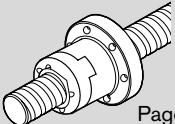
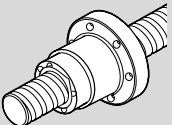
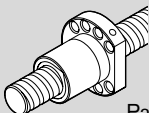
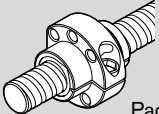
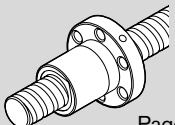
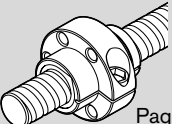
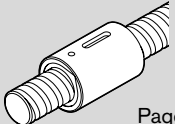
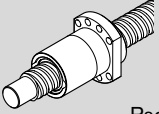
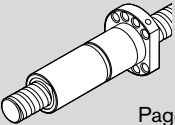
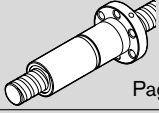
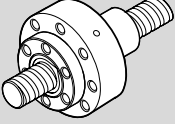
Overall length L_{tot} of a precision ball screw assembly



Inquiries and Orders

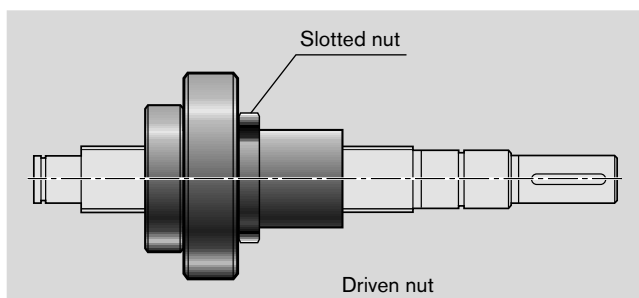
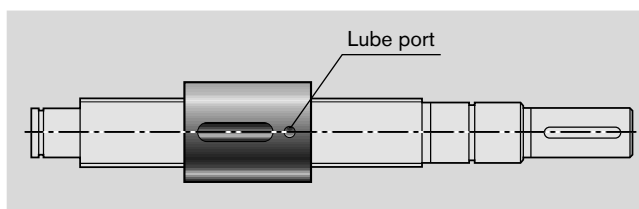
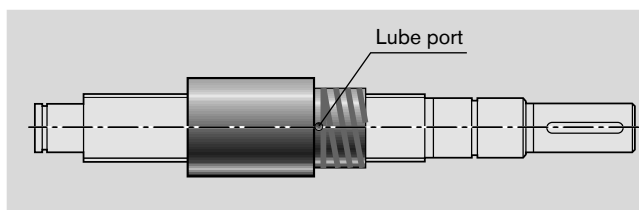
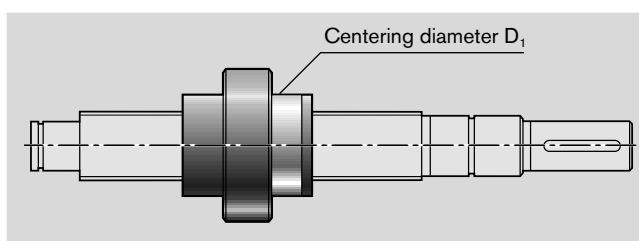
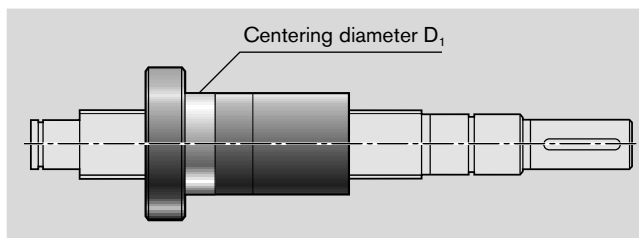
Nut type

The various series versions and forms are shown below.

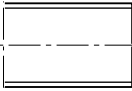
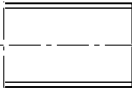
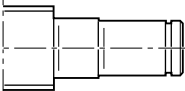
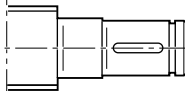
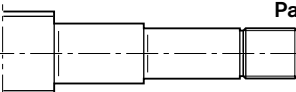
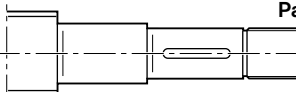
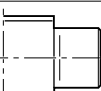
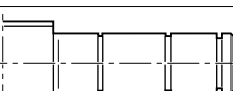
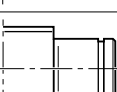

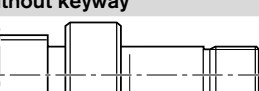

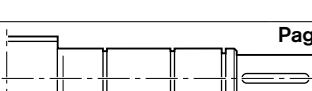








FEM-E-B Single nut with flange Miniature series  Page 22	ZEV-E-S Screw-in nut ECO series  Page 24
FBZ-E-S Single nut with flange ECO series  Page 26	FSZ-E-S Single nut with flange ECOplus series  Page 28
FEP-E-S Single nut with flange Speed series  Page 30	FEM-E-C Single nut with flange DIN 69 051, Part 5 Standard series  Page 32
SEM-E-C Adjustable-preload single nut, DIN 69 051, Part 5 Standard series  Page 34	FEM-E-S Single nut with flange Standard series  Page 36
SEM-E-S Adjustable-preload single nut, Standard series  Page 38	ZEM-E-S Cylindrical single nut Standard series  Page 40
2-start FED-E-B single nut with flange  Page 42	FDM-E-C Double nut with flange DIN 69 051, Part 5 Standard series  Page 44
FDM-E-S Double nut with flange Standard series  Page 46	
FAR-B-S For driven nuts, please refer to catalog R310EN 3304	

Mounting direction of nut types

Definition: The centering diameter on a nut with flange, the slotted nut on a driven nut and the lube bore on a cylindrical nut points to the right end of the screw.

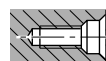


Screw ends, forms for a left or right screw end

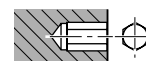
Basic version		With keyway	Cut to size only "T"
00	 Page 56		00  Page 56
01	 Page 58	02  Page 58	
11	 Page 60	12  Page 60	
21	 Page 62		
31	 Page 64		
41	 Page 66		
51	 Page 68		End mechanically connected with/without keyway 53  Page 68
61	 Page 70	62  Page 70	
71	 Page 72	72  Page 72	
81	 Page 74	82  Page 74	83  Page 76
91	 Page 78	92  Page 78	93  Page 80 94

Machining of end face

Z Centering hole DIN 332-D



S Hex socket



Inquiries and Orders

Ordering Code

Complete ball screw assembly with screw and nut

Precision Ball Screw Assembly	SEM-E-S	20 x 5R x 3-4	1	2	T7	R	81Z120	41Z120	1250	1	1
Nut type FEM-E-B Single nut with flange Miniature series ZEV-E-S Screw-in nut ECO series FBZ-E-S Single nut with flange ECO series FSZ-E-S Single nut with flange ECOplus series FEP-E-S Single nut with flange Speed series FEM-E-C Single nut with flange per DIN 69 051, Part 5 FEM-E-S Single nut with flange, Rexroth mounting dimensions SEM-E-C Adjustable-preload single nut per DIN 69 051, Part 5 SEM-E-S Adjustable-preload single nut, Rexroth mounting dim. ZEM-E-S Cylindrical single nut, Rexroth mounting dimensions FED-E-B 2-start single nut with flange FDM-E-C Double nut with flange per DIN 69 051, Part 5 FDM-E-S Double nut with flange, Rexroth mounting dimensions											
Size Nominal diameter (mm) — — — — — Lead (mm) - - - - - Direction of lead R ... right, L ... left — Ball diameter (mm) — — — — — Number of ball track turns in the nut - - - - -											
Seal 0 ... none 1 ... standard seal		2 ¹⁾ ... reinforced seal									
Preload 0 ... standard backlash 1 ... reduced backlash 2 ²⁾ ... 5% (single nut) 3 ... 2% (single nut) standard		4 ... 10% (double nut) 5 ... 7% (double nut) 6 ... 3% (single nut)									
Precision T5, T7, T9 (T3 available upon request)											
Screw R ... precision-rolled screw											
Left screw end Form — — — — — Option - - - - - Version — — — — —		Z ... centering per DIN 332-D - - - - - S ... hex socket - - - - - K ... none - - - - -									
Right screw end see left screw end											
Overall length L_{tot} (mm)											
Documentation 0 ... standard (acceptance test report) — is always supplied 1 ... lead test report		2 ... torque test report 3 ... lead and torque test report									
Lubrication 0 ... preserved		1 ... preserved and nut with basic greasing									

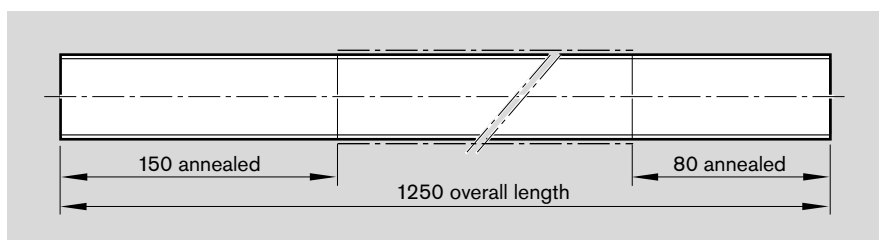
1) only for d_o 25 to 40; note higher frictional torque!2) only for d_o 16 to 80**Order form:** see page 131.**Note:** It is also possible to process inquiries based on a customer's drawings.

For screws supplied separately; cut to size only "T"

Screw	SN	20 x 5R x 3	X	X	T7	R	00T200	00T200	1250	0	0
Screw designation											
Size	Nominal diameter (mm) — — — — —	20									
	Lead (mm) - - - - -	5									
	Direction of lead R ... right, L ... left — — — — —	R									
	Ball diameter (mm) — — — — —	3									
Seal	X ... not possible										
Preload	X ... not possible										
Precision	T5, T7, T9										
Screw	R ... precision-rolled screw										
Left screw end	Form — — — — —										
	Option - - - - - T ... cut to size only - - - - -										
	Version — — — — —										
Right screw end	see left screw end										
Overall length L_{tot} (mm)											
Documentation	0 ... standard (acceptance test report)										
	1 ... lead test report										
Lubrication	0 ... preserved										

For separately supplied screws with annealed ends (special servicing cases)

For special servicing cases involved precision-rolled screw SN-R with annealed ends, please consult us.



Order form: see page 131.

Note: It is also possible to process inquiries based on a customer's drawings.

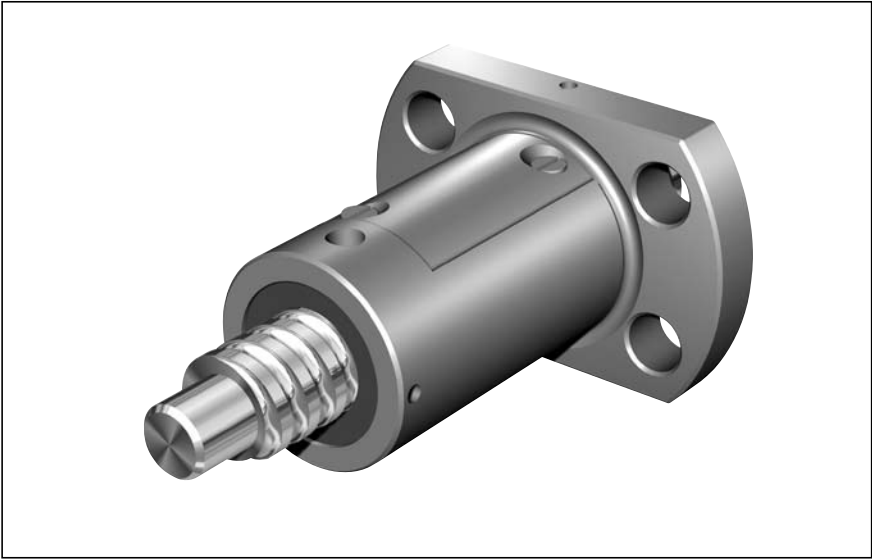
Nuts

Miniature Single Nut with Flange FEM-E-B

Miniature series
Rexroth mounting dimensions
Flange type B

With seals
With backlash or reduced backlash
For precision-rolled screws SN-R
of tolerance grade T5, T7

Supplied only as complete ball screw
assembly.

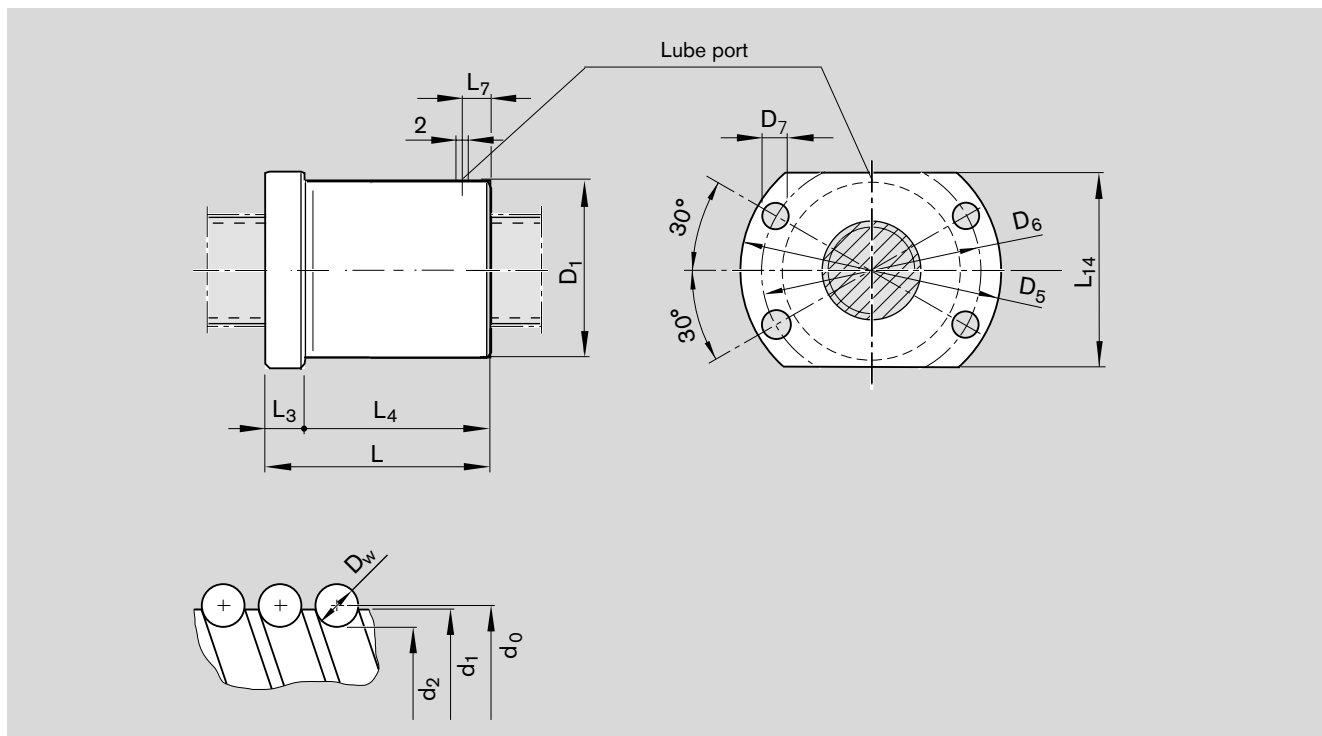


d_0 = nominal diameter
 P = lead
(R = right-hand, L = left-hand)
 D_w = ball diameter
 i = number of ball track turns

Ordering code: **FEM-E-B** **6 x 2R x 0.8-4** **1** **1** **T7** **R** **83K060** **41K050** **250** **0** **1**

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C ₀ (N)	
A	6 x 1R x 0.8 - 4	R1532 100 06	900	1290	3
A	6 x 2R x 0.8 - 4	R1532 120 06	890	1280	6
A	8 x 1R x 0.8 - 4	R1532 200 06	1020	1740	3
A	8 x 2R x 1.2 - 4	R1532 220 06	1870	2760	6
A	8 x 2.5R x 1.588 - 3	R1532 230 06	2200	2800	15
A	12 x 2R x 1.2 - 4	R1532 420 06	2240	4160	12
A	12 x 5R x 2 - 3	R1532 460 06	3800	5800	30
A	12 x 10R x 2 - 2	R1532 490 06	2500	3600	60

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}



Size	Dimensions (mm)											Weight
$d_0 \times P \times D_w - i$	d_1	d_2	D_1 g6	D_5	D_6	D_7	L	L_3	L_4	L_7	L_{14}	m (kg)
6 x 1R x 0.8 - 4	6.0	5.3	12	24	18	3.4	19.5	3.5	16	3.5	16	0.020
6 x 2R x 0.8 - 4	6.0	5.3	12	24	18	3.4	22.5	3.5	19	3.0	16	0.020
8 x 1R x 0.8 - 4	8.0	7.3	16	28	22	3.4	22.0	6.0	16	3.5	19	0.035
8 x 2R x 1.2 - 4	8.0	7.0	16	28	22	3.4	25.0	6.0	19	3.0	19	0.050
8 x 2.5R x 1.588 - 3	7.5	6.3	16	28	22	3.4	16.0	6.0	10	3.0	19	0.030
12 x 2R x 1.2 - 4	11.7	10.8	20	37	29	4.5	19.0	8.0	11	2.5	24	0.055
12 x 5R x 2 - 3	11.4	9.9	22	37	29	4.5	28.0	8.0	20	6.0	24	0.075
12 x 10R x 2 - 2	11.4	9.9	22	37	29	4.5	33.0	8.0	25	8.0	24	0.085

Nuts

Screw-in Nut ZEV-E-S

ECO series
Rexroth mounting dimensions

Without seals (no initial greasing)
Seals available on request
With backlash
For precision-rolled screws SN-R
of tolerance grade T7, T9

Supplied only as complete ball screw
assembly.

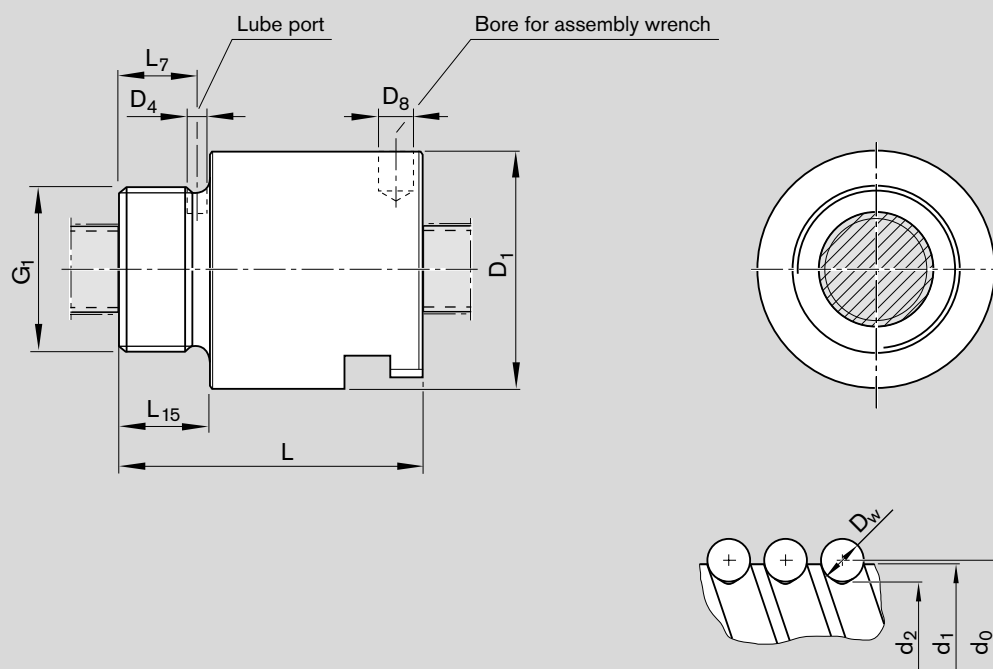


d_o = nominal diameter
 P = lead
(R = right-hand, L = left-hand)
 D_w = ball diameter
 i = number of ball track turns

Ordering code: **ZEV-E-S** **20 x 5R x 3-4** **0** **0** **T7** **R** **81K120** **41K120** **550** **0** **0**

Category	Size $d_o \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C ₀ (N)	
A	12 x 5R x 2 - 3	R2542 430 01	2300	3500	30.0
A	12 x 10R x 2 - 2	R2542 430 11	1500	2200	60.0
A	16 x 5R x 3 - 3	R2542 000 01	5600	7100	25.0
A	16 x 10R x 3 - 3	R2542 000 11	5800	7400	50.0
A	20 x 5R x 3 - 4	R2542 100 01	8600	12900	20.0
A	25 x 5R x 3 - 7	R2542 200 01	15700	29200	16.0
A	25 x 10R x 3 - 5	R2542 200 11	11500	20500	32.0
A	32 x 5R x 3.5 - 5	R2542 300 01	15800	30400	12.5
A	32 x 10R x 3.969 - 5	R2542 300 11	19000	34700	25.0

1) See page 101 Characteristic speed $d_o \cdot n$ and page 124 Critical speed n_{cr}



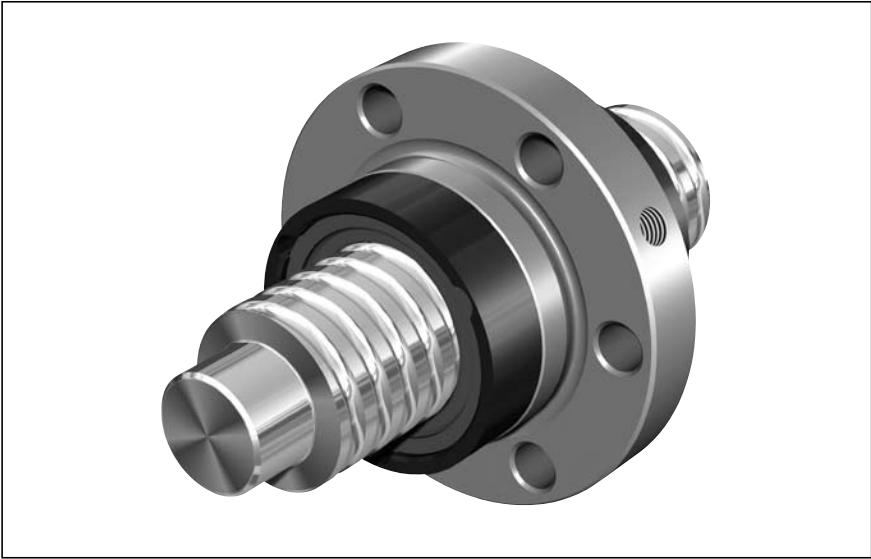
Size	Dimensions (mm)									Max. backlash (mm)	Weight m (kg)
	d_1	d_2	D_1 h10	D_4	D_8	G_1	L ± 0.3	L_7	L_{15}		
$d_0 \times P \times D_w - i$											
12 x 5R x 2 - 3	11.4	9.9	25.5	2.7	3.2	M20 x 1.0	36	8.5	10	0.1	0.09
12 x 10R x 2 - 2	11.4	9.9	25.5	2.7	3.2	M20 x 1.0	40	8.5	10	0.1	0.10
16 x 5R x 3 - 3	15.0	12.9	32.5	2.7	4.2	M26 x 1.5	40	10.5	12	0.1	0.14
16 x 10R x 3 - 3	15.0	12.9	32.5	2.7	4.2	M26 x 1.5	54	10.5	12	0.1	0.21
20 x 5R x 3 - 4	19.0	16.9	38.0	2.7	8.0	M35 x 1.5	50	12.5	14	0.1	0.25
25 x 5R x 3 - 7	24.0	21.9	43.0	1.5	8.0	M40 x 1.5	60	17.5	19	0.1	0.36
25 x 10R x 3 - 5	24.0	21.9	43.0	2.0	8.0	M40 x 1.5	74	17.7	19	0.1	0.45
32 x 5R x 3.5 - 5	31.0	28.4	54.0	2.7	8.0	M48 x 1.5	69	17.5	19	0.1	0.58
32 x 10R x 3.969 - 5	31.0	27.9	54.0	2.7	8.0	M48 x 1.5	95	17.5	19	0.1	0.88

Nuts

Single Nut with Flange and Recirculation Caps FBZ-E-S

ECO series
Rexroth mounting dimensions

With seals
With backlash
For precision-rolled screws SN-R
of tolerance grade T7, T9

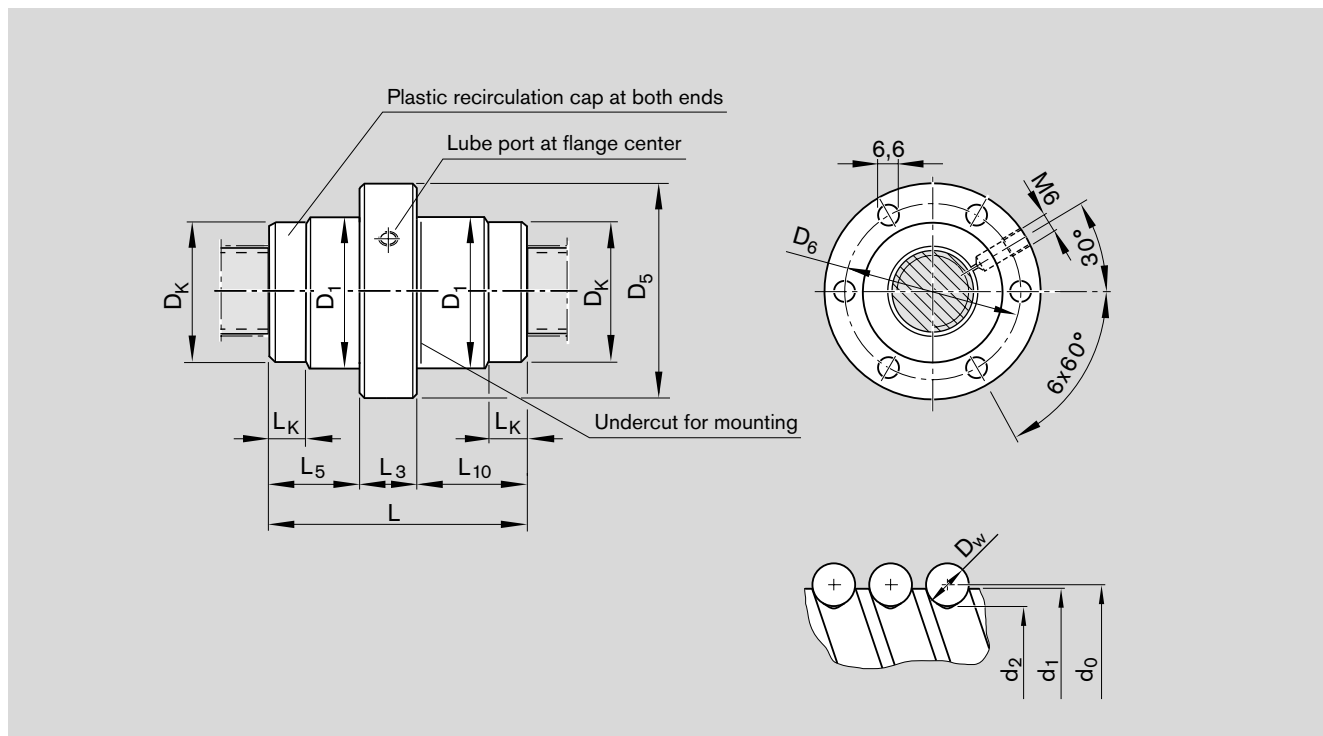


d_0 = nominal diameter
 P = lead
(R = right-hand, L = left-hand)
 D_w = ball diameter
 i = number of ball track turns

Ordering code: **FBZ-E-S** **20 x 5R x 3-4** **1** **0** **T9** **R** **81K120** **41K120** **550** **0** **1**

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C ₀ (N)	
B	20 x 5R x 3 - 4	R2542 100 02	8600	12900	20
B	25 x 5R x 3 - 4	R2542 200 02	9500	16300	16
B	25 x 10R x 3 - 4	R2542 200 12	9400	16200	32
B	32 x 5R x 3.5 - 4	R2542 300 02	13000	24000	13
B	32 x 10R x 3.969 - 5	R2542 300 12	19000	35000	25

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}



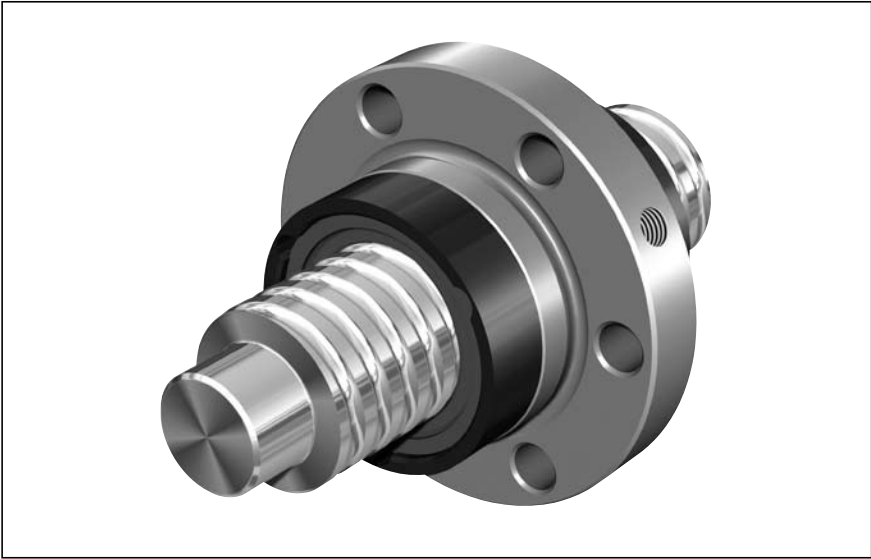
Size	Dimensions (mm)											Max. backlash (mm)	Weight m (kg)
$d_0 \times P \times D_w - i$	d_1	d_2	$D_1 - 0.2$	D_5	D_6	D_K	L	L_3	$L_5 \pm 0.5$	L_{10}	L_K		
20 x 5R x 3 - 4	19	16.9	33	58	45	32.5	40	10	15.0	15.0	8.5	0.1	0.22
25 x 5R x 3 - 4	24	21.9	38	63	50	37.5	43	10	16.5	16.5	10.0	0.1	0.25
25 x 10R x 3 - 4	24	21.9	38	63	50	37.5	62	10	16.0	36.0	10.0	0.1	0.34
32 x 5R x 3.5 - 4	31	28.4	48	73	60	47.5	46	12	17.0	17.0	11.0	0.1	0.41
32 x 10R x 3.969 - 5	31	27.9	48	73	60	47.5	77	12	20.0	45.0	11.0	0.1	0.63

Nuts

Single Nut with Flange and Recirculation Caps FSZ-E-S

ECOplus series
Rexroth mounting dimensions

ECOplus load ratings in accordance with Standard series (see page 36)
With seals
With backlash, reduced backlash, preload 2%; 3%; 5%
For precision-rolled screws SN-R of tolerance grade T5, T7, T9

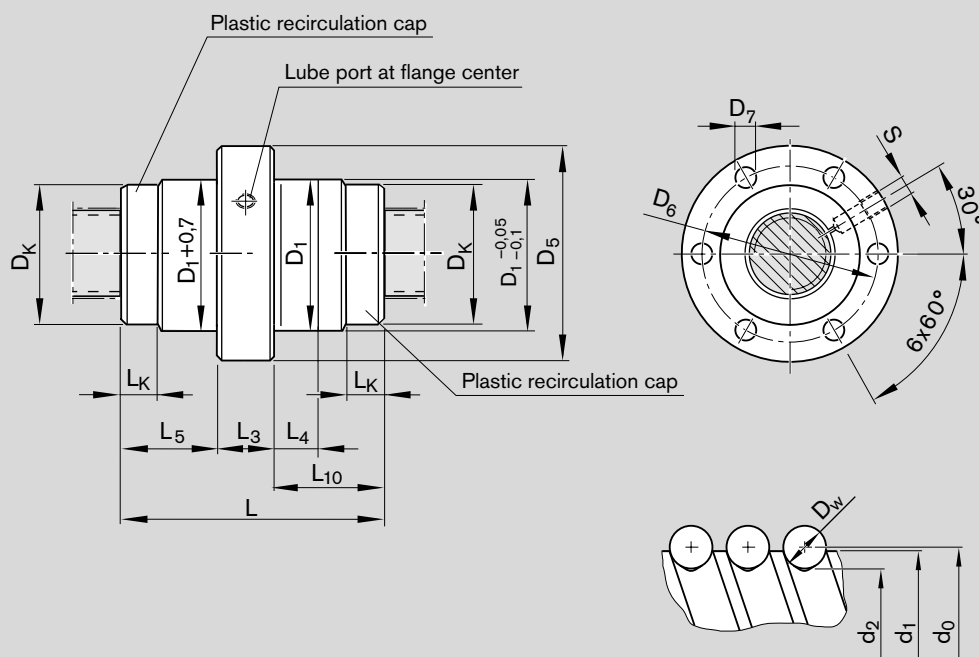


d_0 = nominal diameter
 P = lead
(R = right-hand, L = left-hand)
 D_w = ball diameter
 i = number of ball track turns

Ordering code: **FSZ-E-S** **20 x 5R x 3-4** **1** **0** **T7** **R** **81K120** **41K120** **550** **0** **1**

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C ₀ (N)	
A	20 x 5R x 3 - 4	R1502 110 41	14300	21500	30
A	25 x 5R x 3 - 4	R1502 210 41	15900	27200	30
A	25 x 10R x 3 - 4	R1502 240 41	15700	27000	60
A	32 x 5R x 3.5 - 4	R1502 310 41	21600	40000	23
A	32 x 10R x 3.969 - 5	R1502 340 41	31700	58300	47
A	32 x 20R x 3.969 - 2	R1502 370 41	13500	21800	94
A	40 x 5R x 3.5 - 5	R1502 410 41	29100	64100	19
A	40 x 10R x 6 - 4	R1502 440 41	50000	86400	38
A	40 x 20R x 6 - 3	R1502 470 41	37900	62800	75

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}



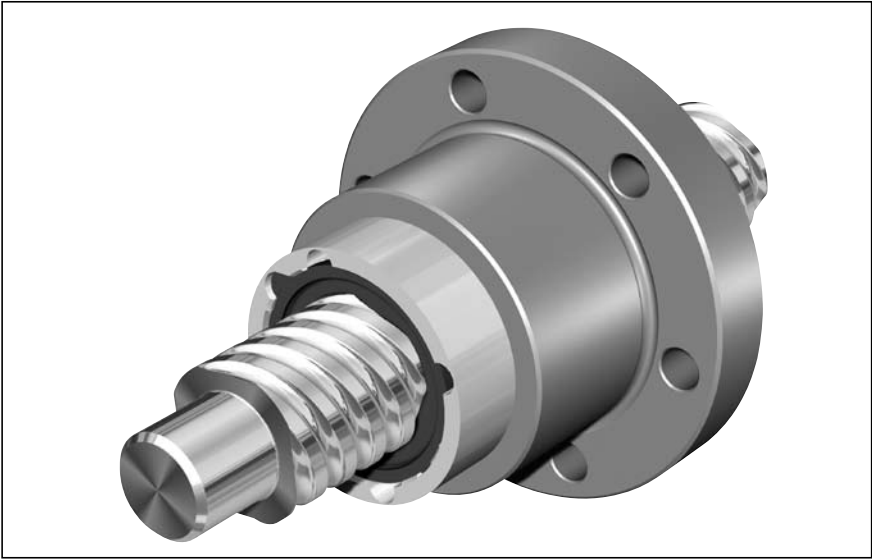
Size	Dimensions (mm)														Weight m (kg)
	d_1	d_2	D_1 g6	D_5	D_6	D_7	D_K	L ± 0.5	L_3	L_4	L_5	L_{10}	L_K	S	
$d_0 \times P \times D_w - i$															
20 x 5R x 3 - 4	19	16.9	33	58	45	6.6	32.5	40	10	6	15.0	15.0	8.5	M6	0.22
25 x 5R x 3 - 4	24	21.9	38	63	50	6.6	37.5	43	10	6	16.5	16.5	10.0	M6	0.25
25 x 10R x 3 - 4	24	21.9	38	63	50	6.6	37.5	62	10	16	16.0	36.0	10.0	M6	0.34
32 x 5R x 3.5 - 4	31	28.4	48	73	60	6.6	47.5	46	12	6	17.0	17.0	11.0	M6	0.41
32 x 10R x 3.969 - 5	31	27.9	48	73	60	6.6	47.5	77	12	16	20.0	45.0	11.0	M6	0.63
32 x 20R x 3.969 - 2	31	27.9	56	80	68	6.6	47.5	65	12	10	19.0	34.0	11.0	M6	0.69
40 x 5R x 3.5 - 5	39	36.4	56	80	68	6.6	55.5	52	14	8	18.5	19.5	11.5	M8x1	0.54
40 x 10R x 6 - 4	38	33.8	63	95	78	9.0	62.5	71	14	16	22.0	35.0	12.5	M8x1	1.06
40 x 20R x 6 - 3	38	33.8	63	95	78	9.0	62.5	89	14	25	22.0	53.0	12.5	M8x1	1.30

Nuts

Single Nut with Flange and Recirculation Caps FEP-E-S

Speed series
Rexroth mounting dimensions

With seals
With backlash, reduced backlash
or preload 2%
For precision-rolled screws SN-R
(4-start) of tolerance grade T5, T7, T9

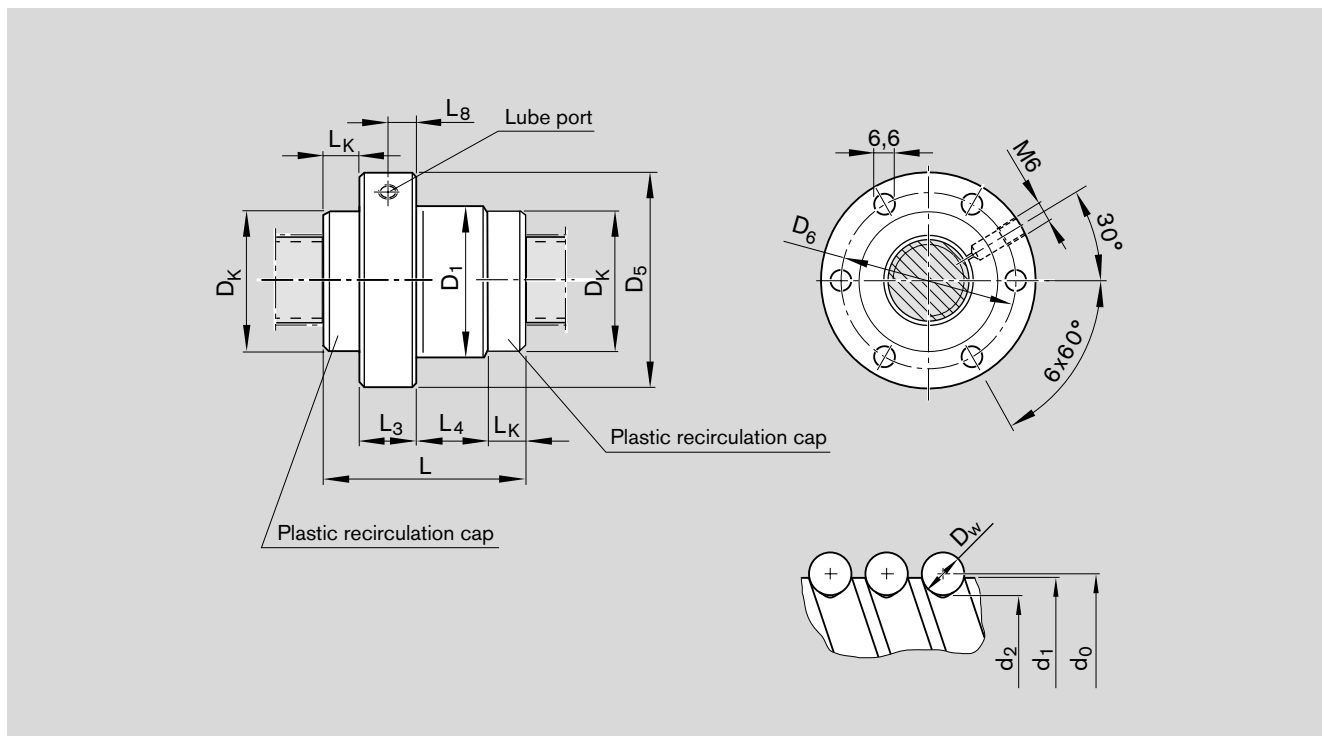


d_o = nominal diameter
 P = lead
(R = right-hand, L = left-hand)
 D_w = ball diameter
 i = a x b
"a" Bearing turns per thread
"b" Number of bearing threads
on the screw

Ordering code: **FEP-E-S** **25 x 25R x 3.5-1.2x4** **1** **0** **T5** **R** **81K120** **41K120** **1100** **0** **1**

Category	Size $d_o \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C ₀ (N)	
A	20 x 40R x 3.5 - 1 x 4	R2522 100 11	14000	26200	240
A	25 x 25R x 3.5 - 1.2 x 4	R2522 200 01	19700	39400	120
A	32 x 32R x 3.969 - 1.2 x 4	R2522 300 01	26300	57600	120

1) See page 101 Characteristic speed $d_o \cdot n$ and page 124 Critical speed n_{cr}



Size	Dimensions (mm)											Weight m (kg)
	d ₁	d ₂	D ₁ g6	D ₅	D ₆	D _K	L ±0.5	L ₃	L ₄	L ₈	L _K	
d ₀ x P x D _w - i												
20 x 40R x 3.5 - 1 x 4	19	16.4	38	63	50	37.5	57	12	23	8.0	11	0.51
25 x 25R x 3.5 - 1.2 x 4	24	21.4	48	73	60	40.0	52	12	14	5.0	13	0.51
32 x 32R x 3.969 - 1.2 x 4	31	27.9	56	80	68	50.0	68	15	21	7.7	16	0.78

Nuts

Single Nut with Flange FEM-E-C

Standard series

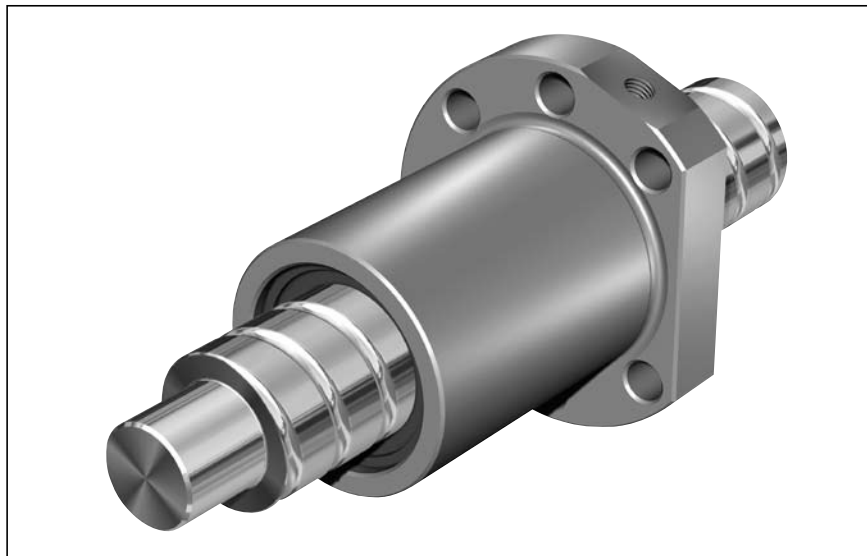
Mounting dimensions
per DIN 69 051, Part 5
Flange type C

With standard seals

Reinforced seals, see page 112

With backlash, reduced backlash,
preload 2%; 3%; 5%

For precision-rolled screws SN-R
of tolerance grade T5, T7, T9



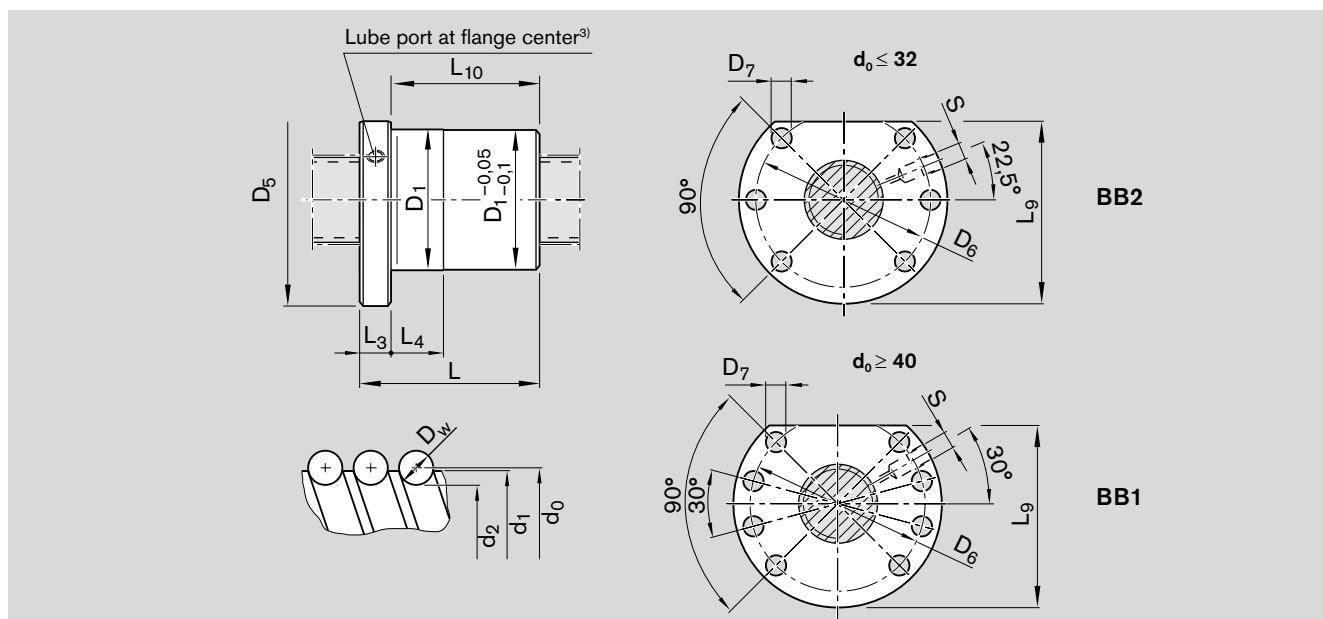
Ordering code: **FEM-E-C** 20 x 5R x 3-4 1 2 T7 R 82Z120 41Z120 1250 0 1

d_0 = nominal diameter
P = lead
(R = right-hand, L = left-hand)
 D_w = ball diameter
i = number of ball track turns

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C_0 (N)	
A	16 x 5R x 3 - 4	R1502 010 65	12300	16100	30
A	16 x 10R x 3 - 3	R1502 040 85	9600	12300	60
A	16 x 16R x 3 - 3	R1502 060 65	9300	12000	96
A	20 x 5R x 3 - 4	R1502 110 85	14300	21500	30
A	20 x 20R x 3.5 - 3	R1502 170 65	13300	18800	120
A	25 x 5R x 3 - 4	R1502 210 85	15900	27200	30
A	25 x 10R x 3 - 4	R1502 240 85	15700	27000	60
A	25 x 25R x 3.5 - 3	R1502 280 65	14700	23300	150
A	32 x 5R x 3.5 - 4	R1502 310 85	21600	40000	23
A	32 x 10R x 3.969 - 5	R1502 340 86	31700	58300	47
A	32 x 20R x 3.969 - 3	R1502 370 65	19700	33700	94
A	32 x 32R x 3.969 - 3	R1502 390 65	19500	34000	150
B	40 x 5R x 3.5 - 5	R1502 410 86	29100	64100	19
A	40 x 10R x 6 - 4	R1502 440 85	50000	86400	38
C	40 x 12R x 6 - 4	R1502 450 65	49900	86200	45
A	40 x 16R x 6 - 4	R1502 460 65	49700	85900	60
A	40 x 20R x 6 - 3	R1502 470 85	37900	62800	75
A	40 x 40R x 6 - 3	R1502 490 65	37000	62300	150
B	50 x 5R x 3.5 - 5	R1502 510 86	32000	81300	15
A	50 x 10R x 6 - 6	R1502 540 86	79700	166500	30
C	50 x 12R x 6 - 6	R1502 550 66	79600	166400	36
B	50 x 16R x 6 - 6	R1502 560 66	79400	166000	48
A	50 x 20R x 6.5 - 5	R1502 570 86	75700	149700	60
B	50 x 40R x 6.5 - 3	R1502 590 65	46500	85900	120
B	63 x 10R x 6 - 6	R1502 640 86	88800	214300	24
B	63 x 20R x 6.5 - 5	R1502 670 86	83900	190300	48
C	63 x 40R x 6.5 - 3	R1502 690 65	53400	114100	95
C	80 x 10R x 6.5 - 6	R1502 740 86	108400	291700	19
B	80 x 20R x 12.7 - 6 ²⁾	R1502 770 96	262700	534200	30

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}

2) Nuts 80 x 20R x 12.7 - 6 available up to a thread length of 2500 mm, with preload



Size	Dimensions (mm)												S ³⁾	Weight m (kg)
d ₀ x P x D _w - i	d ₁	d ₂	D ₁ g6	D ₅	Hole pattern	D ₆	D ₇	L	L ₃	L ₄	L ₉	L ₁₀		
16 x 5R x 3 - 4	15.0	12.9	28	48	BB2	38	5.5	38	12	10	44.0	26	M6	0.19
16 x 10R x 3 - 3	15.0	12.9	28	48	BB2	38	5.5	45	12	16	44.0	33	M6	0.21
16 x 16R x 3 - 3	15.0	12.9	28	48	BB2	38	5.5	61	12	20	44.0	49	M6	0.26
20 x 5R x 3 - 4	19.0	16.9	36	58	BB2	47	6.6	40	12	10	51.0	28	M6	0.31
20 x 20R x 3.5 - 3	19.3	16.7	36	58	BB2	47	6.6	77	12	25	51.0	65	M6	0.49
25 x 5R x 3 - 4	24.0	21.9	40	62	BB2	51	6.6	45	12	10	55.0	33	M6	0.36
25 x 10R x 3 - 4	24.0	21.9	40	62	BB2	51	6.6	64	12	16	55.0	52	M6	0.47
25 x 25R x 3.5 - 3	24.0	21.4	40	62	BB2	51	6.6	95	12	30	55.0	83	M6	0.63
32 x 5R x 3.5 - 4	31.0	28.4	50	80	BB2	65	9.0	48	13	10	71.0	35	M6	0.62
32 x 10R x 3.969 - 5	31.0	27.9	50	80	BB2	65	9.0	77	13	16	71.0	64	M6	0.84
32 x 20R x 3.969 - 3	31.0	27.9	50	80	BB2	65	9.0	84	13	25	71.0	71	M6	0.90
32 x 32R x 3.969 - 3	31.0	27.9	50	80	BB2	65	9.0	120	13	40	71.0	107	M6	1.21
40 x 5R x 3.5 - 5	39.0	36.4	63	93	BB1	78	9.0	54	15	10	81.5	39	M8x1	1.03
40 x 10R x 6 - 4	38.0	33.8	63	93	BB1	78	9.0	70	15	16	81.5	55	M8x1	1.19
40 x 12R x 6 - 4	38.0	33.8	63	93	BB1	78	9.0	75	15	25	81.5	60	M8x1	1.27
40 x 16R x 6 - 4	38.0	33.8	63	93	BB1	78	9.0	90	15	25	81.5	75	M8x1	1.51
40 x 20R x 6 - 3	38.0	33.8	63	93	BB1	78	9.0	88	15	25	81.5	73	M8x1	1.44
40 x 40R x 6 - 3	38.0	33.8	63	93	BB1	78	9.0	142	15	45	81.5	127	M8x1	2.16
50 x 5R x 3.5 - 5	49.0	46.4	75	110	BB1	93	11.0	54	15	10	97.5	39	M8x1	1.39
50 x 10R x 6 - 6	48.0	43.8	75	110	BB1	93	11.0	90	18	16	97.5	72	M8x1	2.14
50 x 12R x 6 - 6	48.0	43.8	75	110	BB1	93	11.0	105	18	25	97.5	87	M8x1	2.38
50 x 16R x 6 - 6	48.0	43.8	75	110	BB1	93	11.0	128	18	25	97.5	110	M8x1	2.75
50 x 20R x 6.5 - 5	48.0	43.4	75	110	BB1	93	11.0	132	18	25	97.5	114	M8x1	2.73
50 x 40R x 6.5 - 3	48.0	43.4	75	110	BB1	93	11.0	149	18	45	97.5	131	M8x1	3.04
63 x 10R x 6 - 6	61.0	56.8	90	125	BB1	108	11.0	90	22	16	110.0	68	M8x1	2.56
63 x 20R x 6.5 - 5	61.0	56.4	95	135	BB1	115	13.5	132	22	25	117.5	110	M8x1	4.51
63 x 40R x 6.5 - 3	61.0	56.4	95	135	BB1	115	13.5	149	22	45	117.5	127	M8x1	5.04
80 x 10R x 6.5 - 6	78.0	73.3	105	145	BB1	125	13.5	95	22	16	127.5	73	M8x1	3.40
80 x 20R x 12.7 - 6	76.0	67.0	125	165	BB1	145	13.5	170	25	25	147.5	145	M8x1	10.20

3) Lube port machining: flat surface $L_3 \leq 13$ mm, countersink $L_3 > 14$ mm

Nuts

Adjustable-Preload Single Nut SEM-E-C

Standard series

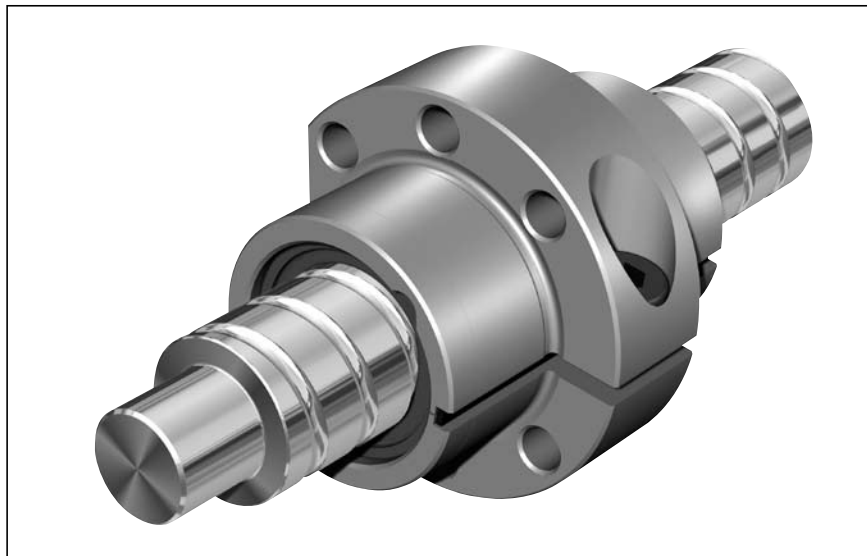
Mounting dimensions
per DIN 69 051, Part 5
Flange type C

With standard seals

Reinforced seals, see page 112

Adjustable preload

For precision-rolled screws SN-R
of tolerance grade T5, T7



d_0 = nominal diameter

P = lead

(R = right-hand, L = left-hand)

D_w = ball diameter

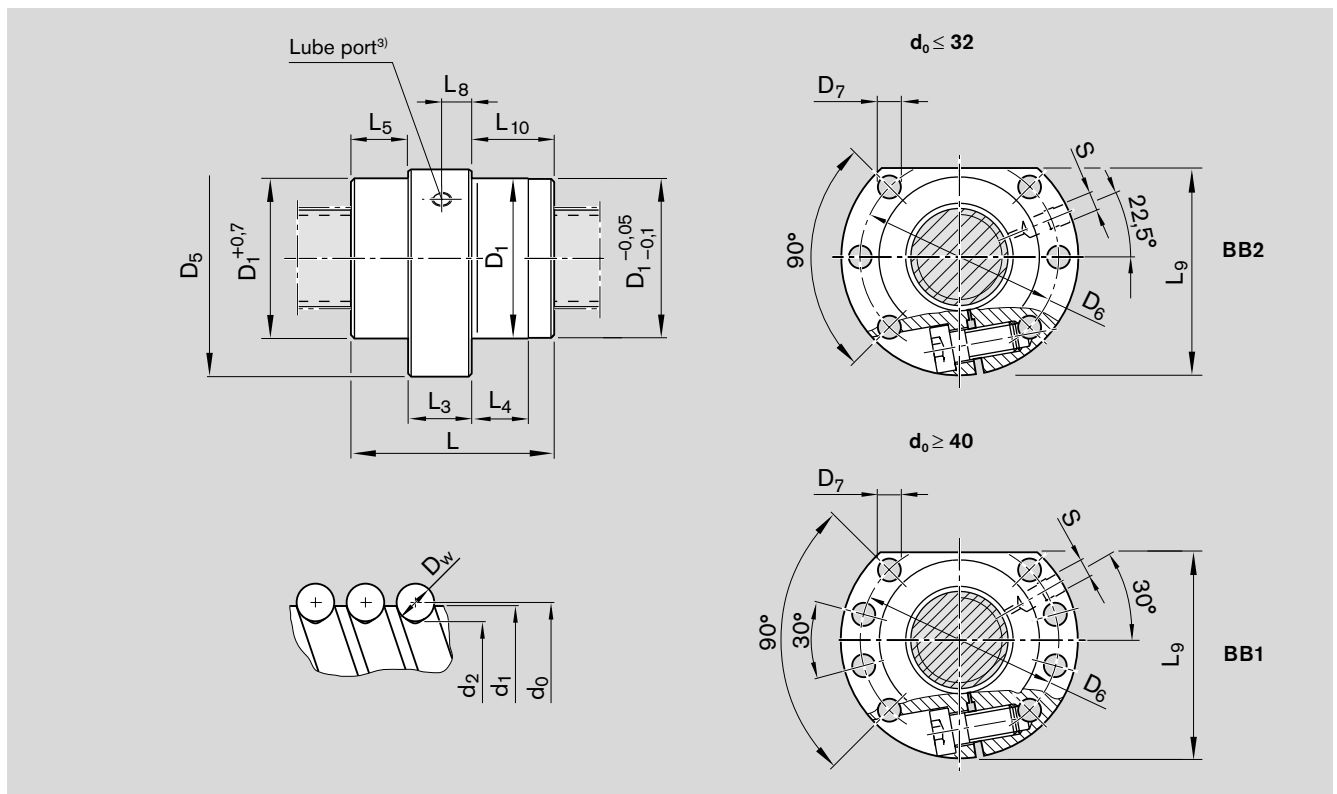
i = number of ball track turns

Ordering code: **SEM-E-C** **20 x 5R x 3-4** **1** **2** **T7** **R** **82Z120** **41Z120** **1250** **0** **1**

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)	Centering diameter D_1 after adjustment	
			dyn. C (N)	stat. C_0 (N)		min. (mm)	max. (mm)
B	16 x 5R x 3 - 4	R1512 010 55	12300	16100	30	27.940	27.975
C	16 x 10R x 3 - 3	R1512 040 75	9600	12300	60	27.940	27.975
C	16 x 16R x 3 - 3	R1512 060 55	9300	12000	96	27.950	27.978
B	20 x 5R x 3 - 4	R1512 110 75	14300	21500	30	35.935	35.970
B	20 x 20R x 3.5 - 3	R1512 170 55	13300	18800	120	35.945	35.973
B	25 x 5R x 3 - 4	R1512 210 75	15900	27200	30	39.935	39.970
B	25 x 10R x 3 - 4	R1512 240 75	15700	27000	60	39.935	39.970
C	25 x 25R x 3.5 - 3	R1512 280 55	14700	23300	150	39.945	39.973
B	32 x 5R x 3.5 - 4	R1512 310 75	21600	40000	23	49.935	49.970
B	32 x 10R x 3.969 - 5	R1512 340 75	31700	58300	47	49.935	49.970
C	32 x 20R x 3.969 - 3	R1512 370 55	19700	33700	94	49.945	49.973
B	32 x 32R x 3.969 - 3	R1512 390 55	19500	34000	150	49.945	49.973
B	40 x 5R x 3.5 - 5	R1512 410 75	29100	64100	19	62.931	62.966
B	40 x 10R x 6 - 4	R1512 440 75	50000	86400	38	62.931	62.966
C	40 x 12R x 6 - 4	R1512 450 55	49900	86200	45	62.931	62.966
B	40 x 20R x 6 - 3	R1512 470 75	37900	62800	75	62.941	62.969
B	40 x 40R x 6 - 3	R1512 490 55	37000	62300	150	62.941	62.969
C	50 x 5R x 3.5 - 5	R1512 510 75	32000	81300	15	74.931	74.966
B	50 x 10R x 6 - 6	R1512 540 75	79700	166500	30	74.931	74.966
C	50 x 12R x 6 - 6	R1512 550 55	79600	166400	36	74.931	74.966
B	50 x 20R x 6.5 - 5	R1512 570 76	75700	149700	60	74.941	74.969
B	50 x 40R x 6.5 - 3	R1512 590 55	46500	85900	120	74.941	74.969
B	63 x 10R x 6 - 6	R1512 640 75	88800	214300	24	89.926	89.961
B	63 x 20R x 6.5 - 5	R1512 670 76	83900	190300	48	94.936	94.964
C	63 x 40R x 6.5 - 3	R1512 690 55	53400	114100	95	94.936	94.964
C	80 x 10R x 6.5 - 6	R1512 740 75	108400	291700	19	104.926	104.961
C	80 x 20R x 12.7 - 6 ²⁾	R1512 770 56	262700	534200	30	124.931	124.959

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}

2) Nuts 80 x 20R x 12.7 - 6 available up to a thread length of 2500 mm, with preload



Size $d_0 \times P \times D_w - i$	Dimensions (mm)															Weight m (kg)
	d_1	d_2	D_1 f9	D_5	Hole pattern	D_6	D_7	L	L_3	L_4	L_5	L_8	L_9	L_{10}	$S^3)$	
16 x 5R x 3 - 4	15.0	12.9	28	48	BB2	38	5.5	38	15	10	11.5	7.1	44.0	11.5	M6	0.20
16 x 10R x 3 - 3	15.0	12.9	28	48	BB2	38	5.5	45	15	15	15.0	11.0	44.0	15.0	M6	0.22
16 x 16R x 3 - 3	15.0	12.9	28	48	BB2	38	5.5	61	15	20	23.0	10.0	44.0	23.0	M6	0.29
20 x 5R x 3 - 4	19.0	16.9	36	58	BB2	47	6.6	40	15	10	12.5	7.1	51.0	12.5	M6	0.33
20 x 20R x 3.5 - 3	19.3	16.7	36	58	BB2	47	6.6	77	20	25	28.5	12.5	51.0	28.5	M6	0.56
25 x 5R x 3 - 4	24.0	21.9	40	62	BB2	51	6.6	45	20	10	12.5	9.5	55.0	12.5	M6	0.43
25 x 10R x 3 - 4	24.0	21.9	40	62	BB2	51	6.6	64	20	16	22.0	10.0	55.0	22.0	M6	0.54
25 x 25R x 3.5 - 3	24.0	21.4	40	62	BB2	51	6.6	95	25	30	35.0	14.0	55.0	35.0	M6	0.77
32 x 5R x 3.5 - 4	31.0	28.4	50	80	BB2	65	9.0	48	20	10	14.0	9.7	71.0	14.0	M6	0.74
32 x 10R x 3.969 - 5	31.0	27.9	50	80	BB2	65	9.0	77	20	16	28.5	12.5	71.0	28.5	M6	0.97
32 x 20R x 3.969 - 3	31.0	27.9	50	80	BB2	65	9.0	84	20	25	32.0	12.5	71.0	32.0	M6	1.04
32 x 32R x 3.969 - 3	31.0	27.9	50	80	BB2	65	9.0	120	20	40	50.0	12.5	71.0	50.0	M6	1.34
40 x 5R x 3.5 - 5	39.0	36.4	63	93	BB1	78	9.0	54	25	10	14.5	12.0	81.5	14.5	M8x1	1.25
40 x 10R x 6 - 4	38.0	33.8	63	93	BB1	78	9.0	70	25	16	22.5	11.8	81.5	22.5	M8x1	1.39
40 x 12R x 6 - 4	38.0	33.8	63	93	BB1	78	9.0	75	25	25	25.0	12.5	81.5	25.0	M8x1	1.47
40 x 20R x 6 - 3	38.0	33.8	63	93	BB1	78	9.0	88	25	25	31.5	16.5	81.5	31.5	M8x1	1.55
40 x 40R x 6 - 3	38.0	33.8	63	93	BB1	78	9.0	142	40	45	51.0	25.0	81.5	51.0	M8x1	2.69
50 x 5R x 3.5 - 5	49.0	46.4	75	110	BB1	93	11.0	54	25	10	14.5	12.0	97.5	14.5	M8x1	1.67
50 x 10R x 6 - 6	48.0	43.8	75	110	BB1	93	11.0	90	30	16	30.0	14.1	97.5	30.0	M8x1	2.46
50 x 12R x 6 - 6	48.0	43.8	75	110	BB1	93	11.0	105	30	25	37.5	15.0	97.5	37.5	M8x1	2.69
50 x 20R x 6.5 - 5	48.0	43.4	75	110	BB1	93	11.0	132	30	25	51.0	20.0	97.5	51.0	M8x1	3.08
50 x 40R x 6.5 - 3	48.0	43.4	75	110	BB1	93	11.0	149	30	45	59.5	18.0	97.5	59.5	M8x1	3.39
63 x 10R x 6 - 6	61.0	56.8	90	125	BB1	108	11.0	90	30	16	30.0	14.0	110.0	30.0	M8x1	2.83
63 x 20R x 6.5 - 5	61.0	56.4	95	135	BB1	115	13.5	132	30	25	51.0	20.0	117.5	51.0	M8x1	4.86
63 x 40R x 6.5 - 3	61.0	56.4	95	135	BB1	115	13.5	149	30	45	59.5	18.0	117.5	59.5	M8x1	5.36
80 x 10R x 6.5 - 6	78.0	73.3	105	145	BB1	125	13.5	95	30	16	32.5	14.0	127.5	32.5	M8x1	3.73
80 x 20R x 12.7 - 6	76.0	67.0	125	165	BB1	145	13.5	170	50	25	60.0	24.0	147.5	60.0	M8x1	13.50

3) Lube port machining: flat surface $L_3 \leq 13$ mm, countersink $L_3 > 14$ mm

Nuts

Single Nut with Flange FEM-E-S

Standard series

Rexroth mounting dimensions

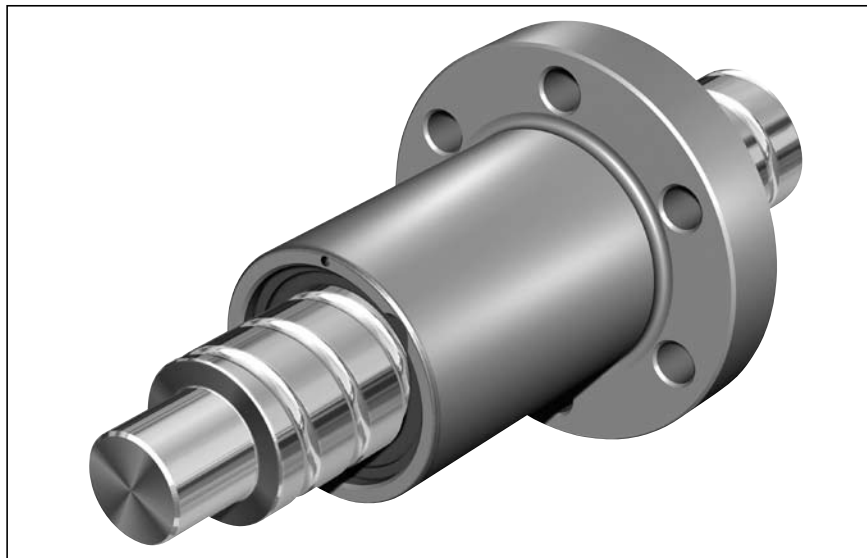
With standard seals

With left-hand thread in some versions

Reinforced seals, see page 112

With backlash, reduced backlash,
preload 2%; 3%; 5%

For precision-rolled screws SN-R
of tolerance grade T5, T7, T9



Ordering code: **FEM-E-S** 20 x 5R x 3-4 1 2 T7 R 82Z120 41Z120 1250 0 1

d_0 = nominal diameter

P = lead

(R = right-hand, L = left-hand)

D_w = ball diameter

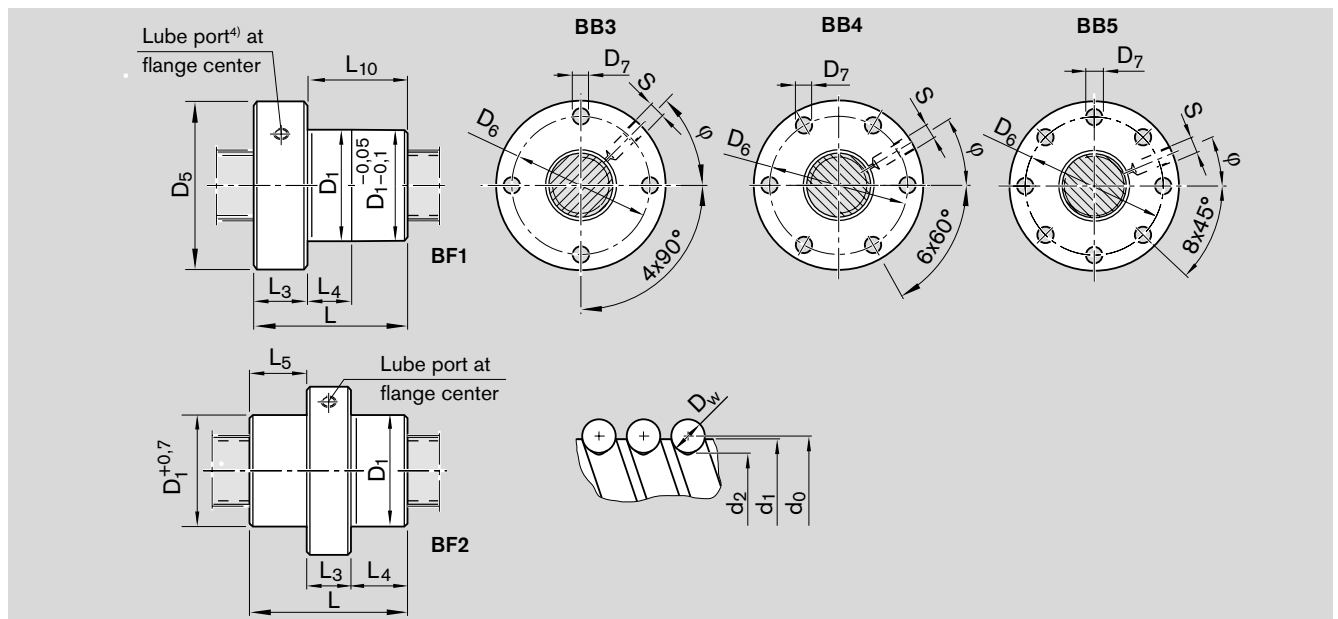
i = number of ball track turns

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C ₀ (N)	
A	8 x 2.5R x 1.588 - 3	R1532 230 03	2200	2800	15
A	12 x 5R x 2 - 3	R1532 460 23	3800	5800	30
B	12 x 10R x 2 - 2	R1532 490 13	2500	3600	60
A	16 x 5R x 3 - 4	R1512 010 23	12300	16100	30
A	16 x 10R x 3 - 3	R1512 040 13	9600	12300	60
B	16 x 16R x 3 - 2	R1512 060 13	6300	7600	96
A ²⁾	20 x 5R x 3 - 4	R1512 110 13	14300	21500	30
B	20 x 5L x 3 - 4	R1552 110 13	14300	21500	30
A	20 x 10R x 3 - 4	R1512 140 13	14100	21300	60
A	20 x 20R x 3.5 - 2	R1512 170 13	9100	12100	120
B	20 x 20L x 3.5 - 2	R1552 170 13	9100	12100	120
A ²⁾	25 x 5R x 3 - 4	R1512 210 13	15900	27200	30
B	25 x 5 L x 3 - 4	R1552 210 13	15900	27200	30
A ²⁾	25 x 10R x 3 - 4	R1512 240 13	15700	27000	60
A	25 x 25R x 3.5 - 2	R1512 280 13	10100	15100	150
B	25 x 25 L x 3.5 - 2	R1552 280 13	10100	15100	150
A ²⁾	32 x 5R x 3.5 - 4	R1512 310 13	21600	40000	23
A ²⁾	32 x 10R x 3.969 - 5	R1512 340 13	31700	58300	47
A ²⁾	32 x 20R x 3.969 - 2	R1512 370 13	13500	21800	94
A	32 x 32R x 3.969 - 2	R1512 390 13	13400	22000	150
A	40 x 5R x 3.5 - 5	R1512 410 13	29100	64100	19
A ²⁾	40 x 10R x 6 - 4	R1512 440 13	50000	86400	38
A ²⁾	40 x 20R x 6 - 3	R1512 470 13	37900	62800	75
A	40 x 40R x 6 - 2	R1512 490 13	25500	40300	150
B	50 x 5R x 3.5 - 5	R1512 510 13	32000	81300	15
A	50 x 10R x 6 - 6	R1512 540 13	79700	166500	30
C	50 x 16R x 6 - 6	R1512 560 13	79400	166000	48
B	50 x 20R x 6.5 - 3	R1512 570 13	47900	87900	60
B	50 x 40R x 6.5 - 2	R1512 590 13	32100	55800	120
A	63 x 10R x 6 - 6	R1512 640 13	88800	214300	24
B	63 x 20R x 6.5 - 3	R1512 670 13	53200	112100	48
C	63 x 40R x 6.5 - 2	R1512 690 13	36900	74300	95
B	80 x 10R x 6.5 - 6	R1512 740 13	108400	291700	19
B	80 x 20R x 12.7 - 6 ³⁾	R1512 770 23	262700	534200	30

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}

2) Can be replaced in these sizes by FSZ-E-S

3) Nuts 80 x 20R x 12.7 - 6 available up to a thread length of 2500 mm, with preload



Size	Dimensions (mm)															Weight
$d_0 \times P \times D_w - i$	d_1	d_2	D_1 g6	D_5	Hole pattern	D_6	D_7	Type	L	L_3	L_4	L_5	L_{10}	$S^4)$	φ (°)	m (kg)
8 x 2.5R x 1.588 - 3	7.5	6.3	16	30	BB4	23	3.4	BF1	16	8	8.0	—	8	M4	30.0	0.05
12 x 5R x 2 - 3	11.4	9.9	24	40	BB4	32	4.5	BF1	28	12	10.0	—	16	M6	330.0	0.12
12 x 10R x 2 - 2	11.4	9.9	24	40	BB4	32	4.5	BF1	33	12	16.0	—	21	M6	330.0	0.14
16 x 5R x 3 - 4	15.0	12.9	28	53	BB3	40	6.6	BF1	38	12	10.0	—	26	M6	315.0	0.24
16 x 10R x 3 - 3	15.0	12.9	28	53	BB3	40	6.6	BF1	45	12	16.0	—	33	M6	315.0	0.25
16 x 16R x 3 - 2	15.0	12.9	33	58	BB4	45	6.6	BF2	45	15	15.0	15.0	—	M6	30.0	0.39
20 x 5R x 3 - 4	19.0	16.9	33	58	BB4	45	6.6	BF1	40	12	10.0	—	28	M6	30.0	0.28
20 x 5L x 3 - 4	19.0	16.9	33	58	BB4	45	6.6	BF1	40	12	10.0	—	28	M6	30.0	0.28
20 x 10R x 3 - 4	19.0	16.9	33	58	BB4	45	6.6	BF1	60	12	16.0	—	48	M6	30.0	0.36
20 x 20R x 3.5 - 2	19.3	16.7	38	63	BB4	50	6.6	BF2	57	20	18.5	18.5	—	M6	30.0	0.60
20 x 20L x 3.5 - 2	19.3	16.7	38	63	BB4	50	6.6	BF2	57	20	18.5	18.5	—	M6	30.0	0.60
25 x 5R x 3 - 4	24.0	21.9	38	63	BB4	50	6.6	BF1	45	12	10.0	—	33	M6	30.0	0.35
25 x 5 L x 3 - 4	24.0	21.9	38	63	BB4	50	6.6	BF1	45	12	10.0	—	33	M6	30.0	0.35
25 x 10R x 3 - 4	24.0	21.9	38	63	BB4	50	6.6	BF1	64	12	16.0	—	52	M6	30.0	0.44
25 x 25R x 3.5 - 2	24.0	21.4	48	73	BB4	60	6.6	BF2	70	25	22.5	22.5	—	M6	18.0	1.09
25 x 25 L x 3.5 - 2	24.0	21.4	48	73	BB4	60	6.6	BF2	70	25	22.5	22.5	—	M6	18.0	1.09
32 x 5R x 3.5 - 4	31.0	28.4	48	73	BB4	60	6.6	BF1	48	13	10.0	—	35	M6	30.0	0.54
32 x 10R x 3.969 - 5	31.0	27.9	48	73	BB4	60	6.6	BF1	77	13	16.0	—	64	M6	30.0	0.72
32 x 20R x 3.969 - 2	31.0	27.9	56	80	BB4	68	6.6	BF1	64	15	25.0	—	49	M6	30.0	1.02
32 x 32R x 3.969 - 2	31.0	27.9	56	80	BB4	68	6.6	BF2	88	20	34.0	34.0	—	M6	30.0	1.40
40 x 5R x 3.5 - 5	39.0	36.4	56	80	BB4	68	6.6	BF1	54	15	10.0	—	39	M8x1	30.0	0.71
40 x 10R x 6 - 4	38.0	33.8	63	95	BB4	78	9.0	BF1	70	15	16.0	—	55	M8x1	30.0	1.29
40 x 20R x 6 - 3	38.0	33.8	63	95	BB4	78	9.0	BF1	88	15	25.0	—	73	M8x1	30.0	1.54
40 x 40R x 6 - 2	38.0	33.8	72	110	BB4	90	11.0	BF2	102	40	31.0	31.0	—	M8x1	19.0	3.59
50 x 5R x 3.5 - 5	49.0	46.4	68	98	BB4	82	9.0	BF1	54	15	10.0	—	39	M8x1	30.0	1.02
50 x 10R x 6 - 6	48.0	43.8	72	110	BB4	90	11.0	BF1	90	18	16.0	—	72	M8x1	30.0	2.02
50 x 16R x 6 - 6	48.0	43.8	72	110	BB4	90	11.0	BF1	128	18	25.0	—	110	M8x1	30.0	2.58
50 x 20R x 6.5 - 3	48.0	43.4	85	125	BB4	105	11.0	BF1	92	22	25.0	—	70	M8x1	30.0	3.40
50 x 40R x 6.5 - 2	48.0	43.4	85	125	BB4	105	11.0	BF1	109	22	45.0	—	87	M8x1	30.0	3.87
63 x 10R x 6 - 6	61.0	56.8	85	125	BB4	105	11.0	BF1	90	22	16.0	—	68	M8x1	30.0	2.62
63 x 20R x 6.5 - 3	61.0	56.4	95	140	BB4	118	14.0	BF1	92	22	25.0	—	70	M8x1	30.0	3.71
63 x 40R x 6.5 - 2	61.0	56.4	95	140	BB4	118	14.0	BF1	109	22	45.0	—	87	M8x1	30.0	4.21
80 x 10R x 6.5 - 6	78.0	73.3	105	150	BB4	125	14.0	BF1	95	22	16.0	—	73	M8x1	30.0	3.78
80 x 20R x 12.7 - 6	76.0	67.0	125	180	BB5	152	18.0	BF1	170	25	25.0	—	145	M8x1	22.5	11.00

4) Lube port machining: flat surface $L_3 \leq 13$ mm, countersink $L_3 > 14$ mm. For size 8 x 2.5, a funnel-type lube nipple DIN 3405 is provided.

Nuts

Adjustable-Preload Single Nut SEM-E-S

Standard series

Rexroth mounting dimensions

With standard seals

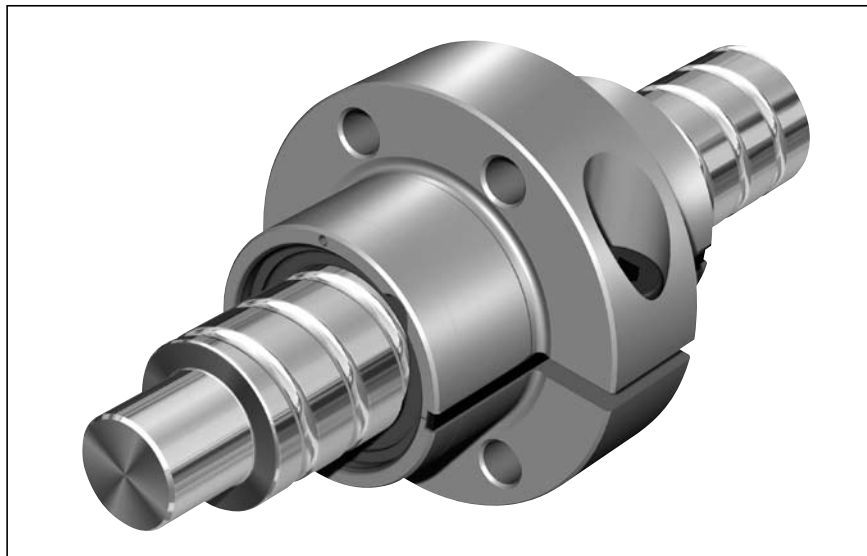
Reinforced seals, see page 112

Adjustable preload

For precision-rolled screws SN-R

of tolerance grade T5, T7

With left-hand thread in some versions

 d_0 = nominal diameter P = lead

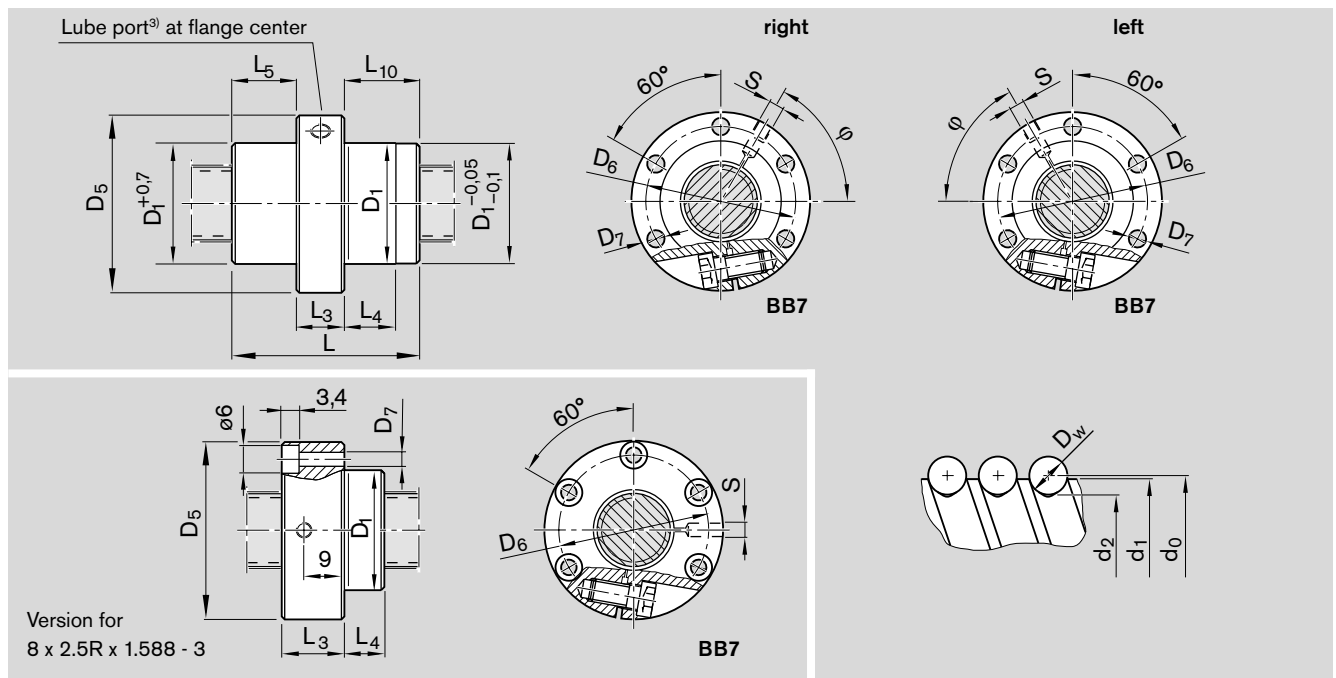
(R = right-hand, L = left-hand)

 D_w = ball diameter i = number of ball track turnsOrdering code: **SEM-E-S 20 x 5R x 3-4 1 2 T7 R 82Z120 41Z120 1250 0 1**

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)	Centering diameter D_1 after adjustment	
			dyn. C (N)	stat. C ₀ (N)		min. (mm)	max. (mm)
B	8 x 2.5R x 1.588 - 3	R1532 230 04	2200	2800	15	15.953	15.987
B	12 x 5R x 2 - 3	R1532 460 24	3800	5800	30	23.940	23.975
C	12 x 10R x 2 - 2	R1532 490 14	2500	3600	60	23.940	23.975
B	16 x 5R x 3 - 4	R1512 010 24	12300	16100	30	27.940	27.975
C	16 x 10R x 3 - 3	R1512 040 14	9600	12300	60	27.940	27.975
B	16 x 16R x 3 - 2	R1512 060 14	6300	7600	96	32.945	32.973
A	20 x 5R x 3 - 4	R1512 110 14	14300	21500	30	32.935	32.970
B	20 x 20R x 3.5 - 2	R1512 170 14	9100	12100	120	37.945	37.973
A	25 x 5R x 3 - 4	R1512 210 14	15900	27200	30	37.935	37.970
A	25 x 10R x 3 - 4	R1512 240 14	15700	27000	60	37.935	37.970
B	25 x 25R x 3.5 - 2	R1512 280 14	10100	15100	150	47.945	47.973
A	32 x 5R x 3.5 - 4	R1512 310 14	21600	40000	23	47.935	47.970
A	32 x 5L x 3.5 - 4	R1552 310 04	21600	40000	23	47.935	47.970
A	32 x 10R x 3.969 - 5	R1512 340 14	31700	58300	47	47.935	47.970
B	32 x 20R x 3.969 - 2	R1512 370 14	13500	21800	94	55.941	55.969
B	32 x 32R x 3.969 - 2	R1512 390 14	13400	22000	150	55.941	55.969
A	40 x 5R x 3.5 - 5	R1512 410 14	29100	64100	19	55.931	55.966
B	40 x 5L x 3.5 - 5	R1552 410 04	29100	64100	19	55.931	55.966
A	40 x 10R x 6 - 4	R1512 440 14	50000	86400	38	62.931	62.966
B	40 x 10L x 6 - 4	R1552 440 04	50000	86400	38	62.931	62.966
A	40 x 20R x 6 - 3	R1512 470 14	37900	62800	75	62.941	62.969
A	40 x 40R x 6 - 2	R1512 490 14	25500	40300	150	71.941	71.969
B	50 x 5R x 3.5 - 5	R1512 510 14	32000	81300	15	67.931	67.966
B	50 x 10R x 6 - 6	R1512 540 14	79700	166500	30	71.931	71.966
B	50 x 20R x 6.5 - 3	R1512 570 14	47900	87900	60	84.936	84.964
B	50 x 40R x 6.5 - 2	R1512 590 14	32100	55800	120	84.936	84.964
B	63 x 10R x 6 - 6	R1512 640 14	88800	214300	24	84.926	84.961
C	63 x 20R x 6.5 - 3	R1512 670 14	53200	112100	48	94.936	94.964
C	63 x 40R x 6.5 - 2	R1512 690 14	36900	74300	95	94.936	94.964
C	80 x 10R x 6.5 - 6	R1512 740 14	108400	291700	19	104.926	104.961
B	80 x 20R x 12.7 - 6 ²⁾	R1512 770 24	262700	534200	30	124.931	124.959

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}

2) Nuts 80 x 20R x 12.7 - 6 available up to a thread length of 2500 mm, with preload



Size	Dimensions (mm)													Weight	
$d_0 \times P \times D_w - i$	d_1	d_2	D_1 f9	D_5	Hole pattern	D_6	D_7	L	L_3	L_4	L_5	L_{10}	$S^{3)}$	φ (°)	m (kg)
8 x 2.5R x 1.588 - 3	7.5	6.3	16	30	BB7	23	3.4	16	13	3.0	-	3.0	M4	0	0.06
12 x 5R x 2 - 3	11.4	9.9	24	40	BB7	32	4.5	28	12	8.0	8.0	8.0	M6	55	0.12
12 x 10R x 2 - 2	11.4	9.9	24	40	BB7	32	4.5	33	12	10.5	10.5	10.5	M6	55	0.13
16 x 5R x 3 - 4	15.0	12.9	28	53	BB7	40	6.6	38	15	10.0	11.5	11.5	M6	53	0.24
16 x 10R x 3 - 3	15.0	12.9	28	53	BB7	40	6.6	45	15	15.0	15.0	15.0	M6	180	0.25
16 x 16R x 3 - 2	15.0	12.9	33	58	BB7	45	6.6	45	15	15.0	15.0	15.0	M6	50	0.42
20 x 5R x 3 - 4	19.0	16.9	33	58	BB7	45	6.6	40	15	10.0	12.5	12.5	M6	56	0.31
20 x 20R x 3.5 - 2	19.3	16.7	38	63	BB7	50	6.6	57	20	18.5	18.5	18.5	M6	60	0.63
25 x 5R x 3 - 4	24.0	21.9	38	63	BB7	50	6.6	45	20	10.0	12.5	12.5	M6	60	0.44
25 x 10R x 3 - 4	24.0	21.9	38	63	BB7	50	6.6	64	20	16.0	22.0	22.0	M6	60	0.53
25 x 25R x 3.5 - 2	24.0	21.4	48	73	BB7	60	6.6	70	25	22.5	22.5	22.5	M6	48	1.13
32 x 5R x 3.5 - 4	31.0	28.4	48	73	BB7	60	6.6	48	20	10.0	14.0	14.0	M6	60	0.64
32 x 5L x 3.5 - 4	31.0	28.4	48	73	BB7	60	6.6	48	20	10.0	14.0	14.0	M6	59	0.64
32 x 10R x 3.969 - 5	31.0	27.9	48	73	BB7	60	6.6	77	20	16.0	28.5	28.5	M6	168	0.87
32 x 20R x 3.969 - 2	31.0	27.9	56	80	BB7	68	6.6	64	20	22.0	22.0	22.0	M6	60	1.14
32 x 32R x 3.969 - 2	31.0	27.9	56	80	BB7	68	6.6	88	20	34.0	34.0	34.0	M6	60	1.44
40 x 5R x 3.5 - 5	39.0	36.4	56	80	BB7	68	6.6	54	20	10.0	17.0	17.0	M8x1	65	0.87
40 x 5L x 3.5 - 5	39.0	36.4	56	80	BB7	68	6.6	54	20	10.0	17.0	17.0	M8x1	65	0.87
40 x 10R x 6 - 4	38.0	33.8	63	95	BB7	78	9.0	70	25	16.0	22.5	22.5	M8x1	57	1.53
40 x 10L x 6 - 4	38.0	33.8	63	95	BB7	78	9.0	70	25	16.0	22.5	22.5	M8x1	57	1.53
40 x 20R x 6 - 3	38.0	33.8	63	95	BB7	78	9.0	88	25	25.0	31.5	31.5	M8x1	180	1.77
40 x 40R x 6 - 2	38.0	33.8	72	110	BB7	90	11.0	102	40	31.0	31.0	31.0	M8x1	49	3.77
50 x 5R x 3.5 - 5	49.0	46.4	68	98	BB7	82	9.0	54	25	10.0	14.5	14.5	M8x1	67	1.23
50 x 10R x 6 - 6	48.0	43.8	72	110	BB7	90	11.0	90	30	16.0	30.0	30.0	M8x1	61	2.44
50 x 20R x 6.5 - 3	48.0	43.4	85	125	BB7	105	11.0	92	30	25.0	31.0	31.0	M8x1	180	3.94
50 x 40R x 6.5 - 2	48.0	43.4	85	125	BB7	105	11.0	109	30	39.5	39.5	39.5	M8x1	60	4.42
63 x 10R x 6 - 6	61.0	56.8	85	125	BB7	105	11.0	90	30	16.0	30.0	30.0	M8x1	65	2.94
63 x 20R x 6.5 - 3	61.0	56.4	95	140	BB7	118	14.0	92	30	25.0	31.0	31.0	M8x1	190	4.45
63 x 40R x 6.5 - 2	61.0	56.4	95	140	BB7	118	14.0	109	30	39.5	39.5	39.5	M8x1	70	4.95
80 x 10R x 6.5 - 6	78.0	73.3	105	150	BB7	125	14.0	95	30	16.0	32.5	32.5	M8x1	67	4.20
80 x 20R x 12.7 - 6	76.0	67.0	125	180	BB7	152	18.0	170	50	25.0	60.0	60.0	M8x1	60	13.30

3) Lube port machining: flat surface $L_3 \leq 13$ mm, countersink $L_3 > 14$ mm. For size 8 x 2.5, a funnel-type lube nipple DIN 3405 is provided.

Nuts

Cylindrical Single Nut ZEM-E-S

Standard series

Rexroth mounting dimensions

With standard seals

Reinforced seals, see page 112

With backlash, reduced backlash,
preload 2%; 3%; 5%

For precision-rolled screws SN-R
of tolerance grade T5, T7, T9

With left-hand thread in some versions



Ordering code: **ZEM-E-S** 20 x 5R x 3-5 1 2 T7 R 82Z120 41Z120 1250 0 1

d_0 = nominal diameter

P = lead

(R = right-hand, L = left-hand)

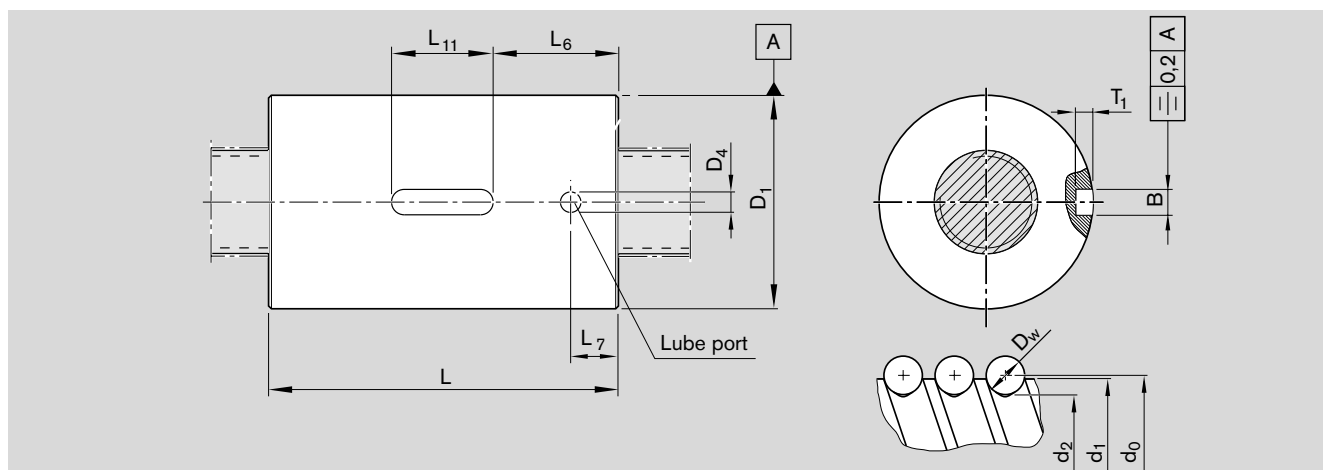
D_w = ball diameter

i = number of ball track turns

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C_0 (N)	
A	8 x 2.5R x 1.588 - 3	R1532 230 02	2200	2800	15
B ²⁾	12 x 2R x 1.2 - 4	R1532 422 01	2240	4160	12
A	12 x 5R x 2 - 3	R1532 460 32	3800	5800	30
B ²⁾	12 x 5R x 2 - 3	R1532 462 25	3800	5800	30
B	12 x 10R x 2 - 2	R1532 490 22	2500	3600	60
B ²⁾	12 x 10R x 2 - 2	R1532 492 00	2500	3600	60
A	16 x 5R x 3 - 4	R1512 010 22	12300	16100	30
C	16 x 5L x 3 - 4	R1552 010 02	12300	16100	30
B ²⁾	16 x 5R x 3 - 4	R1512 012 67	12300	16100	30
A	16 x 10R x 3 - 3	R1512 040 12	9600	12300	60
B ²⁾	16 x 10R x 3 - 3	R1512 042 08	9600	12300	60
B ²⁾	16 x 10R x 3 - 3	R1512 042 09	9600	12300	60
A	16 x 16R x 3 - 2	R1512 060 12	6300	7600	96
B ²⁾	16 x 16R x 3 - 2	R1512 062 10	6300	7600	96
B ²⁾	16 x 16R x 3 - 3	R1512 062 11	9600	12300	96
A	20 x 5R x 3 - 5	R1512 110 12	17500	27300	30
B ²⁾	20 x 5R x 3 - 4	R1512 112 43	14300	21500	30
A	20 x 20R x 3.5 - 2	R1512 170 12	9100	12100	120
B ²⁾	20 x 20R x 3.5 - 3	R1512 172 07	13300	18800	120
A	25 x 5R x 3 - 4	R1512 210 12	15900	27200	30
A	25 x 10R x 3 - 4	R1512 240 12	15700	27000	60
B	25 x 25R x 3.5 - 2	R1512 280 12	10100	15100	150
B	25 x 25R x 3.5 - 3	R1512 280 52	14700	23300	150
B	32 x 5R x 3.5 - 4	R1512 310 12	21600	40000	23
A	32 x 10R x 3.969 - 5	R1512 340 12	31700	58300	47
C	32 x 20R x 3.969 - 2	R1512 370 12	13500	21800	94
B	32 x 20R x 3.969 - 3	R1512 370 52	19700	33700	94
B	32 x 32R x 3.969 - 2	R1512 390 12	13400	22000	150
B	32 x 32R x 3.969 - 3	R1512 390 52	19500	34000	150
C	40 x 5R x 3.5 - 5	R1512 410 12	29100	64100	19
B ²⁾	40 x 5R x 3.5 - 5	R1512 412 21	29100	64100	19
B	40 x 10R x 6 - 4	R1512 440 12	50000	86400	38
B	40 x 20R x 6 - 3	R1512 470 12	37900	62800	75
B	40 x 40R x 6 - 2	R1512 490 12	25500	40300	150
B	40 x 40R x 6 - 3	R1512 490 52	37000	62300	150
B	50 x 5R x 3.5 - 5	R1512 510 12	32000	81300	15
C	50 x 10R x 6 - 6	R1512 540 12	79700	166500	30
C	50 x 20R x 6.5 - 3	R1512 570 12	47900	87900	60
C	63 x 10R x 6 - 6	R1512 640 12	88800	214300	24

1) See page 101 Characteristic speed $d_0 \cdot n$
and page 124 Critical speed n_{cr}

2) Special nuts for Rexroth modules and
drive units



Size	Dimensions (mm)										Weight
$d_0 \times P \times D_w - i$	d_1	d_2	D_1 g6	D_4	L ± 0.1	L_6	L_7	L_{11} $+0.2$	B P9	T_1 $+0.1$	m (kg)
8 x 2.5R x 1.588 - 3	7.5	6.3	16	2	16	5.0	3.5	6	3	1.8	0.02
12 x 2R x 1.2 - 4	11.7	10.8	21	2	19	5.5	3.5	8	3	1.8	0.03
12 x 5R x 2 - 3	11.4	9.9	24	2	28	8.0	3.5	12	5	3.0	0.06
12 x 5R x 2 - 3	11.4	9.9	21	2	28	8.0	3.5	12	3	1.8	0.04
12 x 10R x 2 - 2	11.4	9.9	24	2	33	10.5	3.5	12	5	3.0	0.07
12 x 10R x 2 - 2	11.4	9.9	21	2	33	10.5	3.5	12	3	1.8	0.05
16 x 5R x 3 - 4	15.0	12.9	28	4	35	14.5	9.5	12	5	3.0	0.09
16 x 5L x 3 - 4	15.0	12.9	28	4	35	14.5	9.5	12	5	3.0	0.09
16 x 5R x 3 - 4	15.0	12.9	33	4	45	14.5	9.5	16	5	3.0	0.17
16 x 10R x 3 - 3	15.0	12.9	28	4	45	14.5	9.5	16	5	3.0	0.12
16 x 10R x 3 - 3	15.0	12.9	38	4	54	19.0	9.5	16	5	3.0	0.35
16 x 10R x 3 - 3	15.0	12.9	33	4	45	14.5	9.5	16	5	3.0	0.20
16 x 16R x 3 - 2	15.0	12.9	33	4	45	14.5	9.5	16	5	3.0	0.20
16 x 16R x 3 - 2	15.0	12.9	28	4	45	14.5	9.5	16	5	3.0	0.12
16 x 16R x 3 - 3	15.0	12.9	38	4	61	22.5	9.5	16	5	3.0	0.42
20 x 5R x 3 - 5	19.0	16.9	33	4	45	14.5	9.5	16	5	3.0	0.16
20 x 5R x 3 - 4	19.0	16.9	38	4	40	21.0	9.5	12	5	3.0	0.21
20 x 20R x 3.5 - 2	19.3	16.7	38	4	64	22.0	9.5	20	5	3.0	0.34
20 x 20R x 3.5 - 3	19.3	16.7	38	4	77	28.5	9.5	20	5	3.0	0.44
25 x 5R x 3 - 4	24.0	21.9	38	4	45	14.5	9.5	16	5	3.0	0.19
25 x 10R x 3 - 4	24.0	21.9	38	4	64	22.0	9.5	20	5	3.0	0.28
25 x 25R x 3.5 - 2	24.0	21.4	48	4	80	30.0	10.5	20	5	3.0	0.73
25 x 25R x 3.5 - 3	24.0	21.4	40	4	95	37.5	10.5	20	5	3.0	0.50
32 x 5R x 3.5 - 4	31.0	28.4	48	4	48	14.0	9.5	20	5	3.0	0.32
32 x 10R x 3.969 - 5	31.0	27.9	48	4	77	28.5	9.5	20	5	3.0	0.50
32 x 20R x 3.969 - 2	31.0	27.9	56	4	64	22.0	9.5	20	5	3.0	0.74
32 x 20R x 3.969 - 3	31.0	27.9	50	4	84	32.0	9.5	20	5	3.0	0.66
32 x 32R x 3.969 - 2	31.0	27.9	56	4	88	34.0	9.5	20	5	3.0	1.03
32 x 32R x 3.969 - 3	31.0	27.9	50	4	120	50.0	9.5	20	5	3.0	0.97
40 x 5R x 3.5 - 5	39.0	36.4	56	4	54	17.0	9.5	20	5	3.0	0.44
40 x 5R x 3.5 - 5	39.0	36.4	63	4	70	25.0	14.0	20	5	3.0	0.82
40 x 10R x 6 - 4	38.0	33.8	63	4	70	25.0	14.0	20	5	3.0	0.88
40 x 20R x 6 - 3	38.0	33.8	63	4	88	34.0	14.0	20	5	3.0	1.13
40 x 40R x 6 - 2	38.0	33.8	72	4	113	46.5	14.0	20	5	3.0	2.23
40 x 40R x 6 - 3	38.0	33.8	63	4	142	61.0	14.0	20	5	3.0	1.85
50 x 5R x 3.5 - 5	49.0	46.4	68	4	54	17.0	9.5	20	5	3.0	0.62
50 x 10R x 6 - 6	48.0	43.8	72	5	90	35.0	14.0	20	5	3.0	1.34
50 x 20R x 6.5 - 3	48.0	43.4	85	5	92	30.0	14.0	32	6	3.5	2.39
63 x 10R x 6 - 6	61.0	56.8	85	5	90	29.0	14.0	32	6	3.5	1.59

Nuts

2-start Single Nut with Flange FED-E-B

Standard series

Mounting dimensions similar to
DIN 69 051, Part 5
Flange type B

2-start nuts to distinctly increase the
dynamic and static load rating
Mounting dimensions correspond to
those of the Rexroth standard series

With standard seals
With backlash, reduced backlash,
preload 3%
For precision-rolled screws SN-R
of tolerance grade T5, T7

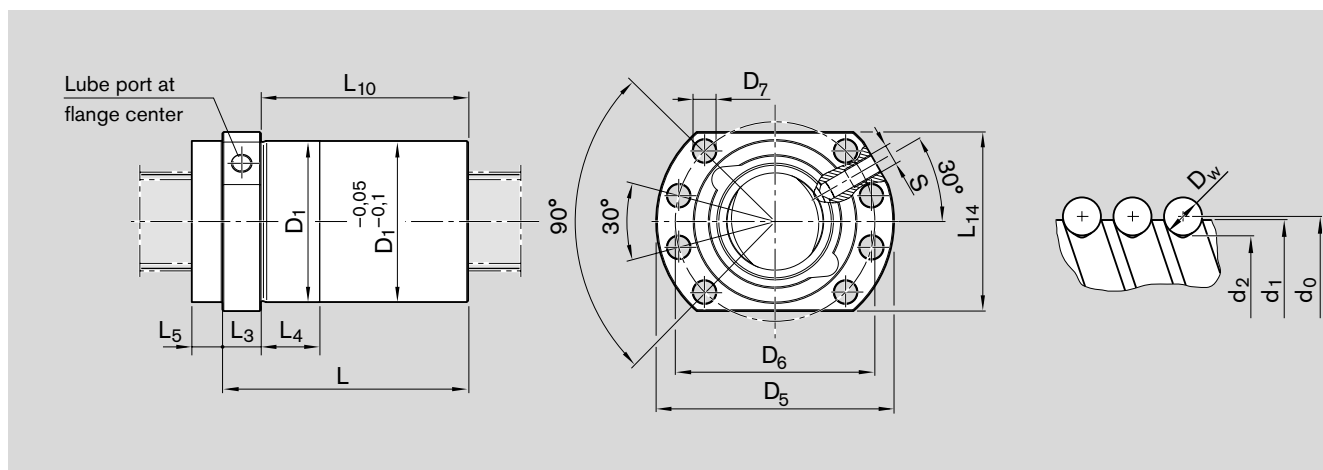


Ordering code: **FED-E-B 40 x 20R x 6 - 8 x 2** **1** **6** **T5** **R** **13Z400** **41K300** **0** **1**

- d₀** = nominal diameter
- P** = lead
(R = right-hand, L = left-hand)
- D_w** = ball diameter
- i** = a x b
- a** = load-carrying turns
- b** = number of load-carrying threads
on the screw

Size d₀ x P x D_w - i x b	Part number	Load ratings		Max. static load ¹⁾ (kN)	Linear speed v_{max} (m/min)
		dyn. C (kN)	stat. C ₀ (kN)		
40 x 20 R x 6 - 8 x 2	R1512 470 32	76.4	171.1	87	75
40 x 40 R x 6 - 6 x 2	R1512 490 32	57.2	124.5	83	150
50 x 20 R x 6.5 - 8 x 2	R1512 570 32	93.2	228.0	120	60
50 x 25 R x 6.5 - 6 x 2	R1512 580 32 ²⁾	74.1	175.1	117	75
50 x 40 R x 6.5 - 6 x 2	R1512 590 32	71.4	171.5	119	120
63 x 20 R x 6.5 - 8 x 2	R1512 670 32	104.6	292.0	142	48
63 x 40 R x 6.5 - 6 x 2	R1512 690 32	80.0	217.0	148	95

1) The load-bearing capability of the rolling contact is greater than the mechanical strength of the nut body, therefore, maximum static load data has been included.
2) In preparation



Size $d_0 \times P \times D_w - i$	Dimensions (mm)													Weight m (kg)
	d_1	d_2	D_1 g6	D_5	D_6	D_7	L	L_3	L_4	L_5	L_{10}	L_{14}	S	
40 x 20 R x 6 - 8x2	38.0	33.8	63	93	78	9.0	108	15	25	13.0	80.0	70	M8x1	1.85
40 x 40 R x 6 - 6x2	38.0	33.8	63	93	78	9.0	142	15	45	11.5	115.5	70	M8x1	2.35
50 x 20 R x 6.5 - 8x2	48.0	43.4	75	110	93	11.0	112	18	25	13.0	81.0	85	M8x1	2.50
50 x 25 R x 6.5 - 6x2	48.0	43.4	75	110	93	11.0	107	18	25	13.5	75.5	85	M8x1	2.45
50 x 40 R x 6.5 - 6x2	48.0	43.4	75	110	93	11.0	149	18	45	15.0	116.0	85	M8x1	3.40
63 x 20 R x 6.5 - 8x2	61.0	56.4	95	135	115	13.5	112	22	25	11.0	79.0	100	M8x1	3.90
63 x 40 R x 6.5 - 6x2	61.0	56.4	95	135	115	13.5	149	22	45	12.0	115.0	100	M8x1	5.05

Nuts

Double Nut with Flange FDM-E-C

Standard series

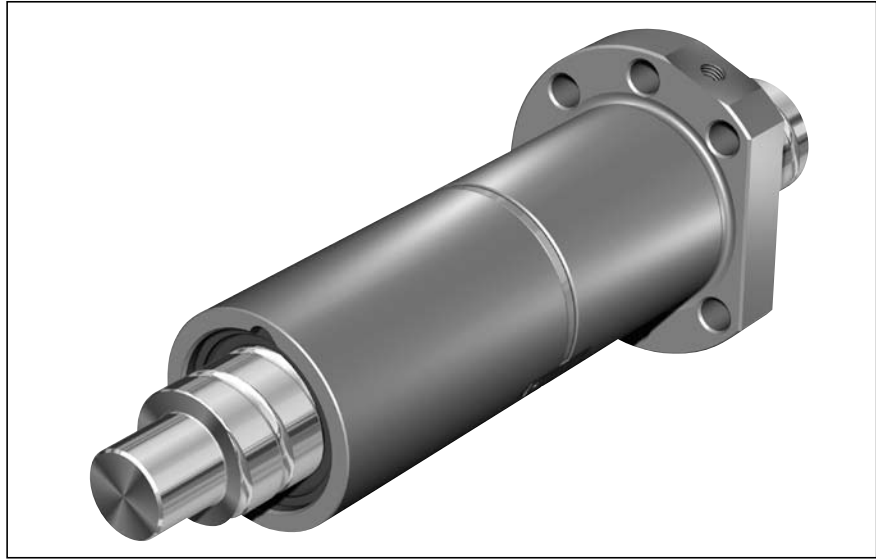
Mounting dimensions
per DIN 69 051, Part 5
Flange type C

With standard seals

Reinforced seals, see page 112

With preload 7% or 10%

For precision-rolled screws SN-R
of tolerance grade T5, T7



Ordering code: **FDM-E-C** **20 x 5R x 3-4** **1** **2** **T7** **R** **82Z120** **41Z120** **1250** **0** **1**

d_0 = nominal diameter

P = lead

(R = right-hand, L = left-hand)

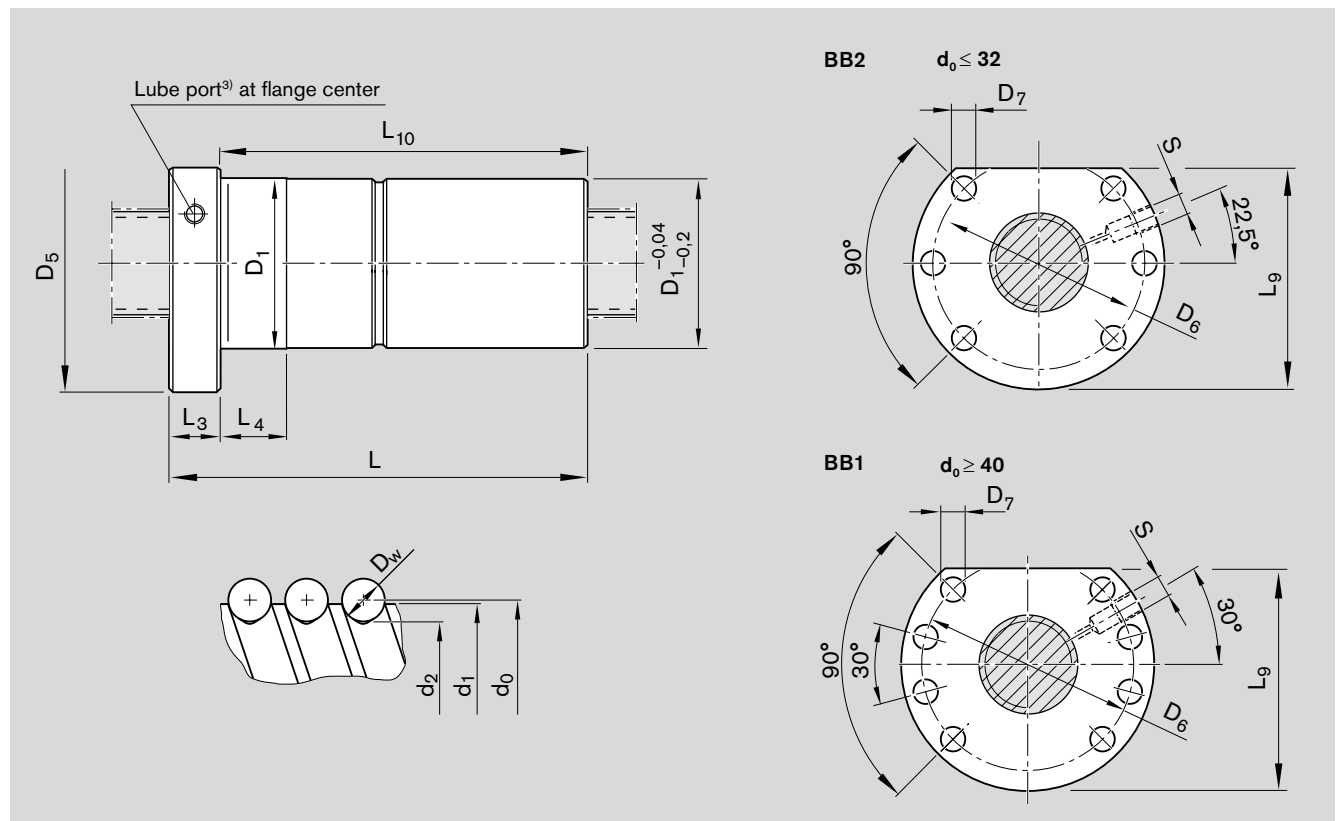
D_w = ball diameter

i = number of ball track turns

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C ₀ (N)	
C	16 x 5R x 3 - 4	R1502 010 55	12300	16100	30
C	20 x 5R x 3 - 4	R1502 110 75	14300	21500	30
C	25 x 5R x 3 - 4	R1502 210 75	15900	27200	30
C	25 x 10R x 3 - 4	R1502 240 75	15700	27000	60
C	32 x 5R x 3.5 - 4	R1502 310 75	21600	40000	23
C	32 x 10R x 3.969 - 5	R1502 340 76	31700	58300	47
C	40 x 5R x 3.5 - 5	R1502 410 76	29100	64100	19
C	40 x 10R x 6 - 4	R1502 440 75	50000	86400	38
C	40 x 10R x 6 - 6	R1502 440 76	72100	132200	38
C	40 x 20R x 6 - 3	R1502 470 75	37900	62800	75
C	50 x 5R x 3.5 - 5	R1502 510 76	32000	81300	15
C	50 x 10R x 6 - 4	R1502 540 75	55400	109000	30
C	50 x 10R x 6 - 6	R1502 540 76	79700	166500	30
C	50 x 20R x 6.5 - 5	R1502 570 76	75700	149700	60
C	63 x 10R x 6 - 4	R1502 640 75	61800	140500	24
C	63 x 10R x 6 - 6	R1502 640 76	88800	214300	24
C	63 x 20R x 6.5 - 5	R1502 670 76	83900	190300	48
C	80 x 10R x 6.5 - 6	R1502 740 76	108400	291700	19
C	80 x 20R x 12.7 - 6 ²⁾	R1502 770 46	262700	534200	30

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}

2) Nuts 80 x 20R x 12.7 - 6 available up to a thread length of 2500 mm, with preload



Size	Dimensions (mm)													Weight
$d_0 \times P \times D_w - i$	d_1	d_2	D_1 g6	D_5	Hole pattern	D_6	D_7	L	L_3	L_4	L_9	L_{10}	$S^{3)}$	m (kg)
16 x 5R x 3 - 4	15.0	12.9	28	48	BB2	38	5.5	72	12	10	44.0	60	M6	0.29
20 x 5R x 3 - 4	19.0	16.9	36	58	BB2	47	6.6	82	12	10	51.0	70	M6	0.53
25 x 5R x 3 - 4	24.0	21.9	40	62	BB2	51	6.6	82	12	10	55.0	70	M6	0.57
25 x 10R x 3 - 4	24.0	21.9	40	62	BB2	51	6.6	120	12	16	55.0	108	M6	0.77
32 x 5R x 3.5 - 4	31.0	28.4	50	80	BB2	65	9.0	88	13	10	71.0	75	M6	0.96
32 x 10R x 3.969 - 5	31.0	27.9	50	80	BB2	65	9.0	146	13	16	71.0	133	M6	1.34
40 x 5R x 3.5 - 5	39.0	36.4	63	93	BB1	78	9.0	100	15	10	81.5	85	M8x1	1.68
40 x 10R x 6 - 4	38.0	33.8	63	93	BB1	78	9.0	140	15	16	81.5	125	M8x1	2.15
40 x 10R x 6 - 6	38.0	33.8	63	93	BB1	78	9.0	180	15	16	81.5	165	M8x1	2.73
40 x 20R x 6 - 3	38.0	33.8	63	93	BB1	78	9.0	175	15	25	81.5	160	M8x1	2.56
50 x 5R x 3.5 - 5	49.0	46.4	75	110	BB1	93	11.0	100	15	10	97.5	85	M8x1	2.25
50 x 10R x 6 - 4	48.0	43.8	75	110	BB1	93	11.0	140	18	16	97.5	122	M8x1	2.97
50 x 10R x 6 - 6	48.0	43.8	75	110	BB1	93	11.0	180	18	16	97.5	162	M8x1	3.73
50 x 20R x 6.5 - 5	48.0	43.4	75	110	BB1	93	11.0	255	18	25	97.5	237	M8x1	4.93
63 x 10R x 6 - 4	61.0	56.8	90	125	BB1	108	11.0	140	22	16	110.0	118	M8x1	4.00
63 x 10R x 6 - 6	61.0	56.8	90	125	BB1	108	11.0	180	22	16	110.0	158	M8x1	4.45
63 x 20R x 6.5 - 5	61.0	56.4	95	135	BB1	115	13.5	255	22	25	117.5	233	M8x1	8.21
80 x 10R x 6.5 - 6	78.0	73.3	105	145	BB1	125	13.5	190	22	16	127.5	168	M8x1	5.93
80 x 20R x 12.7 - 6	76.0	67.0	125	165	BB1	145	13.5	340	25	25	147.5	315	M8x1	19.40

3) Lube port machining: flat surface $L_3 \leq 13$ mm, countersink $L_3 > 14$ mm

Nuts

Double Nut with Flange FDM-E-S

Standard series

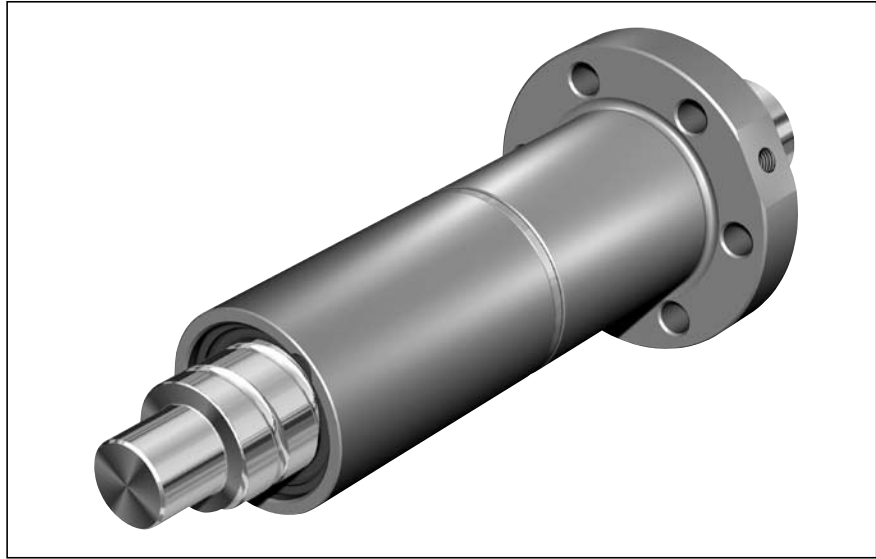
Rexroth mounting dimensions

With standard seals

Reinforced seals, see page 112

With preload 7% or 10%

For precision-rolled screws SN-R
of tolerance grade T5, T7



Ordering code: **FDM-E-S 20 x 5R x 3-4 1 2 T7 R 82Z120 41Z120 1250 0 1**

d_0 = nominal diameter

P = lead

(R = right-hand, L = left-hand)

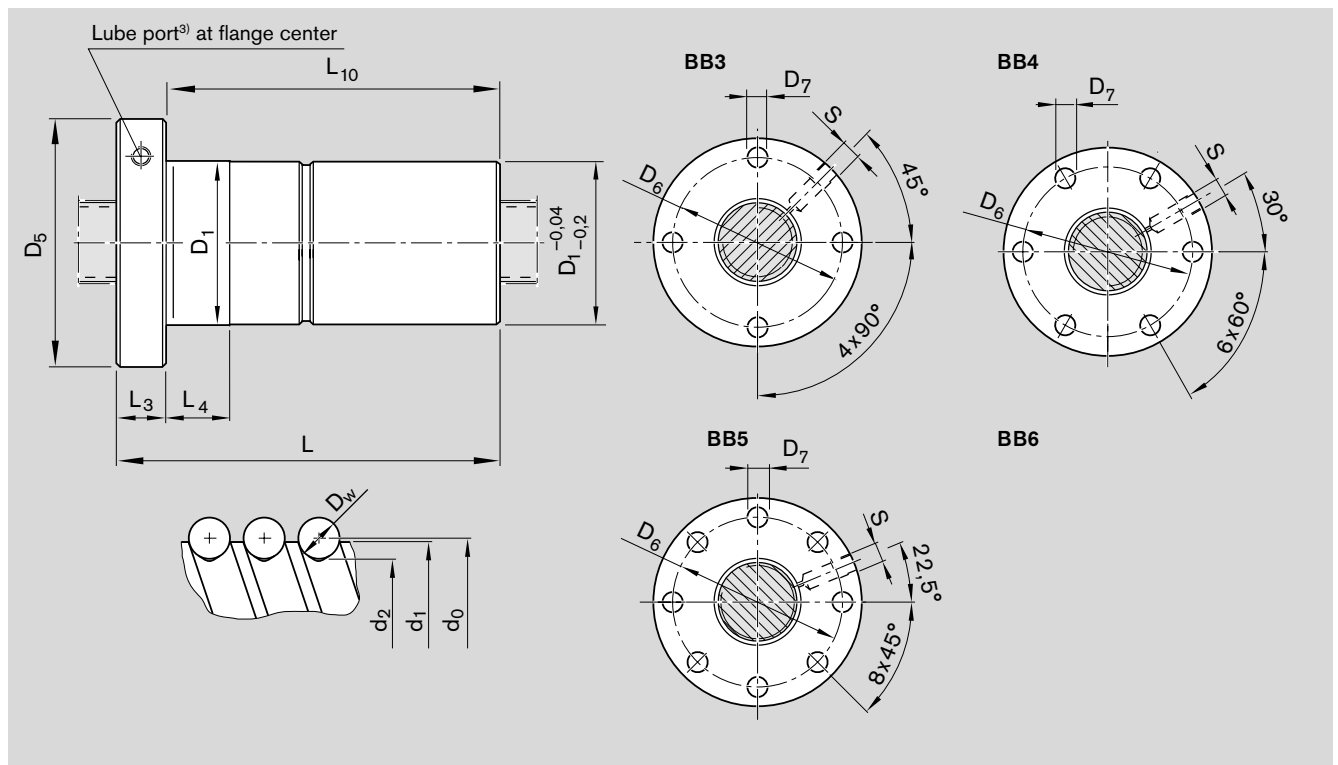
D_w = ball diameter

i = number of ball track turns

Category	Size $d_0 \times P \times D_w - i$	Part number	Load ratings		Linear speed ¹⁾ v_{max} (m/min)
			dyn. C (N)	stat. C_0 (N)	
C	16 x 5R x 3 - 4	R1502 010 23	12300	16100	30
C	20 x 5R x 3 - 4	R1502 110 33	14300	21500	30
C	25 x 5R x 3 - 4	R1502 210 33	15900	27200	30
C	25 x 10R x 3 - 4	R1502 240 33	15700	27000	60
C	32 x 5R x 3.5 - 4	R1502 310 33	21600	40000	23
C	32 x 10R x 3.969 - 5	R1502 340 33	31700	58300	47
C	40 x 5R x 3.5 - 5	R1502 410 33	29100	64100	19
C	40 x 10R x 6 - 4	R1502 440 33	50000	86400	38
C	40 x 10R x 6 - 6	R1502 440 34	72100	132200	38
C	40 x 20R x 6 - 3	R1502 470 33	37900	62800	75
C	50 x 5R x 3.5 - 5	R1502 510 33	32000	81300	15
C	50 x 10R x 6 - 4	R1502 540 33	55400	109000	30
C	50 x 10R x 6 - 6	R1502 540 34	79700	166500	30
C	50 x 20R x 6.5 - 5	R1502 570 34	75700	149700	60
C	63 x 10R x 6 - 4	R1502 640 33	61800	140500	24
C	63 x 10R x 6 - 6	R1502 640 34	88800	214300	24
C	63 x 20R x 6.5 - 5	R1502 670 34	83900	190300	48
C	80 x 10R x 6.5 - 6	R1502 740 34	108400	291700	19
C	80 x 20R x 12.7 - 6 ²⁾	R1502 770 04	262700	534200	30

1) See page 101 Characteristic speed $d_0 \cdot n$ and page 124 Critical speed n_{cr}

2) Nuts 80 x 20R x 12.7 - 6 available up to a thread length of 2500 mm, with preload



Size $d_0 \times P \times D_w - i$	Dimensions (mm)		D_1 g6	D_5	Hole pattern	D_6	D_7	L	L_3	L_4	L_{10}	S^3	Weight m (kg)
	d_1	d_2											
16 x 5R x 3 - 4	15.0	12.9	28	53	BB3	40	6.6	72	12	10	60	M6	0.33
20 x 5R x 3 - 4	19.0	16.9	33	58	BB4	45	6.6	82	12	10	70	M6	0.45
25 x 5R x 3 - 4	24.0	21.9	38	63	BB4	50	6.6	82	12	10	70	M6	0.53
25 x 10R x 3 - 4	24.0	21.9	38	63	BB4	50	6.6	120	12	16	108	M6	0.70
32 x 5R x 3.5 - 4	31.0	28.4	48	73	BB4	60	6.6	88	13	10	75	M6	0.84
32 x 10R x 3.969 - 5	31.0	27.9	48	73	BB4	60	6.6	146	13	16	133	M6	1.22
40 x 5R x 3.5 - 5	39.0	36.4	56	80	BB4	68	6.6	100	15	10	85	M8x1	1.13
40 x 10R x 6 - 4	38.0	33.8	63	95	BB4	78	9.0	140	15	16	125	M8x1	2.25
40 x 10R x 6 - 6	38.0	33.8	63	95	BB4	78	9.0	180	15	16	165	M8x1	2.83
40 x 20R x 6 - 3	38.0	33.8	63	95	BB4	78	9.0	175	15	25	160	M8x1	2.66
50 x 5R x 3.5 - 5	49.0	46.4	68	98	BB4	82	9.0	100	15	10	85	M8x1	1.60
50 x 10R x 6 - 4	48.0	43.8	72	110	BB4	90	11.0	140	18	16	122	M8x1	2.74
50 x 10R x 6 - 6	48.0	43.8	72	110	BB4	90	11.0	180	18	16	162	M8x1	3.39
50 x 20R x 6.5 - 5	48.0	43.4	85	125	BB4	105	11.0	255	22	25	233	M8x1	6.71
63 x 10R x 6 - 4	61.0	56.8	85	125	BB4	105	11.0	140	22	16	118	M8x1	3.53
63 x 10R x 6 - 6	61.0	56.8	85	125	BB4	105	11.0	180	22	16	158	M8x1	4.32
63 x 20R x 6.5 - 5	61.0	56.4	95	140	BB4	118	14.0	255	22	25	233	M8x1	8.65
80 x 10R x 6.5 - 6	78.0	73.3	105	150	BB4	125	14.0	190	22	16	168	M8x1	6.35
80 x 20R x 12.7 - 6	76.0	67.0	125	180	BB5	152	18.0	340	25	25	315	M8x1	20.20

3) Lube port machining: flat surface $L_3 \leq 13$ mm, countersink $L_3 > 14$ mm

Nut Housings

Nut Housing MGS

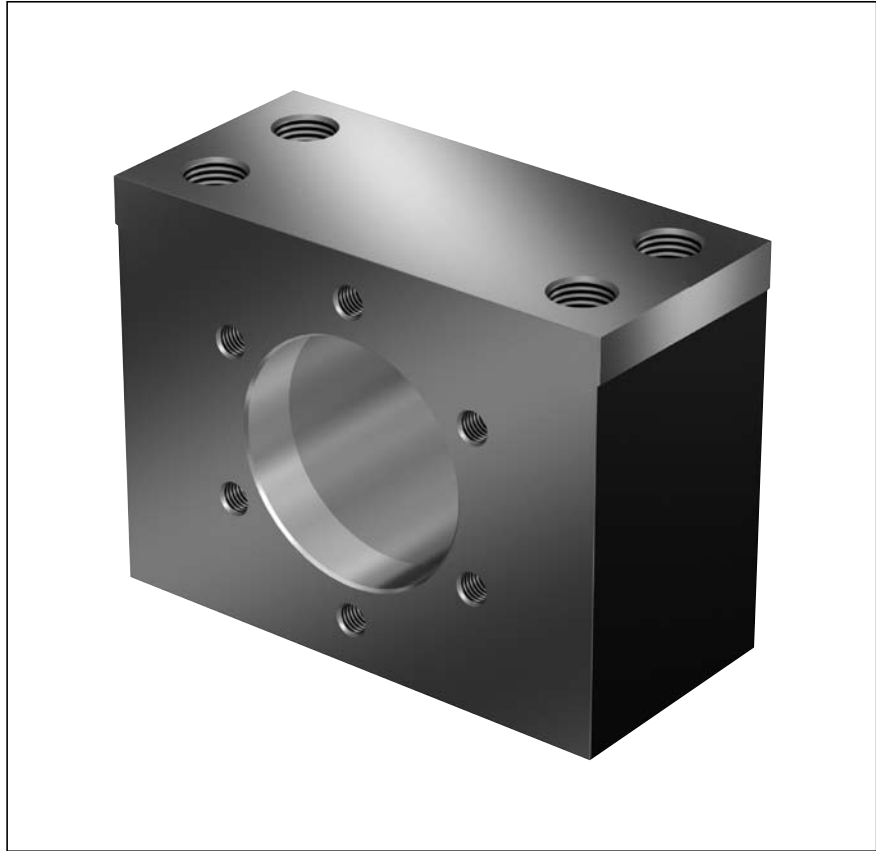
Steel nut housings MGS are designed for FEM-E-S, FDM-E-S, FEP-E-S and SEM-E-S ball nuts.

In addition to bolting, the housings should be locked in place by positive means (e.g. two pins with a diameter equal to that of the screws S_2). We recommend using screws with a strength class of 8.8.

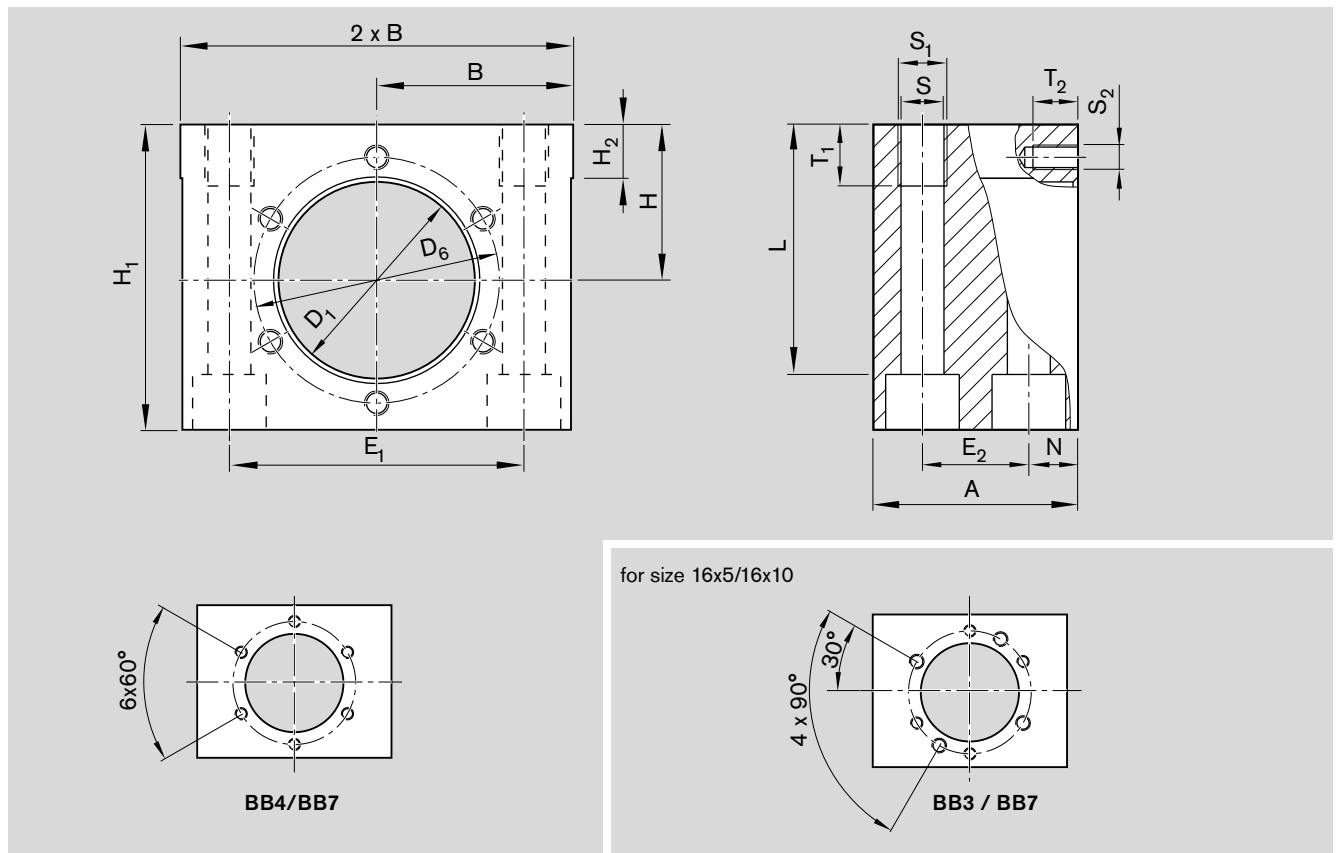
Tightening torque

see "Mounting"

Reference edges are formed on both sides.



Size $d_0 \times P$	Part number	Weight (kg)	Hole pattern		Hex socket cap screw ISO 4762
			FEM-E-S FDM-E-S FEP-E-S	SEM-E-S	
16x5R x 3	R1506 000 20	0.850	BB3	BB7	M8
16x10R x 3					
16x16R x 3	R1506 100 20	1.050	BB4	BB7	M8
20x5R x 3					
20x20R x 3.5	R1506 200 20	1.178	BB4	BB7	M8
20x40R x 3.5					
25x5R x 3					
25x10R x 3					
25x25R x 3.5	R1506 300 20	1.746	BB4	BB7	M10
32x5R x 3.5					
32x10R x 3.969					
32x20R x 3.969	R1506 400 20	2.367	BB4	BB7	M12
32x32R x 3.969					
40x5R x 6					
40x10R x 6	R1506 400 21	3.587	BB4	BB7	M14
40x20R x 6					
40x40R x 6	R1506 500 21	6.187	BB4	BB7	M16
50x5R x 3.5	R1506 500 20	4.000	BB4	BB7	M14
50x10R x 6	R1506 500 21	6.187	BB4	BB7	M16
50x20R x 6.5	R1506 600 20	7.173	BB4	BB7	M16
50x40R x 6.5					
63x10R x 6					
80x10R x 6.5	R1506 700 20	9.334	BB4	BB7	M16



Size	Dimensions (mm)															
$d_0 \times P$	D_1 H7	D_6	A	B ± 0.01	H ± 0.01	H_1	H_2	E_1	E_2	N	S	S_1	T_1	S_2	T_2	Clamping length L
16x5R x 3	28	40	40	35.0	28	55	10	52 ± 0.1	20 ± 0.1	10	8.4	M10	15	M6	10	44.0
16x10R x 3	33	45	40	37.5	32	62	10	56 ± 0.1	20 ± 0.1	10	8.4	M10	15	M6	10	51.0
16x16R x 3																
20x5R x 3																
20x20R x 3.5	38	50	40	42.5	34	65	10	63 ± 0.1	20 ± 0.1	10	8.4	M10	15	M6	10	54.0
20x40R x 3.5																
25x5R x 3																
25x10R x 3	48	60	50	47.5	38	75	10	72 ± 0.1	26 ± 0.1	12	10.5	M12	15	M6	10	61.0
25x25R x 3.5																
32x5R x 3.5																
32x10R x 3.969	56	68	60	52.5	42	82	12	82 ± 0.1	30 ± 0.1	15	13.0	M16	20	M6	12	64.0
32x20R x 3.969																
32x32R x 3.969																
40x5R x 6	63	78	65	60.0	50	98	12	93 ± 0.1	35 ± 0.1	15	15.0	M18	25	M8	14	79.5
40x10R x 6																
40x20R x 6																
40x40R x 6	72	90	80	70.0	58	113	12	108 ± 0.15	46 ± 0.15	17	17.0	M20	30	M10	18	92.0
50x5R x 3.5	68	82	65	65.0	52	101	12	100 ± 0.15	35 ± 0.15	15	15.0	M18	30	M8	14	82.5
50x10R x 6	72	90	80	70.0	58	113	12	108 ± 0.15	46 ± 0.15	17	17.0	M20	30	M10	18	92.0
50x20R x 6.5	85	105	80	75.0	65	128	15	121 ± 0.15	46 ± 0.15	17	17.0	M20	30	M10	18	107.0
50x40R x 6.5																
63x10R x 6																
80x10R x 6.5	105	125	80	85.0	78	153	15	140 ± 0.20	46 ± 0.15	17	17.0	M20	30	M12	20	132.0

Nut Housings

Nut Housing MGD

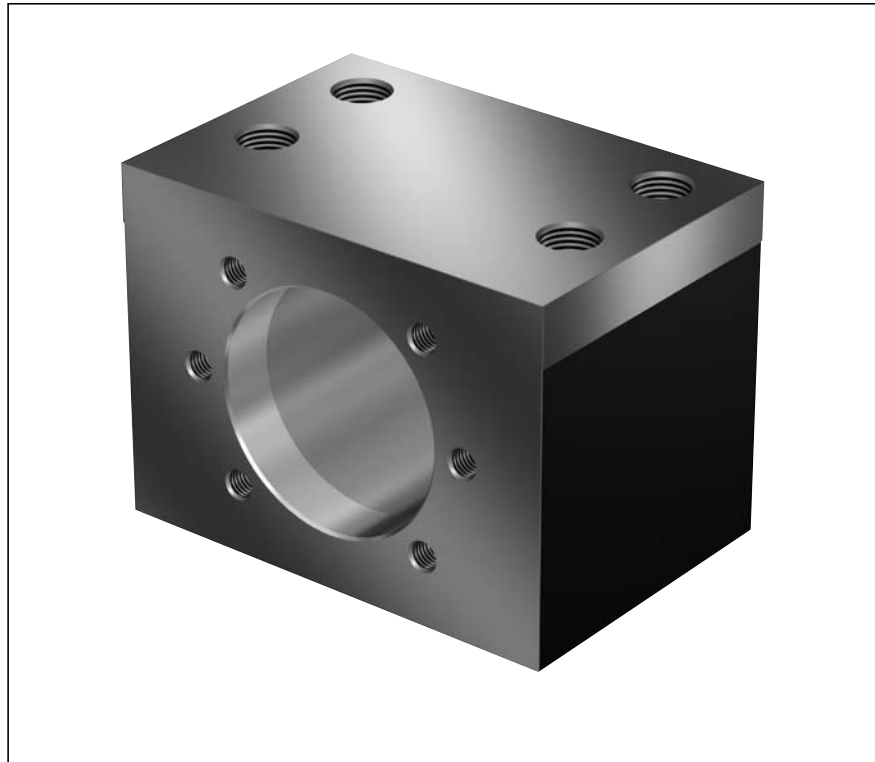
Steel nut housings MGD are designed for FEM-E-C, FDM-E-C and SEM-E-C ball nuts.

In addition to bolting, the housings should be locked in place by positive means (e.g. two pins with a diameter equal to that of the screws S_2). We recommend using screws with a strength class of 8.8.

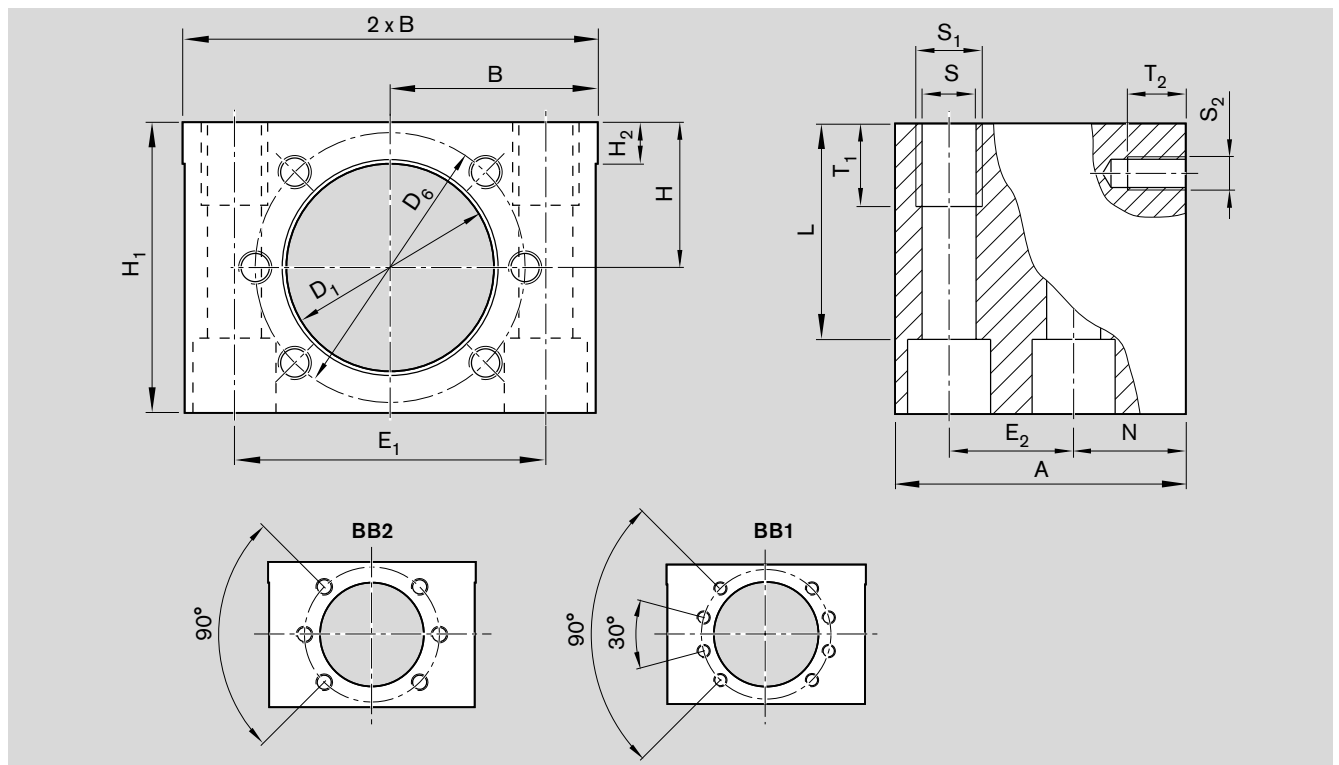
Tightening torque

see "Mounting"

Reference edges are formed on both sides.



Size $d_o \times P$	Part number	Weight (kg)	Hole pattern	Hex socket cap screw ISO 4762
16x5	R1506 000 50	0.91	BB2	M8
16x10				
16x16				
20x5	R1506 100 50	1.18	BB2	M8
20x20				
25x5	R1506 200 50	1.33	BB2	M8
25x10				
25x25				
32x5	R1506 300 50	2.27	BB2	M12
32x10				
32x20				
32x32				
40x5	R1506 400 50	3.61	BB1	M14
40x10				
40x12				
40x16				
40x20				
40x40				
50x5	R1506 500 50	5.63	BB1	M16
50x10				
50x12				
50x16				
50x20				
50x40				
63x10	R1506 600 50	6.72	BB1	M16
63x20	R1506 600 51	7.67	BB1	M16
63x40				
80x10	R1506 700 50	8.60	BB1	M16
80x20	R1506 700 51	10.53	BB1	M16



Size	Dimensions (mm)															Clamping length L
d ₀ x P	D ₁ H7	D ₆	A	B ±0.01	H ±0.01	H ₁	H ₂	E ₁	E ₂	N	S	S ₁	T ₁	S ₂	T ₂	
16x5	28	38	50	35	24	48	10	50±0.1	20±0.1	20	8.4	M10	15	M5	10	37.0
16x10																
16x16																
20x5	36	47	55	37.5	28	56	10	55±0.1	23±0.1	22	8.4	M10	15	M6	11	45.0
20x20																
25x5	40	51	55	40	30	60	10	60±0.1	23±0.1	22	8.4	M10	15	M6	11	
25x10																49.0
25x25																
32x5	50	65	70	50	35	70	10	75±0.1	30±0.1	27	13.0	M16	20	M8	14	
32x10																52.0
32x20																
32x32																
40x5	63	78	80	60	42	84	12	90±0.1	35±0.1	31	15.0	M18	25	M8	17	65.5
40x10																
40x12																
40x16																75.0
40x20																
40x40																
50x5	75	93	95	70	48	96	12	110±0.15	45±0.15	34	17.0	M20	30	M10	17	75.0
50x10																
50x12																
50x16																89.0
50x20																
50x40																
63x10	90	108	100	75	55	110	15	120±0.2	46±0.15	37	17.0	M20	30	M10	20	89.0
63x20	95	115	100	80	58	116	15	130±0.2	46±0.15	37	17.0	M20	30	M12	20	
63x40																
80x10	105	125	100	85	63	126	15	140±0.2	46±0.15	37	17.0	M20	30	M12	20	105.0
80x20	125	145	100	95	73	146	15	160±0.2	46±0.15	37	17.0	M20	30	M12	22	
																125.0

Nut Housings

Nut Housing MGA-Z

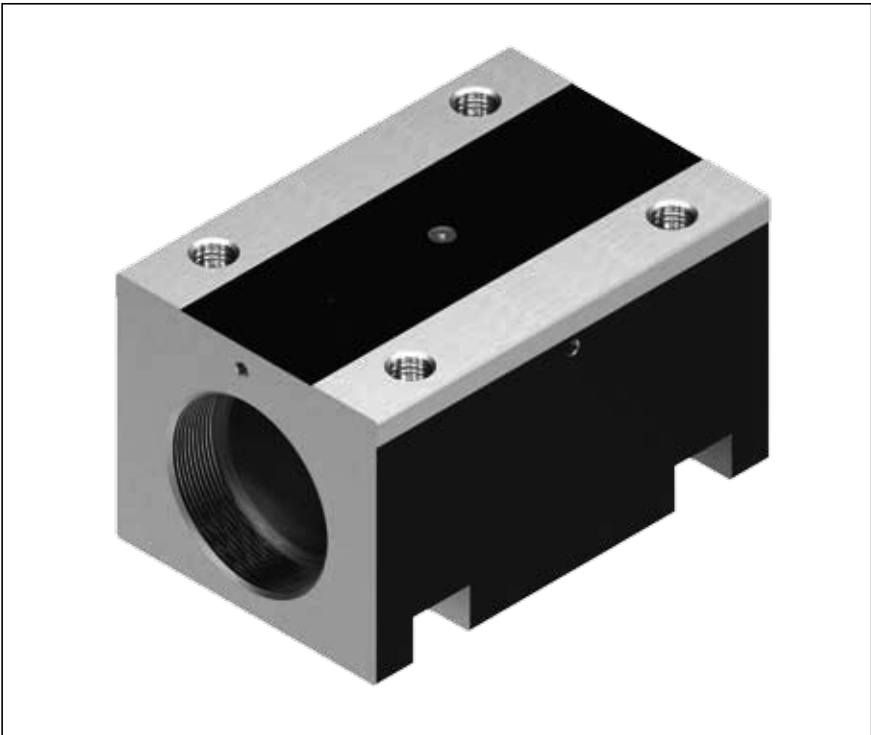
Aluminum nut housings MGA are designed for ZEM-E-S ball nuts.

We recommend using screws with a strength class of 8.8.

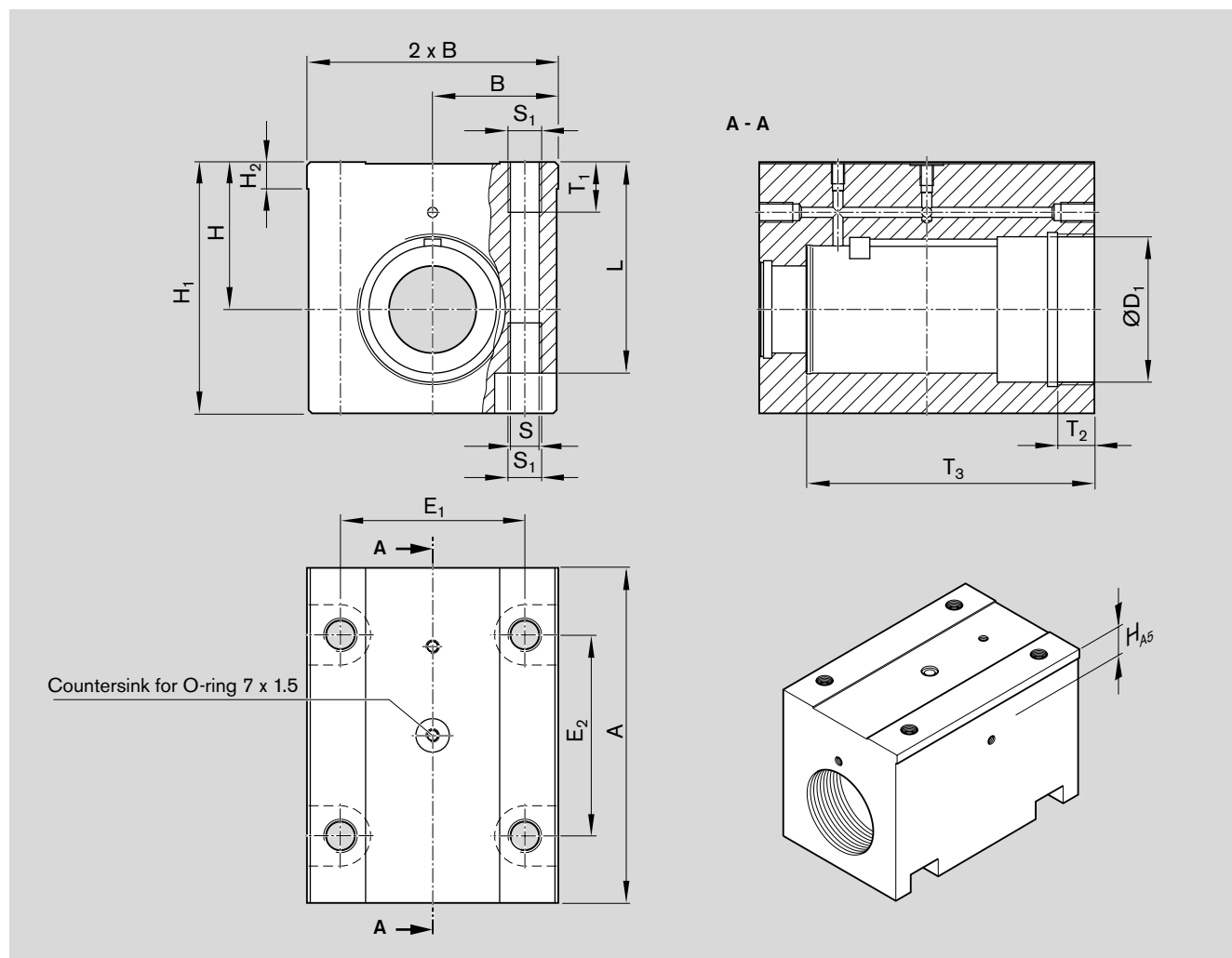
Tightening torque
see “Mounting”

Reference edges are formed on both sides.

Scope of supply: Includes set screws, spacer ring, ring nut, key



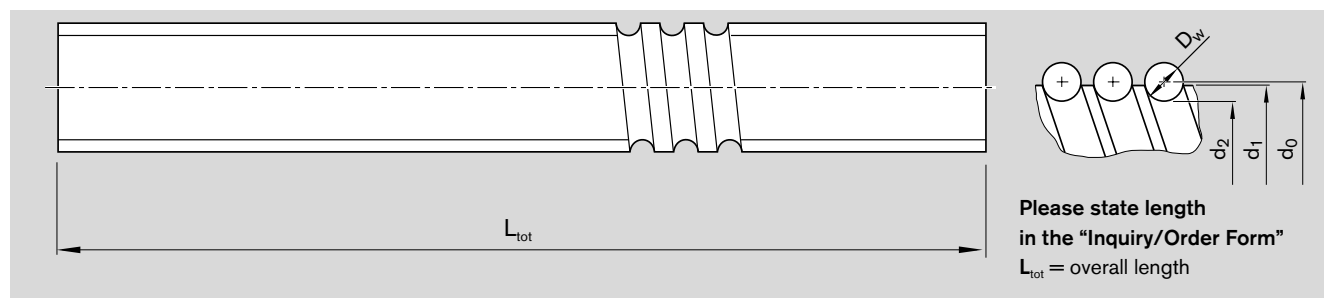
Size	Part number	Weight	Hex socket cap screw for screwing from below ISO 4762
d ₀ x P		(kg)	
20 x 5	R1506 100 70	1.10	M8
20 x 20			
32 x 5	R1506 300 70	2.31	M10
32 x 10			
32 x 20			
32 x 32			
40 x 5	R1506 400 70	4.323	M14
40 x 10			
40 x 20			
40 x 40			



Size d ₀ x P	Dimensions (mm)														
	A	B ±0.01	ØD ₁ H6	E ₁	E ₂	H ±0.01	H ₁	H ₂	H _{A5}	S	S ₁	T ₁	T ₂	T ₃	Clamping length L
20 x 5	100	37.5	38	55	60	44	75	8	15	8.6	M10	15	11	86	63
20 x 20															
32 x 5	150	50.0	50	75	100	49	80	9	16	10.5	M12	18	15	131	66
32 x 10															
32 x 20															
32 x 32															
40 x 5	180	60.0	63	90	120	59	105	10	18	14.5	M16	24	20	155	86
40 x 10															
40 x 20															
40 x 40															

Screws

Precision-Rolled Screw SN-R



Ordering code: SN 20 x 5R x 3 X X T7 R 00T200 00T200 1250 1 0

Size	Part number	Tolerance grade T5	Tolerance grade T7	Tolerance grade T9	Dimensions (mm)	Moment of inertia J _s (kgcm ² /m)	Maximum length (mm)	Weight (kg/m)
d ₀ x P x D _w					d ₁ d ₂		Standard On request	
6 x 1R x 0.8	R1531 105 00	R1531 107 00	R1531 109 00	6.0 5.3	0.02		On request	0.19
6 x 2R x 0.8	R1531 125 00	R1531 127 00	R1531 129 00	6.0 5.3	0.02			0.19
8 x 1R x 0.8	R1531 205 00	R1531 207 00	R1531 209 00	8.0 7.3	0.04			0.36
8 x 2R x 1.2	R1531 225 00	R1531 227 00	R1531 229 00	8.0 7.0	0.04			0.36
8 x 2.5R x 1.588	R1531 235 00	R1531 237 00	R1531 239 00	7.5 6.3	0.04			0.30
12 x 2R x 1.2	R1531 425 00	R1531 427 00	R1531 429 00	11.7 10.8	0.13	1500	2500	0.79
12 x 5R x 2	R1531 465 10	R1531 467 10	R1531 469 10	11.4 9.9	0.11			0.75
12 x 10R x 2	R1531 495 00	R1531 497 00	R1531 499 00	11.4 9.9	0.11			0.74
16 x 5L x 3	R1551 015 00	R1551 017 00	R1551 019 00	15.0 12.9	0.31			1.24
16 x 5R x 3	R1511 015 00	R1511 017 00	R1511 019 00	15.0 12.9	0.31			1.24
16 x 10R x 3	R1511 045 00	R1511 047 00	R1511 049 00	15.0 12.9	0.31			1.23
16 x 16R x 3	R1511 065 10	R1511 067 10	R1511 069 10	15.0 12.9	0.34			1.29
20 x 5R x 3	R1511 115 00	R1511 117 00	R1511 119 00	19.0 16.9	0.84			2.03
20 x 5L x 3	R1551 115 00	R1551 117 00	R1551 119 00	19.0 16.9	0.84			2.03
20 x 10R x 3	R1511 145 00	R1511 147 00	R1511 149 00	19.0 16.9	0.84			2.03
20 x 40R x 3.5-4	R2521 150 00	R2521 170 00	R2521 190 00	19.0 16.4	0.86			2.06
20 x 20R x 3.5	R1511 175 10	R1511 177 10	R1511 179 10	19.0 ¹⁾ 16.7	0.81			1.99
20 x 20L x 3.5	R1551 175 10	R1551 177 10	R1551 179 10	19.0 16.7	0.81			1.99
25 x 5R x 3	R1511 215 00	R1511 217 00	R1511 219 00	24.0 21.9	2.22	2500	5000	3.31
25 x 5L x 3	R1551 215 00	R1551 217 00	R1551 219 00	24.0 21.9	2.22			3.31
25 x 10R x 3	R1511 245 00	R1511 247 00	R1511 249 00	24.0 21.9	2.39			3.43
25 x 25R x 3.5	R1511 285 10	R1511 287 10	R1511 289 10	24.0 21.4	2.15			3.25
25 x 25L x 3.5	R1551 285 10	R1551 287 10	R1551 289 10	24.0 21.4	2.15			3.25
32 x 5R x 3.5	R1511 315 00	R1511 317 00	R1511 319 00	31.0 28.4	6.05			5.45
32 x 5L x 3.5	R1551 315 00	R1551 317 00	R1551 319 00	31.0 28.4	6.05			5.45
32 x 10R x 3.969	R1511 345 10	R1511 347 10	R1511 349 10	31.0 27.9	6.40			5.60
32 x 20R x 3.969	R1511 375 10	R1511 377 10	R1511 379 10	31.0 27.9	6.39			5.60
32 x 32R x 3.969	R1511 395 10	R1511 397 10	R1511 399 10	31.0 27.9	6.17			5.50
40 x 5R x 3.5	R1511 415 00	R1511 417 00	R1511 419 00	39.0 36.4	15.64	4500	5000	8.78
40 x 5L x 3.5	R1551 415 00	R1551 417 00	R1551 419 00	39.0 36.4	15.64			8.78
40 x 10R x 6	R1511 445 00	R1511 447 00	R1511 449 00	38.0 33.8	13.55	4500	7500	8.15
40 x 10L x 6	R1551 445 00	R1551 447 00	R1551 449 00	38.0 33.8	13.55			8.15
40 x 12R x 6	R1511 455 00	R1511 457 00	R1511 459 00	38.0 33.8	13.97			8.27
40 x 16R x 6	R1511 465 00	R1511 467 00	R1511 469 00	38.0 33.8	12.90			7.95
40 x 20R x 6	R1511 475 00	R1511 477 00	R1511 479 00	38.0 33.8	13.52			8.14
40 x 40R x 6	R1511 495 10	R1511 497 10	R1511 499 10	38.0 33.8	13.42			8.11
50 x 5R x 3.5	R1511 515 00	R1511 517 00	R1511 519 00	49.0 46.4	40.03	4500	5000	14.05
50 x 10R x 6	R1511 545 00	R1511 547 00	R1511 549 00	48.0 43.8	35.71	4500	7500	13.25
50 x 12R x 6	R1511 555 00	R1511 557 00	R1511 559 00	48.0 43.8	36.58			13.41
50 x 16R x 6	R1511 565 00	R1511 567 00	R1511 569 00	48.0 43.8	34.37			13.00
50 x 20R x 6.5	R1511 575 10	R1511 577 10	R1511 579 10	48.0 43.3	34.50			13.01
50 x 25R x 6.5 ²⁾	R1511 585 00	R1511 587 00	R1511 589 00	48.0 43.3	32.40			12.58
50 x 40R x 6.5	R1511 595 10	R1511 597 10	R1511 599 10	48.0 43.3	34.34			12.98
63 x 10R x 6	R1511 645 00	R1511 647 00	R1511 649 00	61.0 56.8	95.82			21.72
63 x 20R x 6.5	R1511 675 10	R1511 677 10	R1511 679 10	61.0 56.3	93.29			21.42
63 x 40R x 6.5	R1511 695 10	R1511 697 10	R1511 699 10	61.0 56.3	93.08			21.40
80 x 10R x 6.5	R1511 745 00	R1511 747 00	R1511 749 00	78.0 73.3	256.86			35.58
80 x 20R x 12.7	R1501 771 00	R1501 773 00	R1501 775 00	76.0 66.9	211.51	2500	5000	32.16

1) The outer diameter d₁ has been changed.

2) In preparation

Precision-rolled screws SN-R, with mechanically connected screw ends

These screws consist of

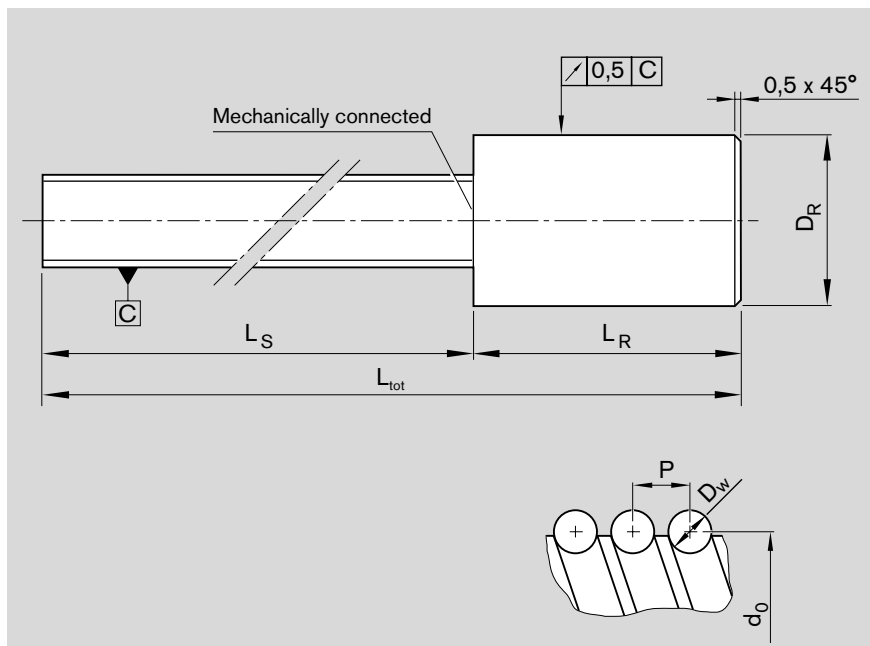
- a precision-rolled screw part and
- an unmachined spigot.

The spigot is mechanically connected on one side and is available in different sizes.

We have a solution to prevent problems arising from big end bearing diameters (e.g. visible thread grooves or axial contact faces which are too small for the fixed bearing).

Please ask.

Separate delivery of a screw without end machining and without nut is not planned.

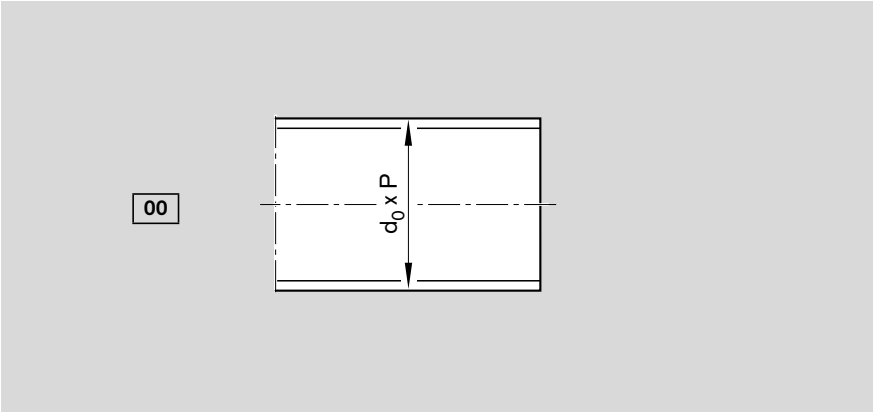


Size $d_0 \times P \times D_w$	Tolerance grade	Dimensions (mm)			
		D_R -1	L_R +2	L_{tot}	L_S
6 x 1R x 0.8	On request				
6 x 2R x 0.8					
8 x 1R x 0.8					
8 x 2R x 1.2					
8 x 2.5R x 1.588	T5	14.25	100	1100 (1500 ¹⁾)	1000 (1400 ¹⁾)
12 x 2R x 1.2	T5	23.25	100	1100 (1500 ¹⁾)	1000 (1400 ¹⁾)
12 x 5R x 2	T5	23.25	150	1250 (1500 ¹⁾)	1100 (1350 ¹⁾)
12 x 10R x 2	T5	23.30	150	1250 (1500 ¹⁾)	1100 (1350 ¹⁾)
16 x 5R x 3	T5	30.35	200	1700	1500
16 x 10R x 3	T5	30.35	200	1700	1500
16 x 16R x 3	T5	30.35	200	1700	1500
20 x 5R x 3	T5	31.50	200	1700	1500
20 x 20R x 3.5	T5	30.35	160	1160	1000
25 x 5R x 3	T5	36.60	200	1700	1500
25 x 10R x 3	T5	36.60	200	1700	1500
25 x 25R x 3.5	T5	36.60	200	1700	1500
32 x 5R x 3.5	T5	46.60	250	2050	1800
32 x 10R x 3.969	T5	46.60	250	2050	1800
32 x 20R x 3.969	T5	46.60	250	2050	1800
32 x 32R x 3.969	T5	46.60	250	2050	1800
40 x 10R x 6	T5	49.30	300	2300	2000
40 x 20R x 6	T5	49.30	300	2300	2000
50 x 10R x 6	T5	61.30	300	2300	2000
50 x 20R x 6.5	T5	61.30	300	2300	2000

1) Values in parentheses apply for screw ends 83; 84 and 93; 94

Screw Ends

Form 00, end cut to size, machining of end face



Option (machining of end face)	
Z	
S	
K	None, ball entry zone rounded

Ordering code: SEM-E-S 20 x 5R x 3-4 X X T7 R 00Z200 82Z120 1250 1 0

Form	Version	Ball screw size		Centering hole		Hex socket	
		d_0	P	Z	t_z	S	t_s
00	060	6	1/2	—	—	—	—
	080	8	1/2/2.5	—	—	—	—
	120	12	2/5/10	—	—	4	4
	160	16	5/10/16	M4	10	5	5
	200	20	5/20/40	M6	16	8	8
	250	25	5/10/25	M8	19	10	10
	320	32	5/10/20/32	M10	22	12	12
	400	40	5/10/12/16/20/40	M12	28	14	14
	500	50	5/10/12/16/20/40	M16	36	17	17
	630	63	10/20/40	M20	42	17	17
	800	80	10/20	M20	42	17	17

Form 00, end cut to size only “T”, for separately delivered screw SN

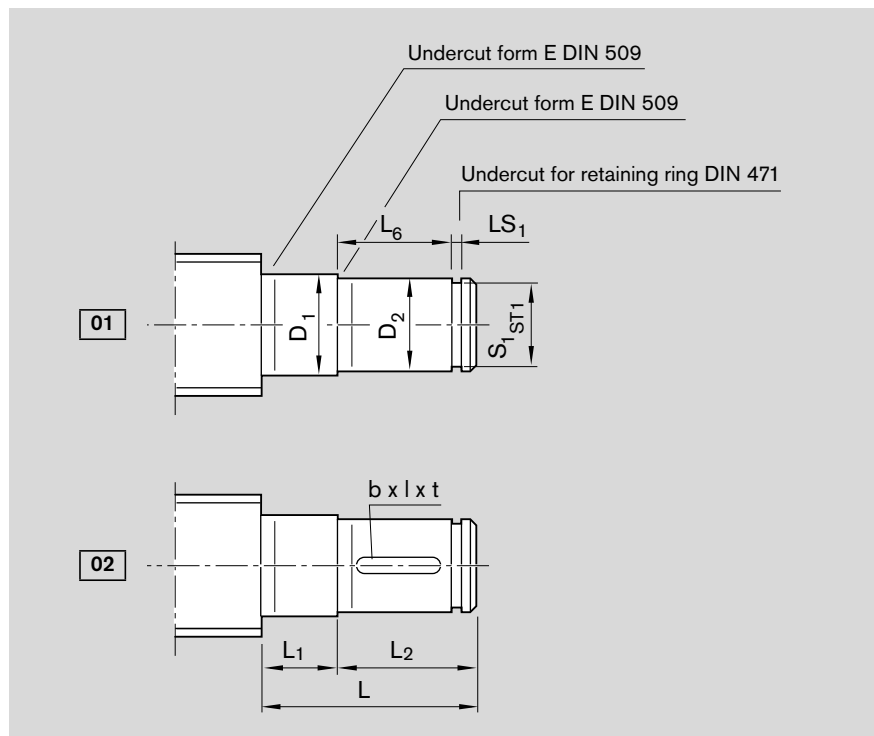
Option (machining of end face)	
T	None, cut to size only, not prepared for ball nut mounting

Ordering code: SN 20 x 5R x 3-4 X X T7 R 00T200 00T200 1250 1 0

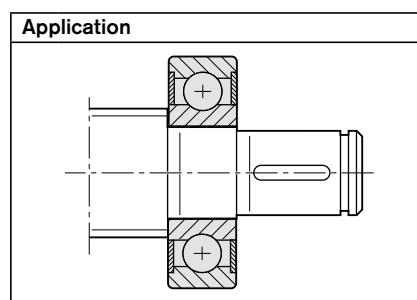
Form	Version	Ball screw size	
		d ₀	P
00	060	6	1/2
	080	8	1/2/2.5
	120	12	2/5/10
	160	16	5/10/16
	200	20	5/20/40
	250	25	5/10/25
	320	32	5/10/20/32
	400	40	5/10/12/16/20/40
	500	50	5/10/12/16/20/40
	630	63	10/20/40
	800	80	10/20

Screw Ends

Form 01–02



Option (machining of end face)	
Z	
S	
K	None



Ordering code: SEM-E-S 20 x 5R x 3-4 X X T7 R 02Z120 82Z120 1250 1 0

Form	Ver- sion ¹⁾	Size		Dimensions (mm)									Keyway per DIN 6885			Centering hole		Hex socket	
		d ₀	P	L	D ₁ j6	L ₁	D ₂ h7	L ₂	L ₆	S ₁	ST1	LS ₁ H13	b P9	l	t	Z	t _z	S	t _s
01	050	8	2.5	19	5	5	4	14	12	3.8	h10	0.50	–	–	–	–	–	–	–
	060	12	2/5/10	24	6	6	5	18	16	4.8	h10	0.70	–	–	–	–	–	–	–
	100	16	5/10/16	32	10	9	8	23	20	7.6	h10	1.10	–	–	–	–	–	–	–
	120	20	5/20/40	38	12	10	10	28	25	9.6	h10	1.10	–	–	–	–	–	4	4
	150	20	5/20/40	39	15	11	12	28	25	11.5	h11	1.10	–	–	–	M4	10	4	4
	170	25	5/10/25	45	17	12	15	33	30	14.3	h11	1.10	–	–	–	M5	12	4	4
	200	32	5/10/20/32	58	20	14	18	44	40	17.0	h11	1.30	–	–	–	M6	16	5	5
	250	32	5/10/20/32	69	25	15	22	54	50	21.0	h11	1.30	–	–	–	M8	19	6	6
	300	40	5/10/12/16/20/40	70	30	16	28	54	50	26.6	h12	1.60	–	–	–	M10	22	10	10
	350	50	5/10/12/16/20/40	82	35	17	32	65	60	30.3	h12	1.60	–	–	–	M12	28	10	10
	500	63	10/20/40	107	50	20	48	87	80	45.5	h12	1.85	–	–	–	M16	36	17	17
600	80	10/20	109	60	22	58	87	80	55.0	h12	2.15	–	–	–	M20	42	17	17	
02	120	20	5/20/40	38	12	10	10	28	25	9.6	h10	1.10	3	20	1.8	–	–	4	4
	150	20	5/20/40	39	15	11	12	28	25	11.5	h11	1.10	4	20	2.5	M4	10	4	4
	170	25	5/10/25	45	17	12	15	33	30	14.3	h11	1.10	5	25	3.0	M5	12	4	4
	200	32	5/10/20/32	58	20	14	18	44	40	17.0	h11	1.30	6	28	3.5	M6	16	5	5
	250	32	5/10/20/32	69	25	15	22	54	50	21.0	h11	1.30	6	36	3.5	M8	19	6	6
	300	40	5/10/12/16/20/40	70	30	16	28	54	50	26.6	h12	1.60	8	36	4.0	M10	22	10	10
	350	50	5/10/12/16/20/40	82	35	17	32	65	60	30.3	h12	1.60	10	40	5.0	M12	28	10	10
	500	63	10/20/40	107	50	20	48	87	80	45.5	h12	1.85	14	63	6.0	M16	36	17	17
600	80	10/20	109	60	22	58	87	80	55.0	h12	2.15	16	63	6.0	M20	42	17	17	

1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 01–02

Deep-groove ball bearing per DIN 625



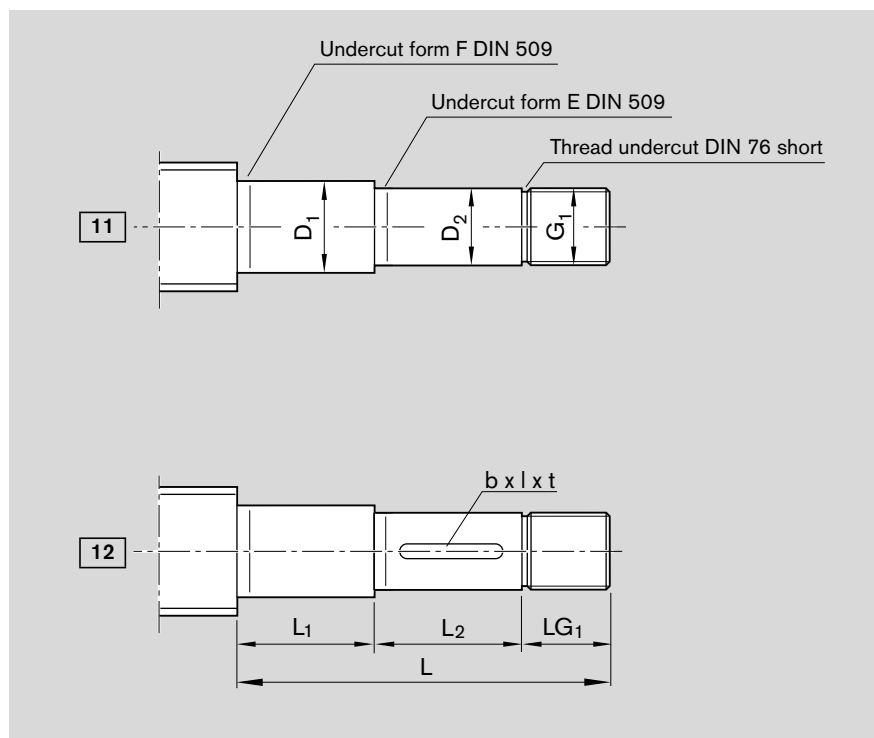
Retaining ring per DIN 471



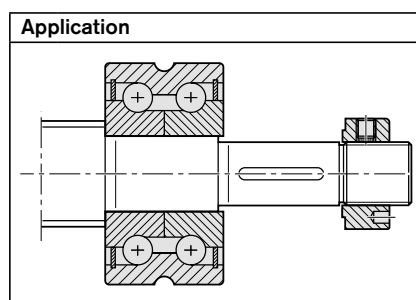
Form	Ver- sion	Size		Deep-groove ball bearing per DIN 625		Retaining ring per DIN 471	
		d ₀	P	Desig- nation	Part number	Desig- nation	Part number
01	050	8	2,5	625.2RS	R3414 048 00	4x0.4	R3410 765 00
	060	12	2/5/10	626.2RS	R3414 043 00	5x0.6	R3410 742 00
	100	16	5/10/16	6200.2RS	R3414 049 00	8x0.8	R3410 737 00
	120	20	5/20/40	6201.2RS	R3414 042 00	10x1	R3410 745 00
	150	20	5/20/40	6202.2RS	R3414 074 00	12x1	R3410 712 00
	170	25	5/10/25	6203.2RS	R3414 050 00	15x1	R3410 748 00
	200	32	5/10/20/32	6204.2RS	R3414 038 00	18x1.2	R3410 723 00
	250	32	5/10/20/32	6205.2RS	R3414 063 00	22x1.2	R3410 714 00
	300	40	5/10/12/16/20/40	6206.2RS	R3414 051 00	28x1.5	R3410 752 00
	350	50	5/10/12/16/20/40	6207.2RS	R3414 075 00	32x1.5	R3410 753 00
	500	63	10/20/40	6210.2RS	R3414 077 00	48x1.75	R3410 718 00
	600	80	10/20	6212.2RS	R3414 078 00	58x2	R3410 728 00
02	120	20	5/20/40	6201.2RS	R3414 042 00	10x1	R3410 745 00
	150	20	5/20/40	6202.2RS	R3414 074 00	12x1	R3410 712 00
	170	25	5/10/25	6203.2RS	R3414 050 00	15x1	R3410 748 00
	200	32	5/10/20/32	6204.2RS	R3414 038 00	18x1.2	R3410 723 00
	250	32	5/10/20/32	6205.2RS	R3414 063 00	22x1.2	R3410 714 00
	300	40	5/10/12/16/20/40	6206.2RS	R3414 051 00	28x1.5	R3410 752 00
	350	50	5/10/12/16/20/40	6207.2RS	R3414 075 00	32x1.5	R3410 753 00
	500	63	10/20/40	6210.2RS	R3414 077 00	48x1.75	R3410 718 00
	600	80	10/20	6212.2RS	R3414 078 00	58x2	R3410 728 00

Screw Ends

Form 11–12



Option (machining of end face)	
Z	
S	
K	None



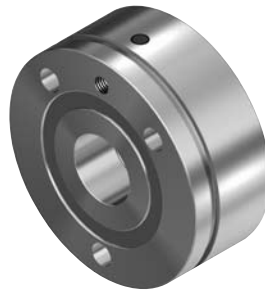
Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 12Z120 41Z120 1250 1 0

Form	Version ¹⁾	Size		Dimensions (mm)							Keyway per DIN 6885			Centering hole		Hex socket	
		d ₀	P	L	D ₁ h6	L ₁	D ₂ h7	L ₂	G ₁	LG ₁	b P9	l	t	Z	t _z	S	t _s
11	100	16	5/10/16	48	10	18	8	20	M6x0.5	10	–	–	–	–	–	–	–
	120	20	5/20/40	60	12	23	10	25	M10x1	12	–	–	–	–	–	4	4
	170	25	5/10/25	75	17	23	15	30	M15x1	22	–	–	–	M5	12	4	4
	200	32	5/10/20/32	88	20	26	18	40	M17x1	22	–	–	–	M5	12	5	5
	250	40	10/12/16/20/40	126	25	54	22	50	M20x1	22	–	–	–	M6	16	5	5
	300	40	5	101	30	25	28	50	M25x1.5	26	–	–	–	M8	19	8	8
	301	50	10/12/16/20/40	130	30	54	28	50	M25x1.5	26	–	–	–	M8	19	8	8
	350	50	5	118	35	32	32	60	M30x1.5	26	–	–	–	M10	22	10	10
	400	63	10/20/40	132	40	44	38	60	M35x1.5	28	–	–	–	M12	28	12	21
	500	80	10/20	160	50	52	48	80	M40x1.5	28	–	–	–	M16	36	12	12
12	120	20	5/20/40	60	12	23	10	25	M10x1	12	3	20	1.8	–	–	4	4
	170	25	5/10/25	75	17	23	15	30	M15x1	22	5	25	3.0	M5	12	4	4
	200	32	5/10/20/32	88	20	26	18	40	M17x1	22	6	28	3.5	M5	12	5	5
	250	40	10/12/16/20/40	126	25	54	22	50	M20x1	22	6	36	3.5	M6	16	5	5
	300	40	5	101	30	25	28	50	M25x1.5	26	8	36	4.0	M8	19	8	8
	301	50	10/12/16/20/40	130	30	54	28	50	M25x1.5	26	8	36	4.0	M8	19	8	8
	350	50	5	118	35	32	32	60	M30x1.5	26	10	40	5.0	M10	22	10	10
	400	63	10/20/40	132	40	44	38	60	M35x1.5	28	10	40	5.0	M12	28	12	12
	500	80	10/20	160	50	52	48	80	M40x1.5	28	14	63	5.5	M16	36	12	12

1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 11–12

Angular-contact thrust ball bearing LGF



Angular-contact thrust ball bearing LGN



Slotted nut NMZ



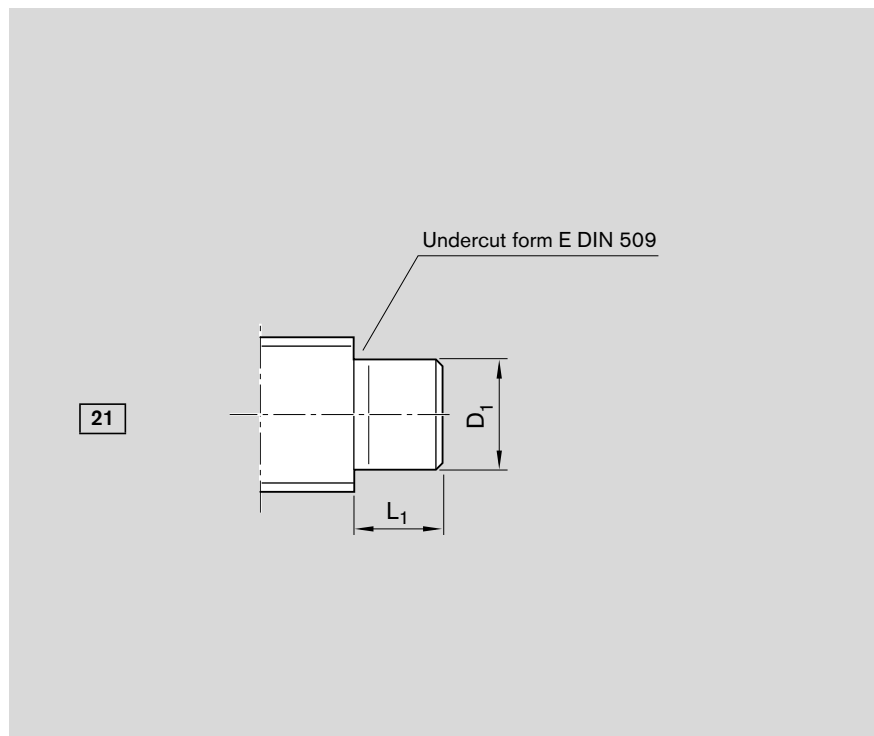
Slotted nut NMA



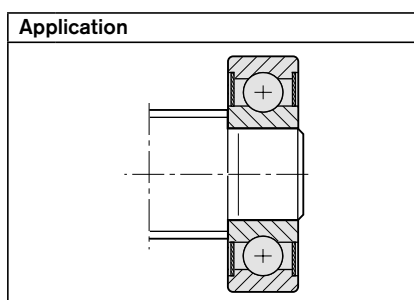
Form	Version	Size		Angular-contact thrust ball bearing				Slotted nut	
		d ₀	P	LGF Designation	Part number	LGN Designation	Part number	Designation	Part number
11	100	16	5/10/16	–	–	LGN-B-1034	R3414 003 06	NMZ6x0.5	R3446 001 04
	120	20	5/20/40	LGF-B-1255	R3414 009 06	LGN-B-1242	R3414 004 06	NMZ10x1	R3446 002 04
	170	25	5/10/25	LGF-B-1762	R3414 010 06	LGN-B-1747	R3414 005 06	NMA15x1	R3446 020 04
	200	32	5/10/20/32	LGF-B-2068	R3414 001 06	LGN-B-2052	R3414 006 06	NMA17x1	R3446 014 04
	250	40	10/12/16/20/40	LGF-C-2575	R3414 015 06	LGN-C-2557	R3414 014 06	NMA20x1	R3446 015 04
	300	40	5	LGF-B-3080	R3414 011 06	LGN-B-3062	R3414 007 06	NMA25x1.5	R3446 011 04
	301	50	10/12/16/20/40	LGF-C-3080	R3414 027 06	LGN-C-3062	R3414 023 06	NMA25x1.5	R3446 011 04
	350	50	5	LGF-B-3590	R3414 026 06	LGN-B-3572	R3414 022 06	NMA30x1.5	R3446 016 04
	400	63	10/20/40	LGF-B-40115	R3414 028 06	LGN-A-4090	R3414 024 06	NMA35x1.5	R3446 012 04
	500	80	10/20	LGF-A-50140	R3414 029 06	LGN-A-50110	R3414 025 06	NMA40x1.5	R3446 018 04
12	120	20	5/20/40	LGF-B-1255	R3414 009 06	LGN-B-1242	R3414 004 06	NMZ10x1	R3446 002 04
	170	25	5/10/25	LGF-B-1762	R3414 010 06	LGN-B-1747	R3414 005 06	NMA15x1	R3446 020 04
	200	32	5/10/20/32	LGF-B-2068	R3414 001 06	LGN-B-2052	R3414 006 06	NMA17x1	R3446 014 04
	250	40	10/12/16/20/40	LGF-B-2575	R3414 015 06	LGN-C-2557	R3414 014 06	NMA20x1	R3446 015 04
	300	40	5	LGF-B-3080	R3414 011 06	LGN-B-3062	R3414 007 06	NMA25x1.5	R3446 011 04
	301	50	10/12/16/20/40	LGF-C-3080	R3414 027 06	LGN-C-3062	R3414 023 06	NMA25x1.5	R3446 011 04
	350	50	5	LGF-B-3590	R3414 026 06	LGN-B-3572	R3414 022 06	NMA30x1.5	R3446 016 04
	400	63	10/20/40	LGF-B-40115	R3414 028 06	LGN-A-4090	R3414 024 06	NMA35x1.5	R3446 012 04
	500	80	10/20	LGF-A-50140	R3414 029 06	LGN-A-50110	R3414 025 06	NMA40x1.5	R3446 018 04

Screw Ends

Form 21



Option (machining of end face)	
Z	
S	
K	None



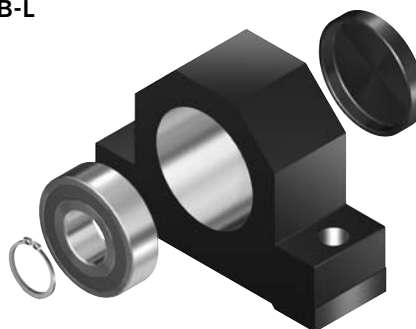
Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 21Z120 82Z120 1250 1 0

Form	Version ¹⁾	Size		Dimensions (mm)		Centering hole		Hex socket	
		d_0	P	D_1 j6	L_1	Z	t_z	S	t_s
21	050	8	2.5	5	5	–	–	–	–
	060	12	2/5/10	6	6	–	–	–	–
	100	16	5/10/16	10	9	–	–	4	4
	120	20	5/20/40	12	10	M4	10	4	4
	150	20	5/20/40	15	11	M5	12	4	4
	170	25	5/10/25	17	12	M6	16	5	5
	200	32	5/10/20/32	20	14	M6	19	5	5
	250	32	5/10/20/32	25	15	M10	22	8	8
	300	40	5	30	16	M10	22	10	10
	300	40	10/12/16/20/40	30	16	M10	22	10	10
	350	50	5	35	17	M12	18	12	12
	350	50	10/12/16/20/40	35	17	M12	18	12	12
	500	63	10/20/40	50	20	M16	36	17	17
	600	80	10/20	60	22	M20	42	17	17

1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 21

Pillow block unit SEB-L

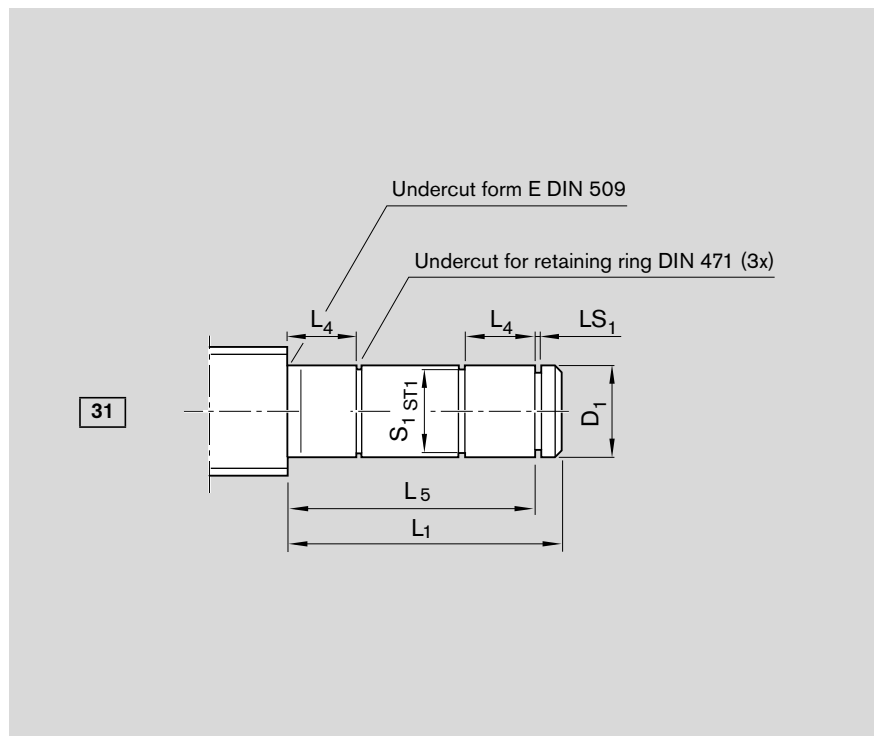
Bearing LAD²⁾

Form	Version	Size		Pillow block unit SEB-L	Bearing LAD ²⁾
		d ₀	P	Part number	Part number
21	050	8	2.5	R1591 605 00	R1590 605 00
	060	12	2/5/10	R1591 606 20	R1590 606 00
	100	16	5/10/16	R1591 610 20	R1590 610 00
	120	20	5/20/40	R1591 612 20	R1590 612 00
	150	20	5/20/40	–	R1590 615 00
	170	25	5/10/25	R1591 617 20	R1590 617 00
	200	32	5/10/20/32	R1591 620 20	R1590 620 00
	250	32	5/10/20/32	–	R1590 625 00
	300	40	5	R1591 630 20	R1590 630 00
	300	40	10/12/16/20/40	R1591 630 10	
	350	50	5	R1591 635 10	R1590 635 00
	350	50	10/12/16/20/40	R1591 635 20	
	500	63	10/20/40	R1591 650 20	R1590 650 00
	600	80	10/20	R1591 660 20	R1590 660 00

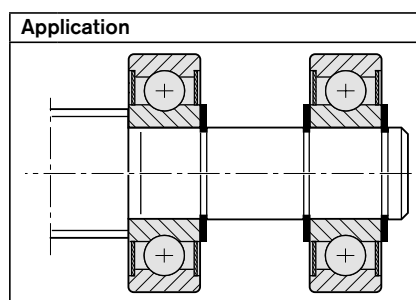
2) Items delivered: 1 bearing, 2 retaining rings.

Screw Ends

Form 31



Option (machining of end face)	
Z	
S	
K	None



Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 31Z120 82Z120 1250 1 0

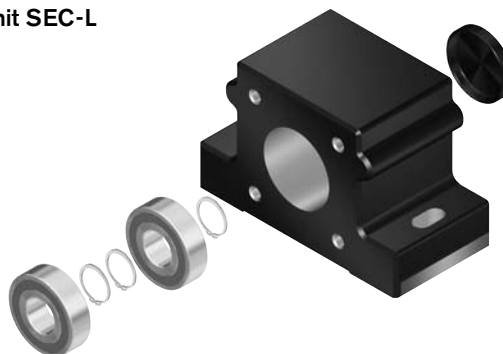
Form	Version ¹⁾	Size		Dimensions (mm)							Centering hole		Hex socket	
		d_0	P	D_1 j6	L_1	L_4	L_5	S_1	ST1	LS_1 H13	Z	t_z	S	t_s
31	050	8	2.5	5	22	5	20	4.8	h10	0.70	–	–	–	–
	060	12	2/5/10	6	26	6	24	5.7	h10	0.80	–	–	–	–
	100	16	5/10/16	10	39	9	36	9.6	h10	1.10	–	–	4	4
	120	20	5/20/40	12	43	10	40	11.5	h11	1.10	M4	10	4	4
	150	20	5/20/40	15	47	11	44	14.3	h11	1.10	M5	12	4	4
	170	25	5/10/25	17	51	12	48	16.2	h11	1.10	M6	16	5	5
	200	32	5/10/20/32	20	60	14	56	19.0	h11	1.30	M6	16	5	5
	250	32	5/10/20/32	25	64	15	60	23.9	h12	1.30	M10	22	8	8
	300	40	5/10/12/16/20/40	30	68	16	64	28.6	h12	1.60	M10	22	10	10
	350	50	5/10/12/16/20/40	35	73	17	68	33.0	h12	1.60	M12	28	12	12
	500	63	10/20/40	50	87	20	80	47.0	h12	2.15	M16	36	17	17
	600	80	10/20	60	95	22	88	57.0	h12	2.15	M20	42	17	17

1) The allocation of screw ends to the bearing is defined by the version.

Note: Form 31 with double floating bearing increases the critical speed, see page 124.

End bearings for screw ends form 31

Pillow block unit SEC-L

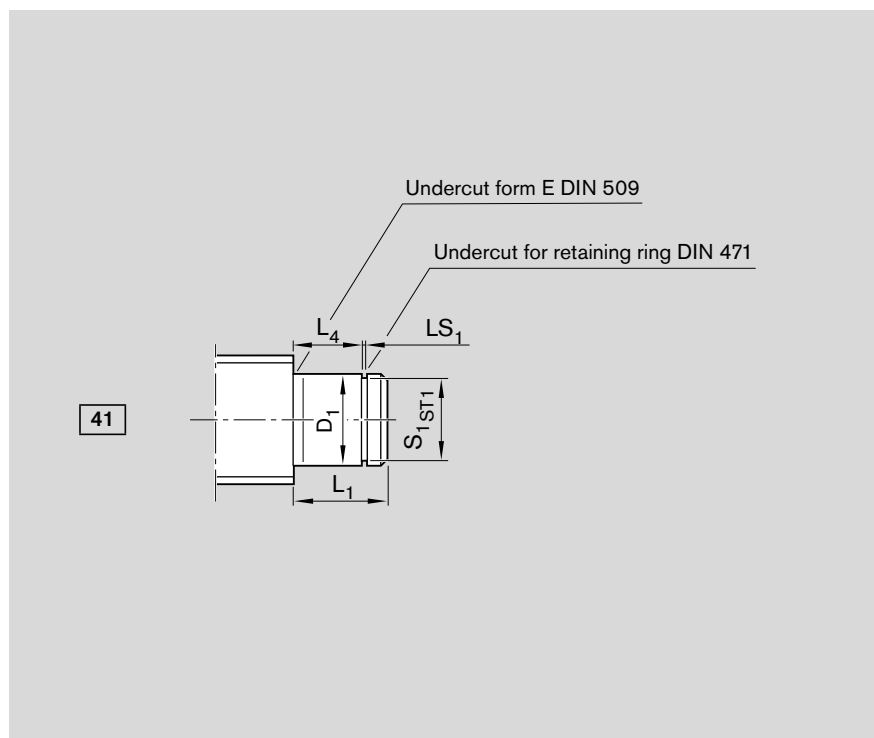
Bearing LAD²⁾

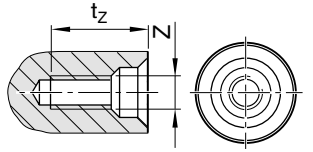
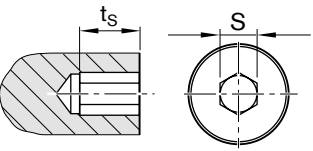
Form	Version	Size		Pillow block unit SEC-L Part number	Bearing LAD ²⁾ Part number
		d ₀	P		
31	050	8	2.5	–	R1590 605 00
	060	12	2/5/10	–	R1590 606 00
	100	16	5/10/16	–	R1590 610 00
	120	20	5/20/40	–	R1590 612 00
	150	20	5/20/40	R1594 615 00	R1590 615 00
	170	25	5/10/25	–	R1590 617 00
	200	32	5/10/20/32	R1594 620 00	R1590 620 00
	250	32	5/10/20/32	–	R1590 625 00
	300	40	5/10/12/16/20/40	R1594 630 00	R1590 630 00
	350	50	5/10/12/16/20/40	–	R1590 635 00
	500	63	10/20/40	–	R1590 650 00
	600	80	10/20	–	R1590 660 00

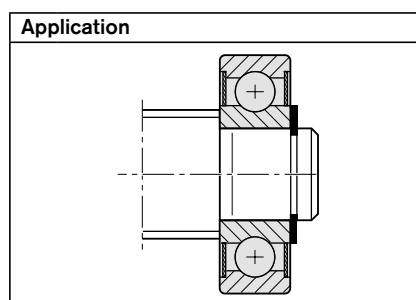
2) Items delivered per bearing LAD: 1 bearing, 2 retaining rings.
Two sets are required for applications with Form 31.

Screw Ends

Form 41



Option (machining of end face)	
Z	
S	
K	None



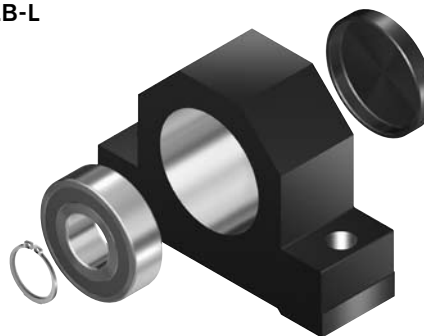
Ordering code: **SEM-E-S** 20 x 5R x 3-4 1 2 T7 R 41Z120 82Z120 1250 1 0

Form	Version ¹⁾	Size		Dimensions (mm)						Centering hole		Hex socket	
		d_0	P	D_1 j6	L_1	L_4	S_1	ST1	LS_1 H13	Z	t_z	S	t_s
41	050	8	1/2/2.5	5	7	5	4.8	h10	0.70	–	–	–	–
	060	12	2/5/10	6	8	6	5.7	h10	0.80	–	–	–	–
	100	16	5/10/16	10	12	9	9.6	h10	1.10	–	–	4	4
	120	20	5/20/40	12	13	10	11.5	h11	1.10	M4	10	4	4
	150	20	5/20/40	15	14	11	14.3	h11	1.10	M5	12	4	4
	170	25	5/10/25	17	15	12	16.2	h11	1.10	M6	16	5	5
	200	32	5/10/20/32	20	18	14	19.0	h11	1.30	M6	16	5	5
	250	32	5/10/20/32	25	19	15	23.9	h12	1.30	M10	22	8	8
	300	40	5	30	20	16	28.6	h12	1.60	M10	22	10	10
	300	40	10/12/16/20/40	30	20	16	28.6	h12	1.60	M10	22	10	10
	350	50	5	35	22	17	33.0	h12	1.60	M12	28	12	12
	350	50	10/12/16/20/40	35	22	17	33.0	h12	1.60	M12	28	12	12
	500	63	10/20/40	50	27	20	47.0	h12	2.15	M16	36	17	17
	600	80	10/20	60	29	22	57.0	h12	2.15	M20	42	17	17

1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 41

Pillow block unit SEB-L



Bearing LAD²⁾

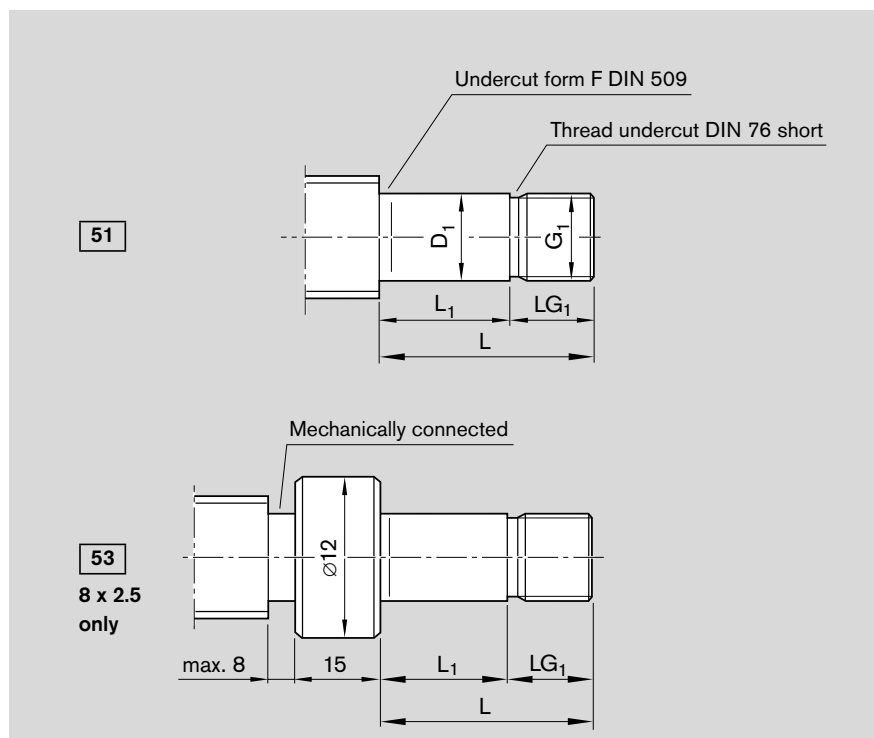


Form	Version	Size		Bearing LAD ²⁾	Pillow block unit SEB-L
		d ₀	P	Part number	Part number
41	050	8	1/2/2.5	R1590 605 00	R1591 605 00
	060	12	2/5/10	R1590 606 00	R1591 606 20
	100	16	5/10/16	R1590 610 00	R1591 610 20
	120	20	5/20/40	R1590 612 00	R1591 612 20
	150	20	5/20/40	R1590 615 00	–
	170	25	5/10/25	R1590 617 00	R1591 617 20
	200	32	5/10/20/32	R1590 620 00	R1591 620 20
	250	32	5/10/20/32	R1590 625 00	–
	300	40	5	R1590 630 00	R1591 630 20
	300	40	10/12/16/20/40	R1590 630 00	R1591 630 10
	350	50	5	R1590 635 00	R1591 635 10
	350	50	10/12/16/20/40	R1590 635 00	R1591 635 20
	500	63	10/20/40	R1590 650 00	R1591 650 20
	600	80	10/20	R1590 660 00	R1591 660 20

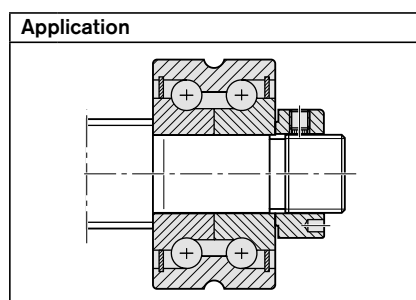
2) Items delivered: 1 bearing, 2 retaining rings.

Screw Ends

Form 51–53



Option (machining of end face)	
Z	
S	
K	None



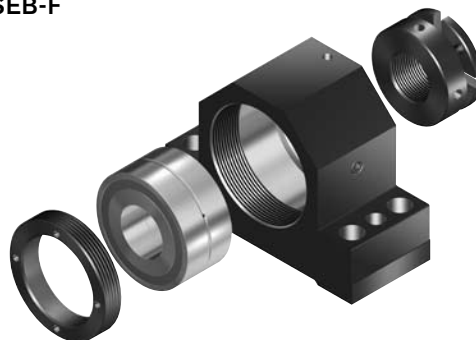
Ordering code: **SEM-E-S** 20 x 5R x 3-4 1 2 T7 R 51Z120 82Z120 1250 1 0

Form	Version ¹⁾	Size		Dimensions (mm)					Centering hole		Hex socket	
		d ₀	P	L	D ₁ h6	L ₁	G ₁	LG ₁	Z	t _Z	S	t _S
51	060	12	2/5/10	24	6	14	M6x0.5	10	–	–	–	–
	100	16	5/10/16	30	10	18	M10x1	12	–	–	4	4
	120	20	5/20/40	35	12	23	M12x1	12	M4	10	4	4
	170	25	5/10/25	45	17	23	M17x1	22	M5	12	5	5
	200	32	5/10/20/32	48	20	26	M20x1	22	M6	16	5	5
	250	40	10/12/16/20/40	80	25	54	M25x1.5	26	M8	19	8	8
	300	40	5	51	30	25	M30x1.5	26	M10	22	10	10
	300	40	10/12/16/20/40	51	30	25	M30x1.5	26	M10	22	10	10
	301	50	10/12/16/20/40	80	30	54	M30x1.5	26	M10	22	10	10
	350	50	5	60	35	32	M35x1.5	28	M12	28	12	12
	400	63	10/20/40	72	40	44	M40x1.5	28	M16	36	12	12
	500	80	10/20	84	50	52	M50x1.5	32	M16	36	17	17
53	060	8	2.5	24	6	14	M6x0.5	10	–	–	–	–

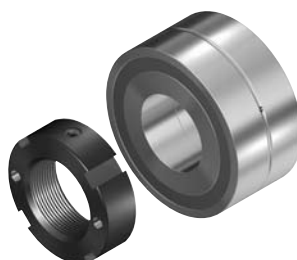
1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 51–53

Pillow block unit SEB-F



Bearing LAN



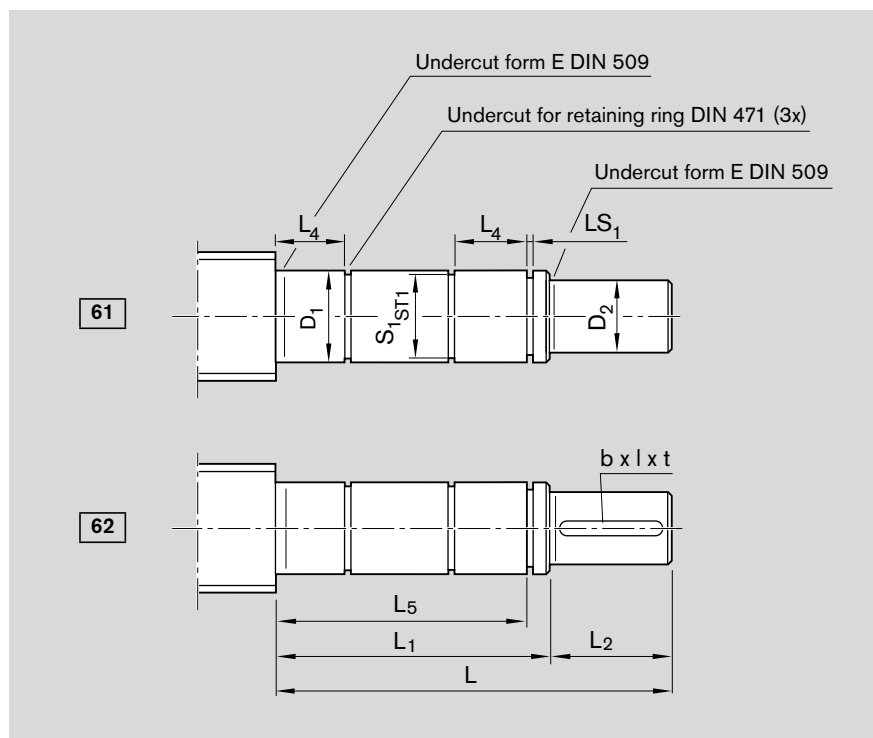
Bearing LAF



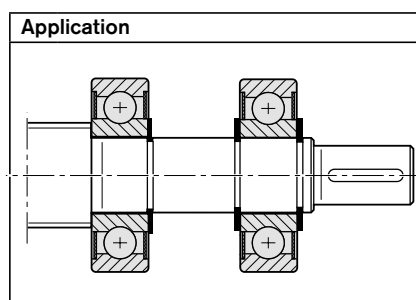
Form	Ver- sion	Size		Pillow block unit SEB-F Part number	Bearing LAF Part number	Bearing LAN Part number
		d ₀	P			
51	060	12	2/5/10	R1591 106 20	–	R1590 106 00
	100	16	5/10/16	R1591 110 20	–	R1590 110 00
	120	20	5/20/40	R1591 112 20	R1590 012 00	R1590 112 00
	170	25	5/10/25	R1591 117 30	R1590 017 30	R1590 117 30
	200	32	5/10/20/32	R1591 120 30	R1590 020 30	R1590 120 30
	250	40	10/12/16/20/40	R1591 225 30	R1590 325 30	R1590 225 30
	300	40	5	R1591 130 30	R1590 030 30	R1590 130 30
	300	40	10/12/16/20/40	–	–	–
	301	50	10/12/16/20/40	R1591 230 30	R1590 330 30	R1590 230 30
	350	50	5	R1591 135 30	R1590 035 30	R1590 135 30
	400	63	10/20/40	R1591 140 30	R1590 040 30	R1590 140 30
	500	80	10/20	R1591 150 30	R1590 050 30	R1590 150 30
53	060	8	2.5	R1591 106 00	–	R1590 106 00

Screw Ends

Form 61–62



Option (machining of end face)	
Z	
S	
K	None



Ordering code: **SEM-E-S** 20 x 5R x 3-4 1 2 T7 R **62Z120** 51Z120 1250 1 0

Form	Version ¹⁾	Size		Dimensions (mm)										Keyway per DIN 6885			Centering hole		Hex socket		
				d ₀	P	L	D ₁ j6	L ₁	D ₂ h7	L ₂	L ₄	L ₅	S ₁	ST1	LS ₁ H13	b P9	l	t	Z	t _z	S
61	050	8	2.5	34	5	22	4	12	5	20	4.8	h10	0.70	–	–	–	–	–	–	–	–
	060	12	2/5/10	42	6	26	5	16	6	24	5.7	h10	0.80	–	–	–	–	–	–	–	–
	100	16	5/10/16	59	10	39	8	20	9	36	9.6	h10	1.10	–	–	–	–	–	–	–	–
	120	20	5/20/40	68	12	43	10	25	10	40	11.5	h11	1.10	–	–	–	–	–	4	4	
	150	20	5/20/40	72	15	47	12	25	11	44	14.3	h11	1.10	–	–	–	M4	10	4	4	
	170	25	5/10/25	81	17	51	15	30	12	48	16.2	h11	1.10	–	–	–	M5	12	4	4	
	200	32	5/10/20/32	100	20	60	18	40	14	56	19.0	h11	1.30	–	–	–	M6	16	5	5	
	250	32	5/10/20/32	114	25	64	22	50	15	60	23.9	h12	1.30	–	–	–	M8	19	6	6	
	300	40	5/10/12/16/20/40	118	30	68	28	50	16	64	28.6	h12	1.60	–	–	–	M10	22	10	10	
	350	50	5/10/12/16/20/40	133	35	73	32	60	17	68	33.0	h12	1.60	–	–	–	M12	28	10	10	
62	500	63	10/20/40	167	50	87	48	80	20	80	47.0	h12	2.15	–	–	–	M16	36	17	17	
	600	80	10/20	175	60	95	58	80	22	88	57.0	h12	2.15	–	–	–	M20	42	17	17	
	120	20	5/20/40	68	12	43	10	25	10	40	11.5	h11	1.10	3	20	1.8	–	–	4	4	
	150	20	5/20/40	72	15	47	12	25	11	44	14.3	h11	1.10	4	20	2.5	M4	10	4	4	
	170	25	5/10/25	81	17	51	15	30	12	48	16.2	h11	1.10	5	25	3.0	M5	12	4	4	
	200	32	5/10/20/32	100	20	60	18	40	14	56	19.0	h11	1.30	6	28	3.5	M6	16	5	5	
	250	32	5/10/20/32	114	25	64	22	50	15	60	23.9	h12	1.30	6	36	3.5	M8	19	6	6	
	300	40	5/10/12/16/20/40	118	30	68	28	50	16	64	28.6	h12	1.60	8	36	4.0	M10	22	10	10	
	350	50	5/10/12/16/20/40	133	35	73	32	60	17	68	33.0	h12	1.60	10	40	5.0	M12	28	10	10	
	500	63	10/20/40	167	50	87	48	80	20	80	47.0	h12	2.15	14	63	5.5	M16	36	17	17	
600	80	10/20	175	60	95	58	80	22	88	57.0	h12	2.15	16	63	6.0	M20	46	17	17		

1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 61–62

Bearing LAD²⁾

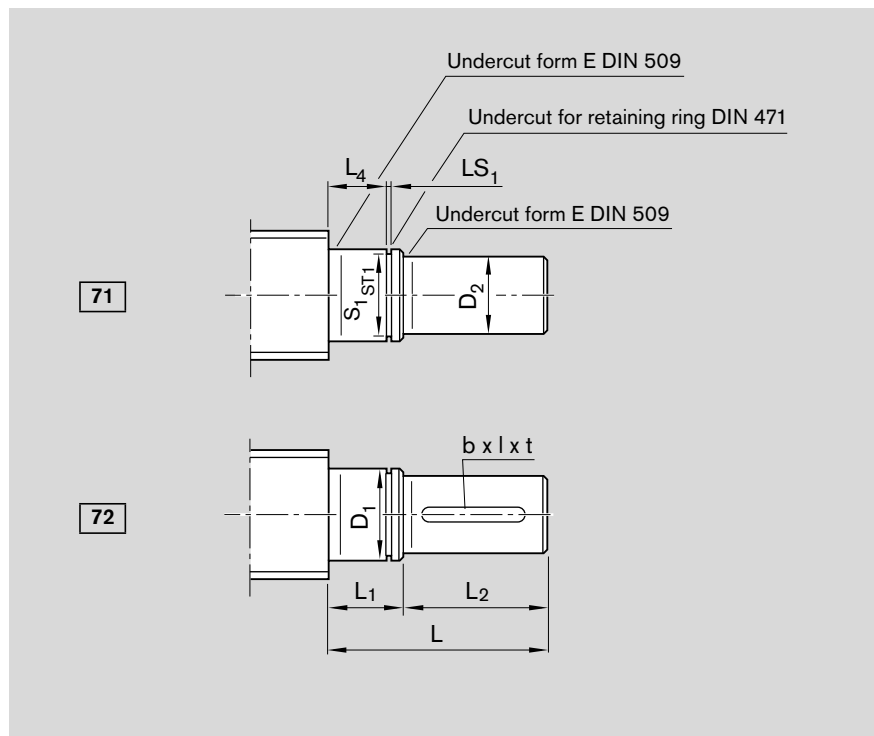


Form	Version	Size		Bearing LAD ²⁾ Part number
		d ₀	P	
61	050	8	2.5	R1590 605 00
	060	12	2/5/10	R1590 606 00
	100	16	5/10/16	R1590 610 00
	120	20	5/20/40	R1590 612 00
	150	20	5/20/40	R1590 615 00
	170	25	5/10/25	R1590 617 00
	200	32	5/10/20/32	R1590 620 00
	250	32	5/10/20/32	R1590 625 00
	300	40	5/10/12/16/20/40	R1590 630 00
	350	50	5/10/12/16/20/40	R1590 635 00
	500	63	10/20/40	R1590 650 00
	600	80	10/20	R1590 660 00
62	120	20	5/20	R1590 612 00
	150	20	5/20	R1590 615 00
	170	25	5/10/25	R1590 617 00
	200	32	5/10/20/32	R1590 620 00
	250	32	5/10/20/32	R1590 625 00
	300	40	5/10/12/16/20/40	R1590 630 00
	350	50	5/10/12/16/20/40	R1590 635 00
	500	63	10/20/40	R1590 650 00
	600	80	10/20	R1590 660 00

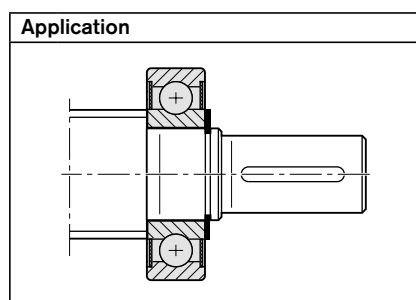
2) Items delivered per bearing: 1 bearing, 2 retaining rings.
Two sets are required for applications with Form 61–62.

Screw Ends

Form 71–72



Option (machining of end face)	
Z	
S	
K	None



Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 72Z120 51Z120 1250 1 0

Form	Version ¹⁾	Size		Dimensions (mm)									Keyway per DIN 6885			Centering hole		Hex socket	
				L	D ₁ j6	L ₁	D ₂ h7	L ₂	L ₄	S ₁	ST1	LS ₁ H13	b P9	l	t	Z	t _z	S	t _s
71	050	8	2.5	19	5	7	4	12	5	4.8	h10	0.70	–	–	–	–	–	–	–
	060	12	2/5/10	24	6	8	5	16	6	5.7	h10	0.80	–	–	–	–	–	–	–
	100	16	5/10/16	32	10	12	8	20	9	9.6	h10	1.10	–	–	–	–	–	–	–
	120	20	5/20/40	38	12	13	10	25	10	11.5	h11	1.10	–	–	–	–	–	4	4
	150	20	5/20/40	39	15	14	12	25	11	14.3	h11	1.10	–	–	–	M4	10	4	4
	170	25	5/10/25	45	17	15	15	30	12	16.2	h11	1.10	–	–	–	M5	12	4	4
	200	32	5/10/20/32	58	20	18	18	40	14	19.0	h11	1.30	–	–	–	M6	16	5	5
	250	32	5/10/20/32	69	25	19	22	50	15	23.9	h12	1.30	–	–	–	M8	19	6	6
	300	40	5/10/12/16/20/40	70	30	20	28	50	16	28.6	h12	1.60	–	–	–	M10	22	10	10
	350	50	5/10/12/16/20/40	82	35	22	32	60	17	33.0	h12	1.60	–	–	–	M12	28	10	10
72	500	63	10/20/40	107	50	27	48	80	20	47.0	h12	2.15	–	–	–	M16	36	17	17
	600	80	10/20	109	60	29	58	80	22	57.0	h12	2.15	–	–	–	M20	42	17	17
	120	20	5/20/40	38	12	13	10	25	10	11.5	h11	1.10	3	20	1.8	–	–	4	4
	150	20	5/20/40	39	15	14	12	25	11	14.3	h11	1.10	4	20	2.5	M4	10	4	4
	170	25	5/10/25	45	17	15	15	30	12	16.2	h11	1.10	5	25	3.0	M5	12	4	4
	200	32	5/10/20/32	58	20	18	18	40	14	19.0	h11	1.30	6	28	3.5	M6	16	5	5
	250	32	5/10/20/32	69	25	19	22	50	15	23.9	h12	1.30	6	36	3.5	M8	19	6	6
	300	40	5/10/12/16/20/40	70	30	20	28	50	16	28.6	h12	1.60	8	36	4.0	M10	22	10	10
	350	50	5/10/12/16/20/40	82	35	22	32	60	17	33.0	h12	1.60	10	40	5.0	M12	28	10	10
	500	63	10/20/40	107	50	27	48	80	20	47.0	h12	2.15	14	63	5.5	M16	36	17	17
	600	80	10/20	109	60	29	58	80	22	57.0	h12	2.15	16	63	6.0	M20	42	17	17

1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 71–72

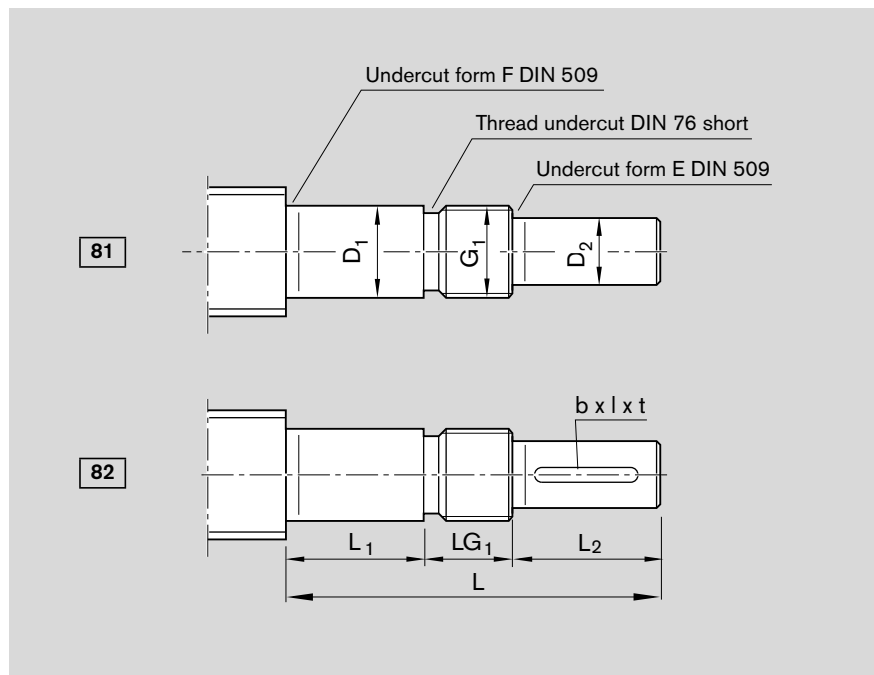
Bearing LAD²⁾

Form	Version	Size		Bearing LAD ²⁾ Part number
		d ₀	P	
71	050	8	2.5	R1590 605 00
	060	12	2/5/10	R1590 606 00
	100	16	5/10/16	R1590 610 00
	120	20	5/20/40	R1590 612 00
	150	20	5/20/40	R1590 615 00
	170	25	5/10/25	R1590 617 00
	200	32	5/10/20/32	R1590 620 00
	250	32	5/10/20/32	R1590 625 00
	300	40	5/10/12/16/20/40	R1590 630 00
	350	50	5/10/12/16/20/40	R1590 635 00
	500	63	10/20/40	R1590 650 00
72	600	80	10/20	R1590 660 00
	120	20	5/20/40	R1590 612 00
	150	20	5/20/40	R1590 615 00
	170	25	5/10/25	R1590 617 00
	200	32	5/10/20/32	R1590 620 00
	250	32	5/10/20/32	R1590 625 00
	300	40	5/10/12/16/20/40	R1590 630 00
	350	50	5/10/12/16/20/40	R1590 635 00
	500	63	10/20/40	R1590 650 00
	600	80	10/20	R1590 660 00

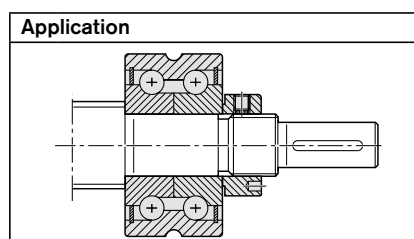
2) Items delivered: 1 bearing, 2 retaining rings.

Screw Ends

Form 81–82



Option (machining of end face)	
Z	
S	
K	None



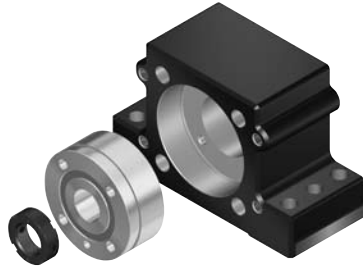
Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 82Z120 41Z120 1250 1 0

Form	Version ¹⁾	Size		Dimensions (mm)							Keyway per DIN 6885			Centering hole		Hex socket	
		d ₀	P	L	D ₁ h6	L ₁	D ₂ h7	L ₂	G ₁	LG ₁	b P9	l	t	Z	t _z	S	t _s
81	060	12	2/5/10	40	6	14	5	16	M6x0.5	10	–	–	–	–	–	–	–
	061	12	2/5/10	41	6	10	5	16	M6x0.5	15	–	–	–	–	–	–	–
	100	16	5/10/16	50	10	18	8	20	M10x1	12	–	–	–	–	–	–	–
	120	20	5/20/40	60	12	23	10	25	M12x1	12	–	–	–	–	–	4	4
	122	20	5	60	12	17	10	25	M12x1	18	–	–	–	–	–	4	4
	151	25	5/10	60	15	19	12	25	M15x1	16	–	–	–	M4	10	4	4
	170	25	5/10/25	75	17	23	15	30	M17x1	22	–	–	–	M5	12	4	4
	200	32	5/10/20/32	88	20	26	18	40	M20x1	22	–	–	–	M6	16	5	5
	203	32	5/10/20/32	78	20	26	16	35	M20x1	17	–	–	–	M5	12	4	4
	204	32	5/10	80	20	25	18	40	M20x1	15	–	–	–	M5	12	4	4
	250	40	10/12/16/20/40	130	25	54	22	50	M25x1.5	26	–	–	–	M8	19	6	6
	300	40	5	101	30	25	25	50	M30x1.5	26	–	–	–	M10	22	8	8
	301	40	5/10/12/16/20/40	93	30	25	25	50	M30x1.5	18	–	–	–	M10	22	8	8
	302	50	10/12/16/20/40	130	30	54	25	50	M30x1.5	26	–	–	–	M10	22	8	8
	350	50	5	110	35	32	30	50	M35x1.5	28	–	–	–	M10	22	10	10
	400	63	10/20/40	132	40	44	36	60	M40x1.5	28	–	–	–	M12	28	12	12
	500	80	10/20	154	50	52	40	70	M50x1.5	32	–	–	–	M16	36	12	12
82	120	20	5/20/40	60	12	23	10	25	M12x1	12	3	20	1.8	–	–	4	4
	170	25	5/10/25	75	17	23	15	30	M17x1	22	5	25	3.0	M5	12	4	4
	200	32	5/10/20/32	88	20	26	18	40	M20x1	22	6	28	3.5	M6	16	5	5
	203	32	5/10/20/32	78	20	26	16	35	M20x1	17	5	28	3.0	M5	12	4	4
	250	40	10/12/16/20/40	130	25	54	22	50	M25x1.5	26	6	36	3.5	M8	19	6	6
	300	40	5	101	30	25	25	50	M30x1.5	26	8	36	4.0	M10	22	8	8
	301	40	5/10/12/16/20/40	93	30	25	25	50	M30x1.5	18	8	36	4.0	M10	22	8	8
	302	50	10/12/16/20/40	130	30	54	25	50	M30x1.5	26	8	36	4.0	M10	22	8	8
	350	50	5	110	35	32	30	50	M35x1.5	28	8	36	4.0	M10	22	10	10
	400	63	10/20/40	132	40	44	36	60	M40x1.5	28	10	40	5.0	M12	28	12	12
	500	80	10/20	154	50	52	40	70	M50x1.5	32	12	50	5.0	M16	36	12	12

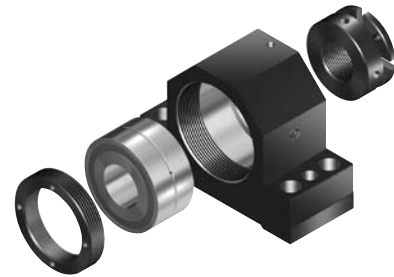
1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 81–82

Pillow block unit SEC-F



Pillow block unit SEB-F



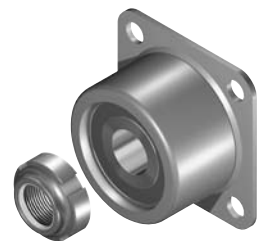
Bearing LAF



Bearing LAN



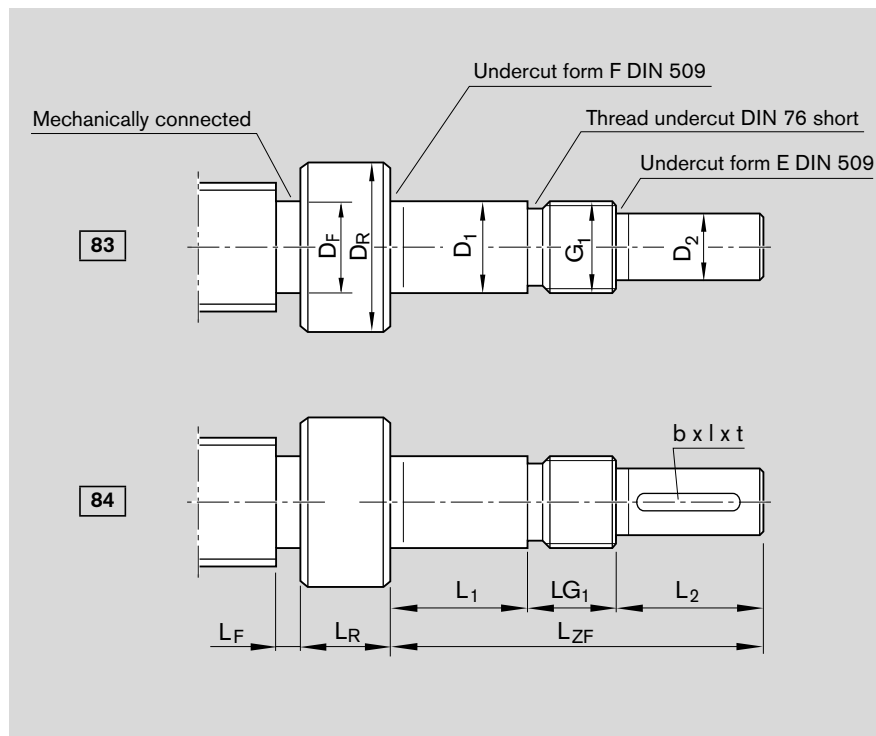
Bearing LAL



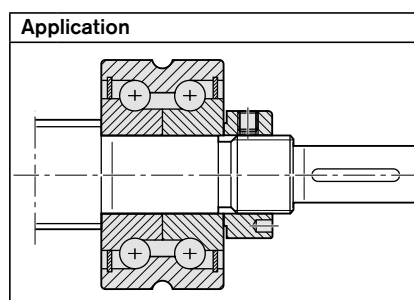
Form	Version	Size		Pillow block unit for motor attachment		Bearing LAF	Bearing LAN	Bearing LAL
		d ₀	P	SEC-F Part number	SEB-F Part number	Part number	Part number	Part number
81	060	12	2/5/10	–	R1591 106 20	–	R1590 106 00	–
	061	12	2/5/10	–	–	–	–	R1590 406 00
	100	16	5/10/16	–	R1591 110 20	–	R1590 110 00	–
	120	20	5/20/40	R1594 012 00	R1591 112 20	R1590 012 00	R1590 112 00	–
	122	20	5	–	–	–	–	R1590 412 00
	151	25	5/10	–	–	–	–	R1590 415 00
	170	25	5/10/25	–	R1591 117 30	R1590 017 30	R1590 117 30	–
	200	32	5/10/20/32	–	R1591 120 30	R1590 020 30	R1590 120 30	–
	203	32	5/10/20/32	R1594 020 00	–	R1590 020 00	R1590 120 00	–
	204	32	5/10	–	–	–	–	R1590 420 00
	250	40	10/12/16/20/40	–	R1591 225 30	R1590 325 30	R1590 225 30	–
	300	40	5	–	R1591 130 30	R1590 030 30	R1590 130 30	–
	301	40	5/10/12/16/20/40	R1594 030 00	–	–	–	–
	302	50	10/12/16/20/40	–	R1591 230 30	R1590 330 30	R1590 230 30	–
	350	50	5	–	R1591 135 30	R1590 035 30	R1590 135 30	–
	400	63	10/20/40	–	R1591 140 30	R1590 040 30	R1590 140 30	–
	500	80	10/20	–	R1591 150 30	R1590 050 30	R1590 150 30	–
82	120	20	5/20/40	R1594 012 00	R1591 112 20	R1590 012 00	R1590 112 00	–
	170	25	5/10/25	–	R1591 117 30	R1590 017 30	R1590 117 30	–
	200	32	5/10/20/32	–	R1591 120 30	R1590 020 30	R1590 120 30	–
	203	32	5/10/20/32	R1594 020 00	–	R1590 020 00	R1590 120 00	–
	250	40	10/12/16/20/40	–	R1591 225 30	R1590 325 30	R1590 225 30	–
	300	40	5	–	R1591 130 30	R1590 030 30	R1590 130 30	–
	301	40	5/10/12/16/20/40	R1594 030 00	–	–	–	–
	302	50	10/12/16/20/40	–	R1591 230 30	R1590 330 30	R1590 230 30	–
	350	50	5	–	R1591 135 30	R1590 035 30	R1590 135 30	–
	400	63	10/20/40	–	R1591 140 30	R1590 040 30	R1590 140 30	–
	500	80	10/20	–	R1591 150 30	R1590 050 30	R1590 150 30	–

Screw Ends

Form 83–84



Option (machining of end face)	
Z	
S	
K	None



Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 83Z200 51Z120 1250 1 0

Form	Version	Size		Dimensions (mm)							Keyway per DIN 6885			Centering hole		Hex socket	
		d ₀	P	L _{ZF}	D ₁ h6	L ₁	D ₂ h7	L ₂	G ₁	L _{G1}	b	l	t	Z	t _z	S	t _s
83–84	060	6	all	40	6	14	5	16	M6x0.5	10	–	–	–	–	–	–	–
	061	6	1/2	41	6	10	5	16	M6x0.5	15	–	–	–	–	–	–	–
	060	8	all	40	6	14	5	16	M6x0.5	10	–	–	–	–	–	–	–
	062	8	1	41	6	10	5	16	M6x0.5	15	–	–	–	–	–	–	–
	063	8	2	41	6	10	5	16	M6x0.5	15	–	–	–	–	–	–	–
	064	8	2.5	41	6	10	5	16	M6x0.5	15	–	–	–	–	–	–	–
	120	12	all	60	12	23	10	25	M12x1	12	3	20	1.8	–	–	4	4
	121	12	5/10	60	12	17	10	25	M12x1	18	–	–	–	–	–	4	4
	122	16	5/10	60	12	17	10	25	M12x1	18	–	–	–	–	–	4	4
	170	16	all	75	17	23	15	30	M17x1	22	4	20	2.5	M5	12	4	4
	200	20	all	88	20	26	18	40	M20x1	22	6	28	3.5	M6	16	5	5
	250	25	all	102	25	26	22	50	M25x1.5	26	6	36	3.5	M8	19	6	6
	300	32	all	101	30	25	25	50	M30x1.5	26	8	36	4.0	M10	22	8	8
	400	40	all	132	40	44	36	60	M35x1.5	28	10	40	5.0	M12	28	12	12
	500	50	all	154	50	52	40	70	M50x1.5	32	12	50	5.0	M16	36	12	12
	600	63	all	155	60	43	55	80	M60x2	32	16	63	6.0	M20	42	17	17

End bearings for screw ends form 83–84

Bearing LAF



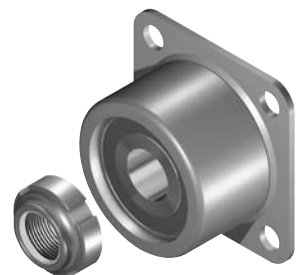
Shown with slotted nut NMA

Bearing LAN



Shown with slotted nut NMZ

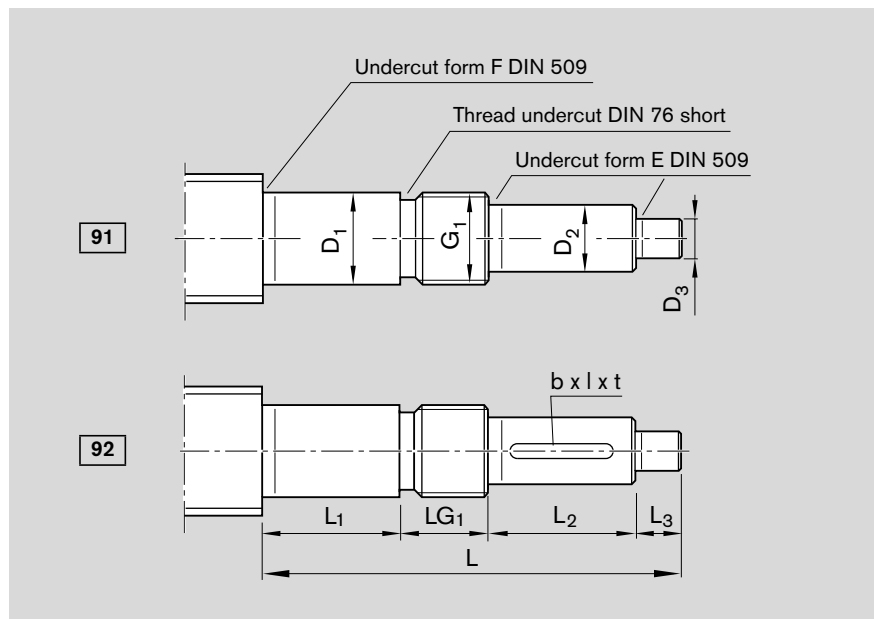
Bearing LAL



Form	Version	Size		Mechanical connection Dimensions (mm)				Bearing LAF	Bearing LAN	Bearing LAL
		d ₀	P	D _R	L _R	D _F	L _{F max}	Part number	Part number	Part number
83–84	060	6	all	12	15	5.2	8	–	R1590 106 00	–
	061	6	1/2	12	15	5.2	8	–	–	R1590 406 00
	060	8	all	12	15	6.2	8	–	R1590 106 00	–
	062	8	1	12	15	7.2	8	–	–	R1590 406 00
	063	8	2	12	15	6.9	8	–	–	R1590 406 00
	064	8	2.5	12	15	6.2	8	–	–	R1590 406 00
	120	12	all	16	15	9.5	8	–	R1590 112 00	–
	121	12	5/10	15	15	9.5	8	–	–	R1590 412 00
	122	16	5/10	15	15	12.5	8	–	–	R1590 412 00
	170	16	all	23	15	12.5	8	R1590 017 30	R1590 117 30	–
	200	20	all	25	15	16.5	8	R1590 020 30	R1590 120 30	–
	250	25	all	32	15	21.0	8	R1590 325 30	R1590 225 30	–
	300	32	all	40	20	28.0	8	R1590 030 30	R1590 130 30	–
	400	40	all	50	20	33.5	8	R1590 040 30	R1590 140 30	–
	500	50	all	63	20	43.5	8	R1590 050 30	R1590 150 30	–
	600	63	all	82	25	56.0	8	–	–	–

Screw Ends

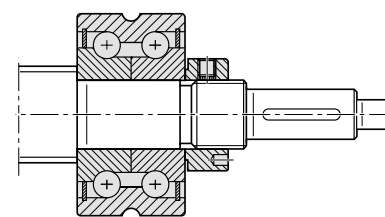
Form 91–92



Option (machining of end face)

K None

Application



Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 92K120 41Z120 1250 1 0 0

Form	Version ¹⁾	Size		Dimensions (mm)									Keyway per DIN 6885		
		d ₀	P	L	D ₁ h6	L ₁	D ₂ h7	L ₂	D ₃ h7	L ₃	G ₁	LG ₁	b P9	l	t
91	060	12	2/5/10	50	6	14	5	16	4	10	M6x0.5	10	–	–	–
	100	16	5/10/16	60	10	18	8	20	4	10	M10x1	12	–	–	–
	120	20	5/20/40	75	12	23	10	25	6	15	M12x1	12	–	–	–
	170	25	5/10/25	90	17	23	15	30	6	15	M17x1	22	–	–	–
	200	32	5/10/20/32	103	20	26	18	40	6	15	M20x1	22	–	–	–
	250	40	10/12/16/20/40	145	25	54	22	50	6	15	M25x1.5	26	–	–	–
	300	40	5	116	30	25	25	50	6	15	M30x1.5	26	–	–	–
	301	50	10/12/16/20/40	145	30	54	25	50	6	15	M30x1.5	26	–	–	–
	350	50	5	125	35	32	30	50	6	15	M35x1.5	28	–	–	–
	400	63	10/20/40	147	40	44	36	60	6	15	M40x1.5	28	–	–	–
500	80	10/20	169	50	52	40	70	6	15	M50x1.5	32	–	–	–	
92	120	20	5/20/40	75	12	23	10	25	6	15	M12x1	12	3	20	1.8
	170	25	5/10/25	90	17	23	15	30	6	15	M17x1	22	5	25	3.0
	200	32	5/10/20/32	103	20	26	18	40	6	15	M20x1	22	6	28	3.5
	250	40	10/12/16/20/40	145	25	54	22	50	6	15	M25x1.5	26	6	36	3.5
	300	40	5	116	30	25	25	50	6	15	M30x1.5	26	8	36	4.0
	301	50	10/12/16/20/40	145	30	54	25	50	6	15	M30x1.5	26	8	36	4.0
	350	50	5	125	35	32	30	50	6	15	M35x1.5	28	8	36	4.0
	400	63	10/20/40	147	40	44	36	60	6	15	M40x1.5	28	10	40	5.0
500	80	10/20	169	50	52	40	70	6	15	M50x1.5	32	12	50	5.0	

1) The allocation of screw ends to the bearing is defined by the version.

End bearings for screw ends form 91–92

Pillow block unit SEB-F



Bearing LAF



Shown with slotted nut NMA

Bearing LAN

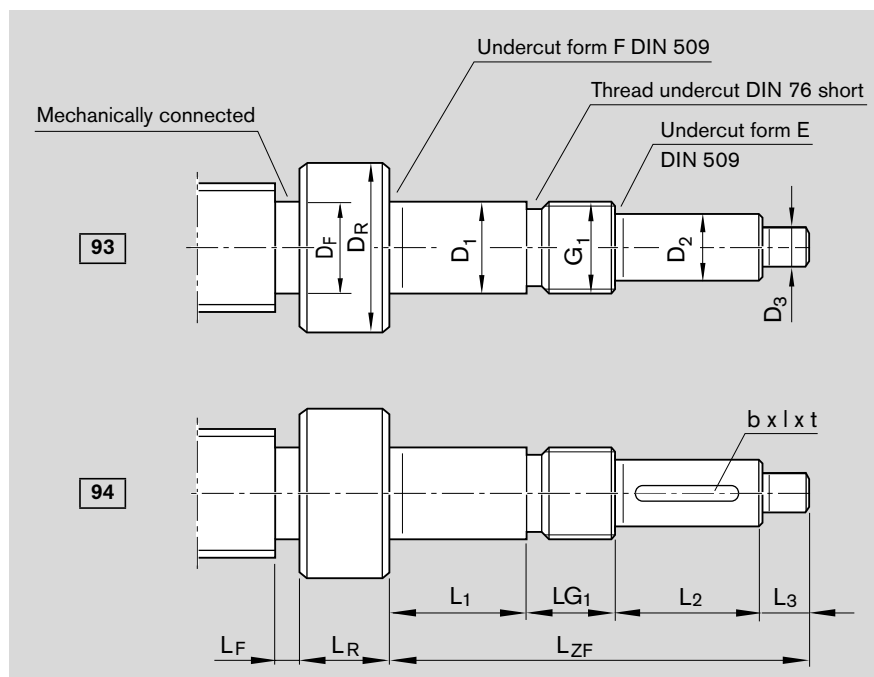


Shown with slotted nut NMZ

Form	Version ¹⁾	Size		Pillow block unit SEB-F	Bearing LAF	Bearing LAN
		d ₀	P	Part number	Part number	Part number
91	060	12	2/5/10	R1591 106 20	–	R1590 106 00
	100	16	5/10/16	R1591 110 20	–	R1590 110 00
	120	20	5/20/40	R1591 112 20	R1590 012 00	R1590 112 00
	170	25	5/10/25	R1591 117 30	R1590 017 30	R1590 117 30
	200	32	5/10/20/32	R1591 120 30	R1590 020 30	R1590 120 30
	250	40	10/12/16/20/40	R1591 225 30	R1590 325 30	R1590 225 30
	300	40	5	R1591 130 30	R1590 030 30	R1590 130 30
	301	50	10/12/16/20/40	R1591 230 30	R1590 330 30	R1590 230 30
	350	50	5	R1591 135 30	R1590 035 30	R1590 135 30
	400	63	10/20/40	R1591 140 30	R1590 040 30	R1590 140 30
	500	80	10/20	R1591 150 30	R1590 050 30	R1590 150 30
92	120	20	5/20/40	R1591 112 20	R1590 012 00	R1590 112 00
	170	25	5/10/25	R1591 117 30	R1590 017 30	R1590 117 30
	200	32	5/10/20/32	R1591 120 30	R1590 020 30	R1590 120 30
	250	40	10/12/16/20/40	R1591 225 30	R1590 325 30	R1590 225 30
	300	40	5	R1591 130 30	R1590 030 30	R1590 130 30
	301	50	10/12/16/20/40	R1591 230 30	R1590 330 30	R1590 230 30
	350	50	5	R1591 135 30	R1590 035 30	R1590 135 30
	400	63	10/20/40	R1591 140 30	R1590 040 30	R1590 140 30
	500	80	10/20	R1591 150 30	R1590 050 30	R1590 150 30

Screw Ends

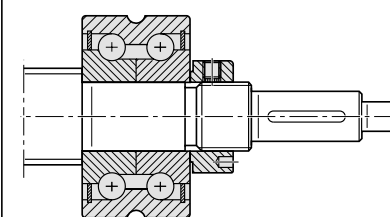
Form 93–94



Option (machining of end face)

K None

Application



Ordering code: SEM-E-S 20 x 5R x 3-4 1 2 T7 R 93K200 41Z120 1250 1 0

Form	Version	Size		Dimensions (mm)									Keyway per DIN 6885		
		d ₀	P	L _{ZF}	D ₁ h6	L ₁	D ₂ h7	L ₂	D ₃ h7	L ₃	G ₁	LG ₁	b P9	l	t
93	060	8	all	50	6	14	5	16	4	10	M6x0.5	10	–	–	–
	120	12	all	75	12	23	10	25	6	15	M12x1	12	–	–	–
	170	16	all	90	17	23	15	30	6	15	M17x1	22	–	–	–
	200	20	all	103	20	26	18	40	6	15	M20x1	22	–	–	–
	250	25	all	117	25	26	22	50	6	15	M25x1.5	26	–	–	–
	300	32	all	116	30	25	25	50	6	15	M30x1.5	26	–	–	–
	400	40	all	147	40	44	36	60	6	15	M40x1.5	28	–	–	–
	500	50	all	169	50	52	40	70	6	15	M50x1.5	32	–	–	–
94	600	63	all	170	60	43	55	80	6	15	M60x2	32	–	–	–
	120	12	all	75	12	23	10	25	6	15	M12x1	12	3	20	2.0
	170	16	all	90	17	23	15	30	6	15	M17x1	22	5	25	3.0
	200	20	all	103	20	26	18	40	6	15	M20x1	22	6	28	4.0
	250	25	all	117	25	26	22	50	6	15	M25x1.5	26	6	36	4.0
	300	32	all	116	30	25	25	50	6	15	M30x1.5	26	8	36	4.0
	400	40	all	147	40	44	36	60	6	15	M40x1.5	28	10	40	5.0
	500	50	all	169	50	52	40	70	6	15	M50x1.5	32	12	50	5.0
	600	63	all	170	60	43	55	80	6	15	M60x2	32	16	63	6.0

End bearings for screw ends form 93–94

Pillow block unit SEB-F



Bearing LAF



Shown with slotted nut NMA

Bearing LAN



Shown with slotted nut NMZ

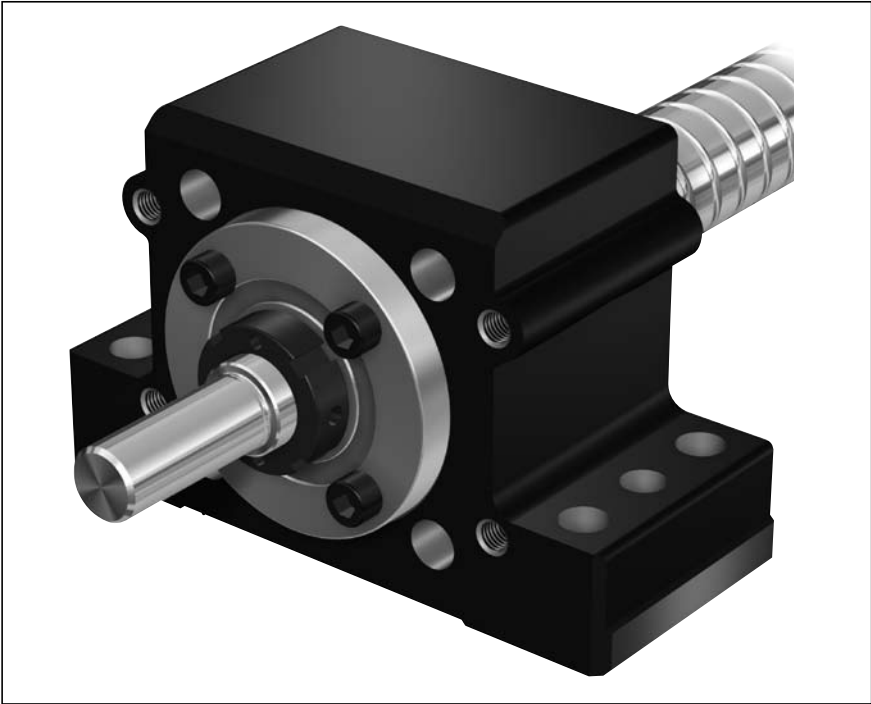
Form	Version	Size		Mechanical connection Dimensions (mm)				Pillow block unit SEB-F Part number	Bearing LAF Part number	Bearing LAN Part number
		d ₀	P	D _R	L _R	D _F	L _{F max}			
93	060	8	all	12	15	6.2	8	R1591 106 20	–	R1590 106 00
	120	12	all	16	15	9.5	8	R1591 112 20	–	R1590 112 00
	170	16	all	23	15	12.5	8	R1591 117 30	R1590 017 30	R1590 117 30
	200	20	all	25	15	16.5	8	R1591 120 30	R1590 020 30	R1590 120 30
	250	25	all	32	15	21.0	8	R1591 225 30	R1590 325 30	R1590 225 30
	300	32	all	40	20	28.0	8	R1591 113 30	R1590 030 30	R1590 130 30
	400	40	all	50	20	33.5	8	R1591 114 30	R1590 040 30	R1590 140 30
	500	50	all	63	20	43.5	8	R1591 115 30	R1590 050 30	R1590 150 30
94	600	63	all	82	25	56.0	8	–	–	–
	120	12	all	16	15	9.5	8	R1591 112 20	–	R1590 112 00
	170	16	all	23	15	12.5	8	R1591 117 30	R1590 017 30	R1590 117 30
	200	20	all	25	15	16.5	8	R1591 120 30	R1590 020 30	R1590 120 30
	250	25	all	32	15	21.0	8	R1591 225 30	R1590 325 30	R1590 225 30
	300	32	all	40	20	28.0	8	R1591 113 30	R1590 030 30	R1590 130 30
	400	40	all	50	20	33.5	8	R1591 114 30	R1590 040 30	R1590 140 30
	500	50	all	63	20	43.5	8	R1591 115 30	R1590 050 30	R1590 150 30
	600	63	all	82	25	56.0	8	–	–	–

Bearings

Pillow Block Unit SEC-F

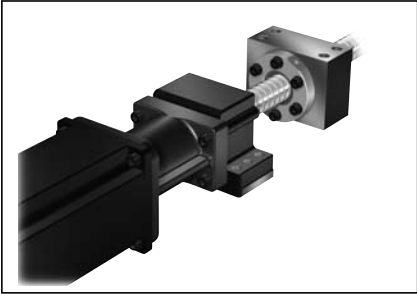
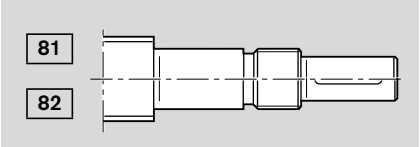
Fixed bearing with angular-contact thrust ball bearing LGF-B-...

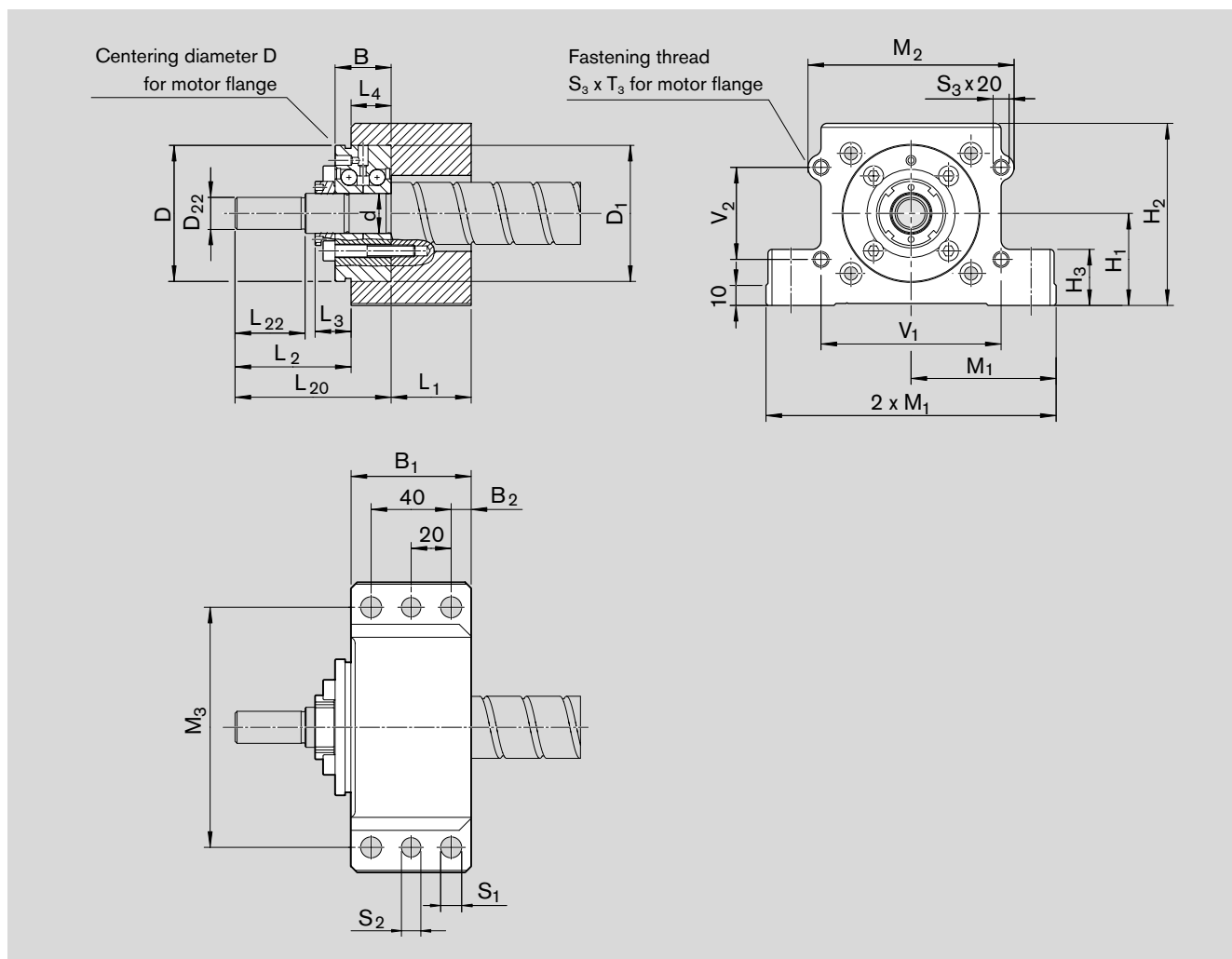
- The pillow block unit consists of:
- precision pillow block housing made of aluminum with reference edges on two sides
 - angular-contact thrust ball bearing LGF...
 - slotted nut NMZ
- The nut is supplied unmounted.



Size	Pillow block unit complete	Angular-contact thrust ball bearing						Slotted nut		Weight complete
		Load ratings (axial)		Dimensions			Designation	Designation		
		dyn. C (N)	stat. C ₀ (N)	d (mm)	D	B				
d ₀ x P	Part number							M _A (Nm)		(kg)
20x5/20/40	R1594 012 00	17000	24700	12	55	25	LGF-B-1255	8.0	NMZ 12x1	1.49
32x5/10/20/32	R1594 020 00	26000	47000	20	68	28	LGF-B-2068	18.0	NMZ 20x1	1.88
40x5/10/12/16/20/40	R1594 030 00	29000	64000	30	80	28	LGF-B-3080	32.0	NMZ 30x1.5	2.75

Screw end form 81–82 suitable for motor mounting, see section on Screw Ends.





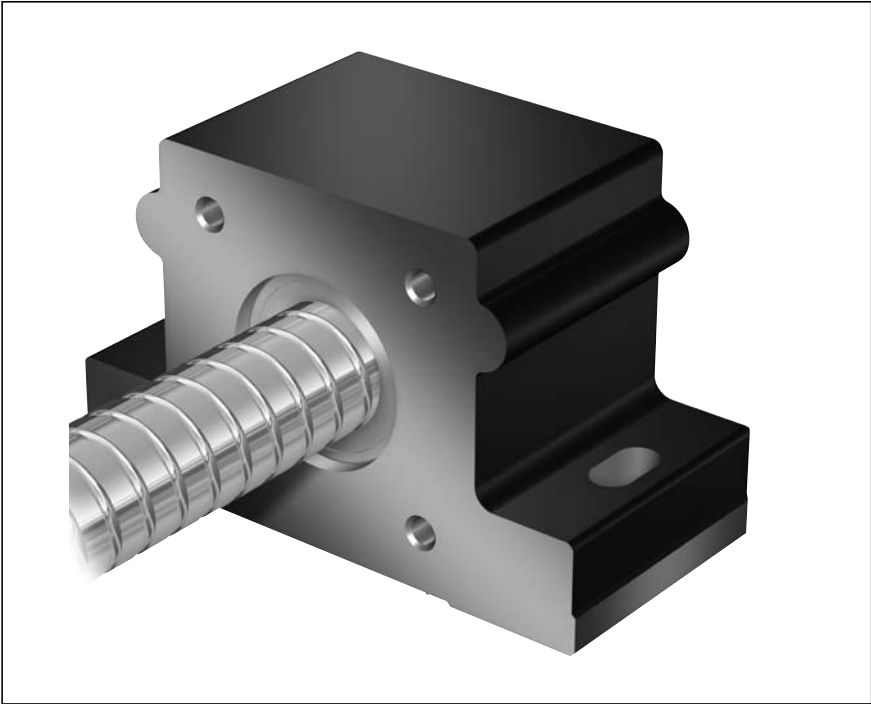
Size	Dimensions (mm)																					
$d_0 \times P$	B ₁	B ₂	L ₁	L ₂	L ₃	L ₄	L ₂₀	L ₂₂	D ₁	D ₂₂	M ₁ ±0.015	M ₂	M ₃	H ₁ ±0.015	H ₂	H ₃	S ₁	S ₂	S ₃	V ₁	V ₂	
20x5/20/40	60	10.0	42	42	15	18	60	25	55	10	72.5	80	120	41	81	28	10.5	9.7	M8	66	50	
32x5/10/20/32	60	10.0	40	58	18	20	78	35	68	16	72.5	103	120	46	91	28	10.5	9.7	M8	90	46	
40x5/10/12/16/20/40	65	12.5	45	73	20	20	93	50	80	25	90.0	116	150	56	111	33	13.0	11.7	M10	100	65	

Bearings

Pillow Block Unit SEC-L

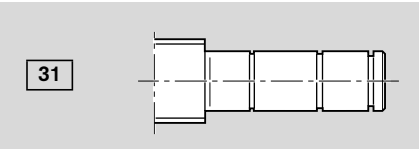
Floating bearing with deep-groove ball bearing per DIN 625

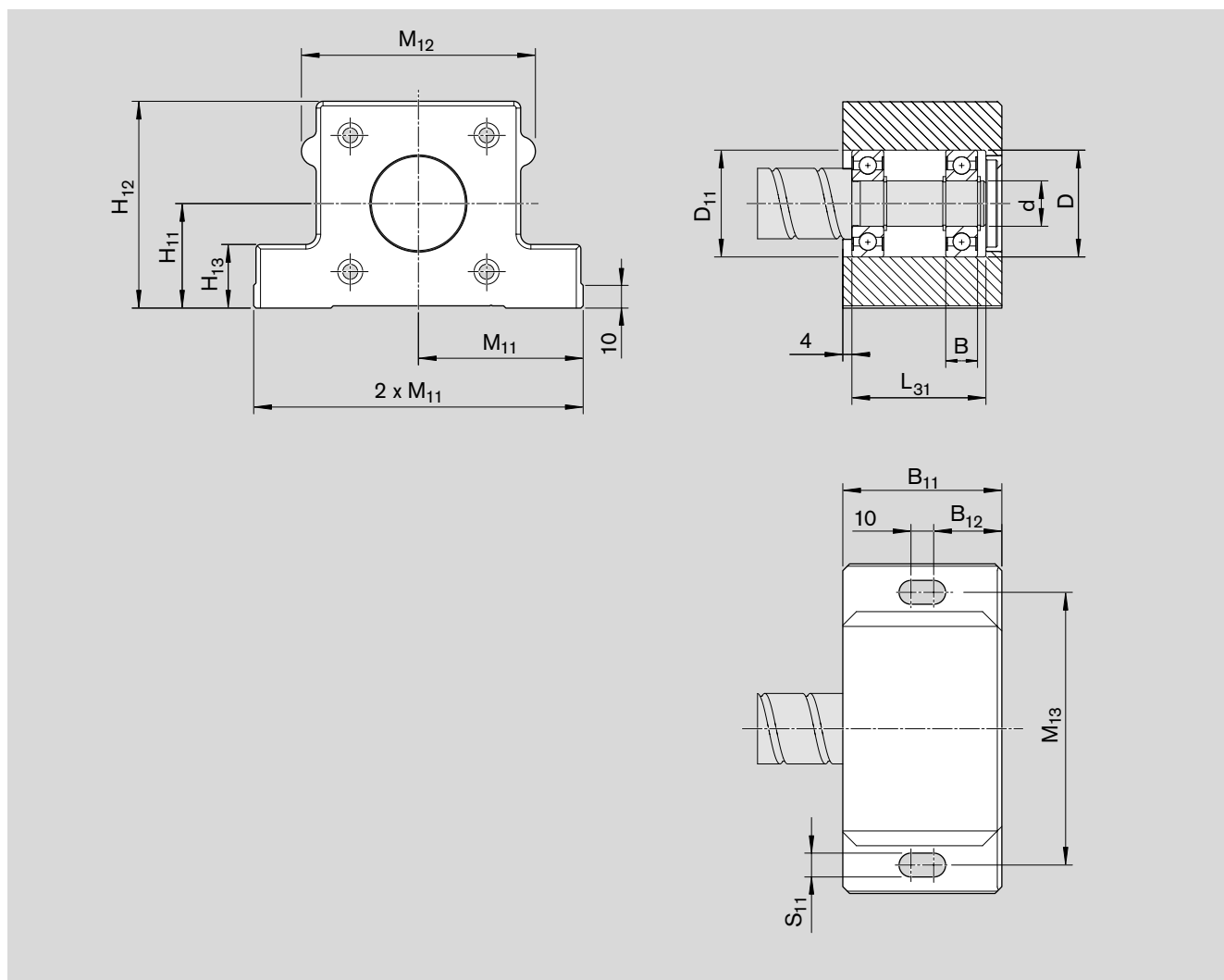
- The pillow block unit consists of:
- precision pillow block housing made of aluminum with reference edges on two sides
 - deep-groove ball bearing per DIN 625... 2RS
 - retaining ring per DIN 471
- All parts are supplied unmounted.



Size	Pillow block unit complete	Deep-groove ball bearing per DIN 625		Dimensions (mm)			Designation DIN 625...	Retaining ring per DIN 471	Weight complete (kg)
		Load ratings (radial)							
d ₀ x P	Part number	dyn. C (N)	stat. C ₀ (N)	d	D	B			
20x5/20/40	R1594 615 00	7800	3250	15	35	11	6202.2RS	15x1	1.24
32x5/10/20/32	R1594 620 00	12700	5700	20	47	14	6204.2RS	20x1.2	1.66
40x5/10/12/16/20/40	R1594 630 00	19300	9800	30	62	16	6206.2RS	30x1.5	2.74

Suitable for screw ends: Form





Size	Dimensions (mm)										
$d_o \times P$	B_{11}	B_{12}	L_{31}	D_{11}	M_{11} ± 0.015	M_{12}	M_{13}	H_{11} ± 0.015	H_{12}	H_{13}	S_{11}
20x5/20/40	60	25	47	35	72.5	80	120	41	81	28	10.5
32x5/10/20/32	70	30	60	47	72.5	103	120	46	91	28	10.5
40x5/10/12/16/20/40	80	35	68	62	90.0	116	150	56	111	33	13.0

Bearings

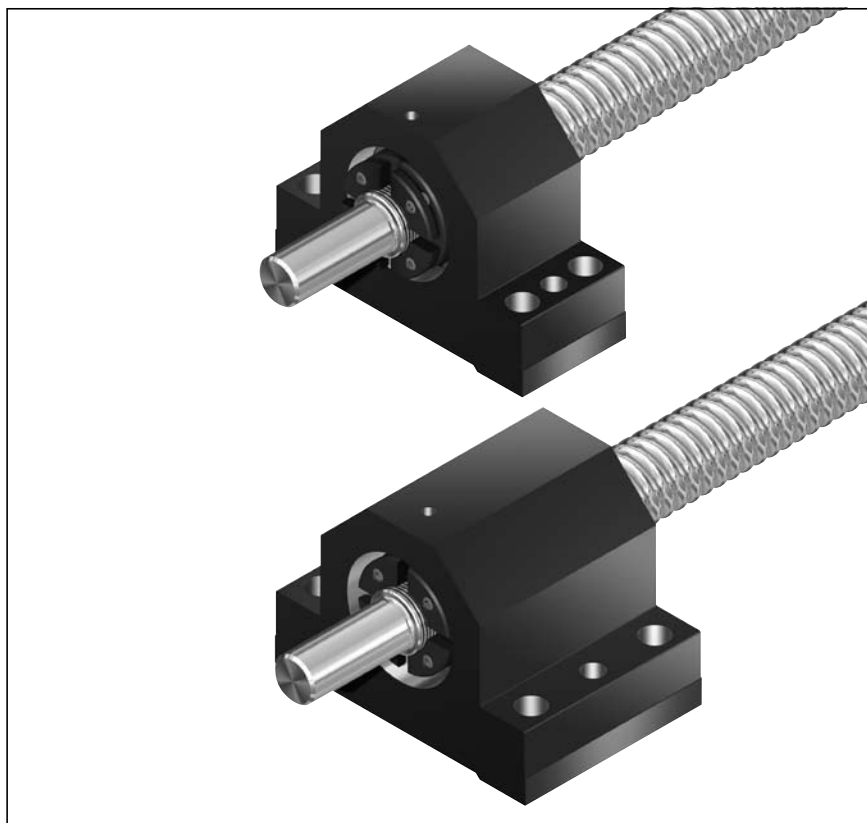
Pillow Block Unit SEB-F

Fixed bearing with angular-contact thrust ball bearing
LGN-B-...
LGN-C-...

The pillow block unit consists of:

- precision pillow block housing made of steel with reference edges on two sides
- angular-contact thrust ball bearing LGN...
- slotted nut NMA or NMZ
- housing nut GWR

The nut is supplied unmounted.

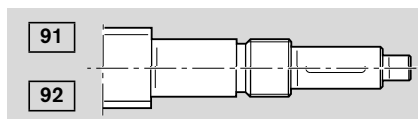
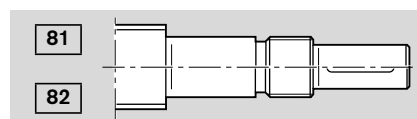
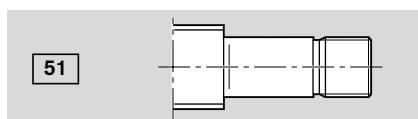


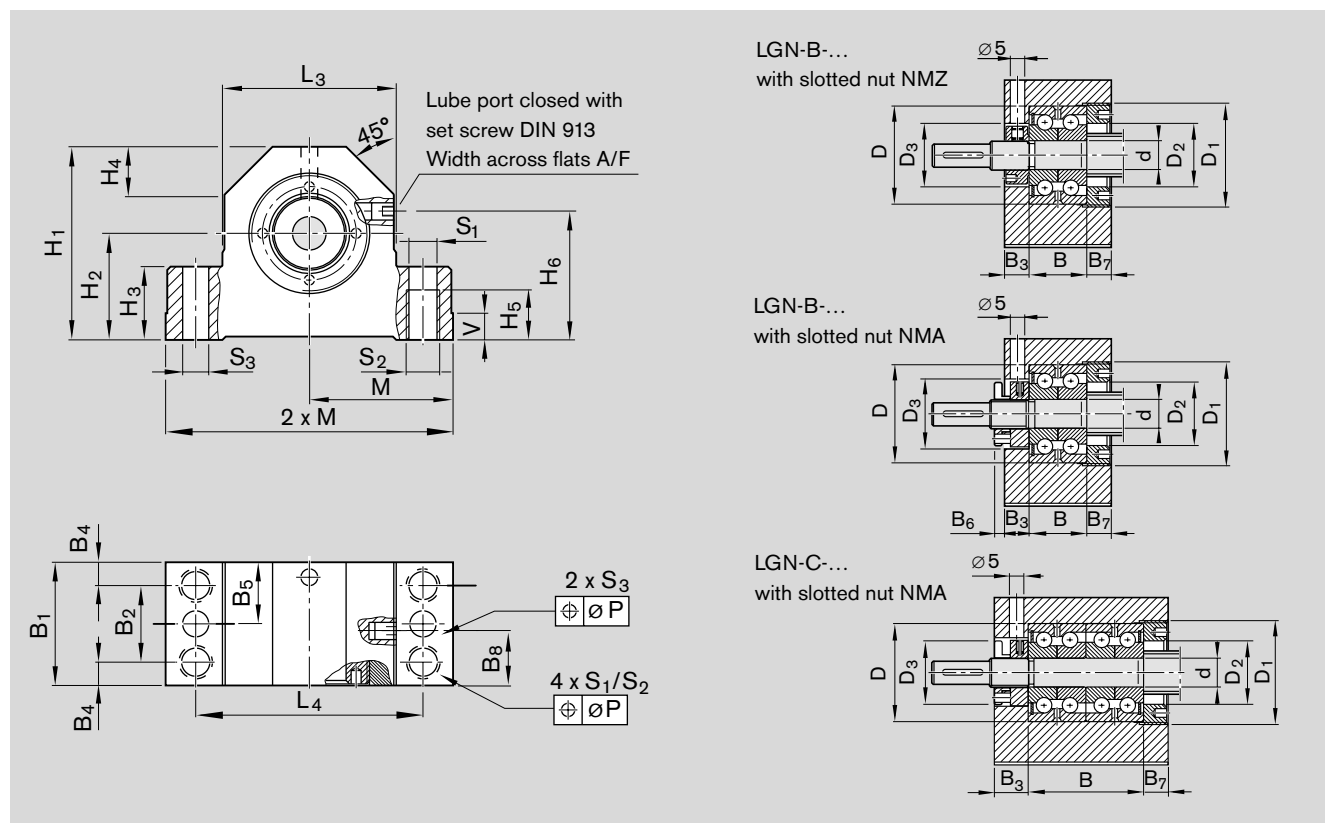
Size	Pillow block unit complete	Angular-contact thrust ball bearing						Slotted nut		Weight complete
d ₀ x P	Part number	Load ratings (axial)		Dimensions			Designation	M _A (Nm)	Designation	(kg)
		dyn. C (N)	stat. C ₀ (N)	(mm)	d	D				
6x1/2	R1591 106 00	6900	8500	6	24	15	LGN-B-0624	2.0	NMZ 6x0.5	0.38
8x1/2/2.5	R1591 106 00	6900	8500	6	24	15	LGN-B-0624	2.0	NMZ 6x0.5	0.38
12x2/5/10	R1591 106 20	6900	8500	6	24	15	LGN-B-0624	2.0	NMZ 6x0.5	0.38
16x5/10/16	R1591 110 20	13400	18800	10	34	20	LGN-B-1034	6.0	NMZ 10x1	0.87
20x5/20	R1591 112 20	17000	24700	12	42	25	LGN-B-1242	8.0	NMZ 12x1	1.12
25x5/10/25	R1591 117 20	18800	31000	17	47	25	LGN-B-1747	15.0	NMZ 17x1	1.65
25x5/10/25	R1591 117 30	18800	31000	17	47	25	LGN-B-1747	15.0	NMA 17x1	1.69
32x5/10/20/32	R1591 120 20	26000	47000	20	52	28	LGN-B-2052	18.0	NMZ 20x1	1.93
32x5/10/20/32	R1591 120 30	26000	47000	20	52	28	LGN-B-2052	18.0	NMA 20x1	2.03
40x10/12/16/20/40	R1591 225 30	44500	111000	25	57	56	LGN-C-2557	25.0	NMA 25x1.5	5.13
40x5	R1591 130 20	29000	64000	30	62	28	LGN-B-3062	32.0	NMZ 30x1.5	2.64
40x5	R1591 130 30	29000	64000	30	62	28	LGN-B-3062	32.0	NMA 30x1.5	2.77
50x5	R1591 135 30	41000	89000	35	72	34	LGN-B-3572	40.0	NMA 35x1.5	4.66
50x10/12/16/20/40	R1591 230 30	47500	127000	30	62	56	LGN-C-3062	32.0	NMA 30x1.5	7.04
63x10/20/40	R1591 140 30	72000	149000	40	90	46	LGN-A-4090	55.0	NMA 40x1.5	10.49
80x10/20	R1591 150 30	113000	250000	50	110	54	LGN-A-50110	85.0	NMA 50x1.5	15.61

Suitable for screw ends: Form

For screws 8 x1/2/2.5:

Form 53, 83, 93





Size	Dimensions (mm)																										
$d_0 \times P$	M js7	L ₃	L ₄	H ₁	H ₂ ±0.02	H ₃	H ₄	H ₅	H ₆	B ₁	B ₂	B ₃	B ₄	B ₅	B ₆	B ₇	B ₈	V	S ₁ H12	S ₂	S ₃	SW	D ₁	D ₂	D ₃	P	
6x1/2	31.0	38	50	34	18	13	8	9	22	32	16	8.5	8.0	16.0	–	8.5	16.0	6	5.3	M6	3.7	3	M26x1.5	16.5	18	0.10	
8x1/2/2.5	31.0	38	50	34	18	13	8	9	22	32	16	8.5	8.0	16.0	–	8.5	16.0	6	5.3	M6	3.7	3	M26x1.5	16.5	18	0.10	
12x2/5/10	31.0	38	50	41	22	13	8	9	22	32	16	8.5	8.0	16.0	–	8.5	16.0	6	5.3	M6	3.7	3	M26x1.5	16.5	18	0.10	
16x5/10/16	43.0	52	68	58	32	22	14	15	37	37	23	8.5	7.0	18.5	–	8.5	18.5	8	8.4	M10	7.7	4	M36x1.5	22.0	27	0.15	
20x5/20	47.0	60	77	64	34	22	16	15	40	42	25	8.5	8.5	21.0	–	8.5	21.0	8	8.4	M10	7.7	4	M45x1.5	28.0	32	0.15	
25x5/10/25	54.0	66	88	72	39	27	18	18	45	46	29	10.5	8.5	23.0	–	10.5	23.0	10	10.5	M12	9.7	4	M50x1.5	31.0	36	0.20	
25x5/10/25	54.0	66	88	72	39	27	18	18	45	46	29	10.5	8.5	23.0	7.5	10.5	23.0	10	10.5	M12	9.7	4	M50x1.5	31.0	36	0.20	
32x5/10/20/32	56.0	70	92	77	42	27	19	18	48	49	29	10.5	10.0	24.5	–	10.5	24.5	10	10.5	M12	9.7	4	M55x1.5	36.0	42	0.20	
32x5/10/20/32	56.0	70	92	77	42	27	19	18	48	49	29	10.5	10.0	24.5	7.5	10.5	24.5	10	10.5	M12	9.7	4	M55x1.5	36.0	42	0.20	
40x10/12/16/20/40	63.0	80	105	98	58	32	23	21	64	89	62	20.5	13.5	44.5	–	12.5	54.5	12	12.6	M14	9.7	4	M62x1.5	43.0	48	0.20	
40x5	63.0	80	105	90	50	32	22	21	56	53	32	12.5	10.5	26.5	–	12.5	26.5	12	12.6	M14	9.7	4	M65x1.5	47.0	53	0.20	
40x5	63.0	80	105	90	50	32	22	21	56	53	32	12.5	10.5	26.5	7.5	12.5	26.5	12	12.6	M14	9.7	4	M65x1.5	47.0	53	0.20	
50x5	72.0	92	118	105	58	38	25	22	63	70	43	20.5	13.5	35.0	–	15.5	32.5	12	12.5	M14	9.7	4	M78x2	54.0	60	0.20	
50x10/12/16/20/40	72.0	92	118	112	65	38	25	22	70	92	65	20.5	13.5	46.0	–	15.5	57.5	12	12.5	M14	9.7	4	M78x2	54.0	53	0.20	
63x10/20/40	95.0	130	160	138	73	50	35	22	78	85	58	22.5	13.5	42.5	–	16.5	39.5	16	12.5	M14	9.7	4	M95x2	68.0	72	0.20	
80x10/20	102.5	145	175	165	93	50	40	36	98	98	58	25.5	20.0	49.0	–	18.5	45.5	16	17.3	M20	11.7	4	M115x2	85.0	90	0.20	

Bearings

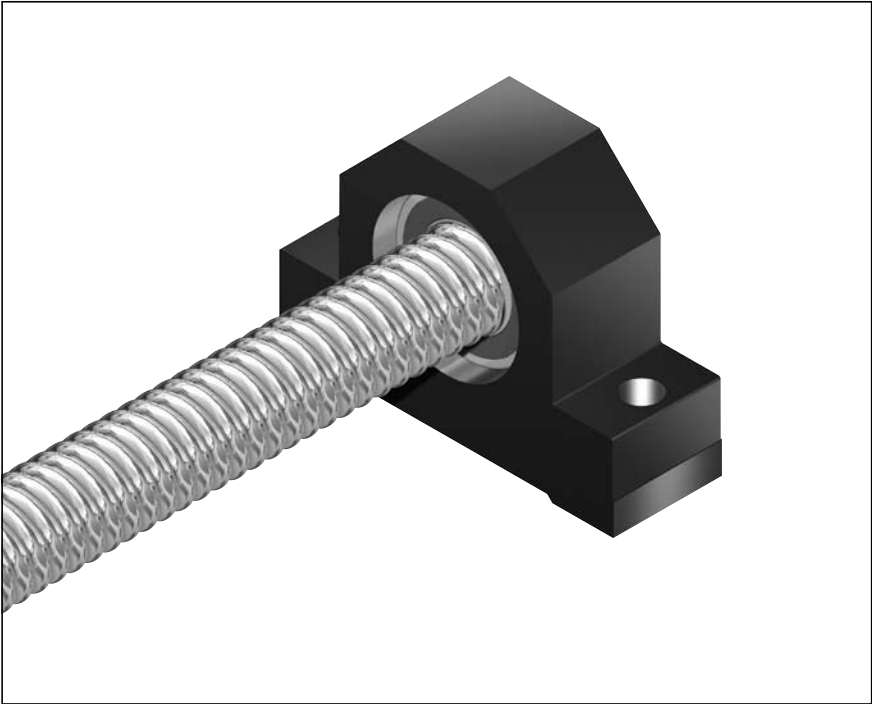
Pillow Block Unit SEB-L

Floating bearing with deep-groove ball bearing per DIN 625

The pillow block unit consists of:

- precision pillow block housing made of steel with reference edge on one side
- deep-groove ball bearing per DIN 625-... .2RS
- retaining ring per DIN 471
- cover

All parts are supplied unmounted.

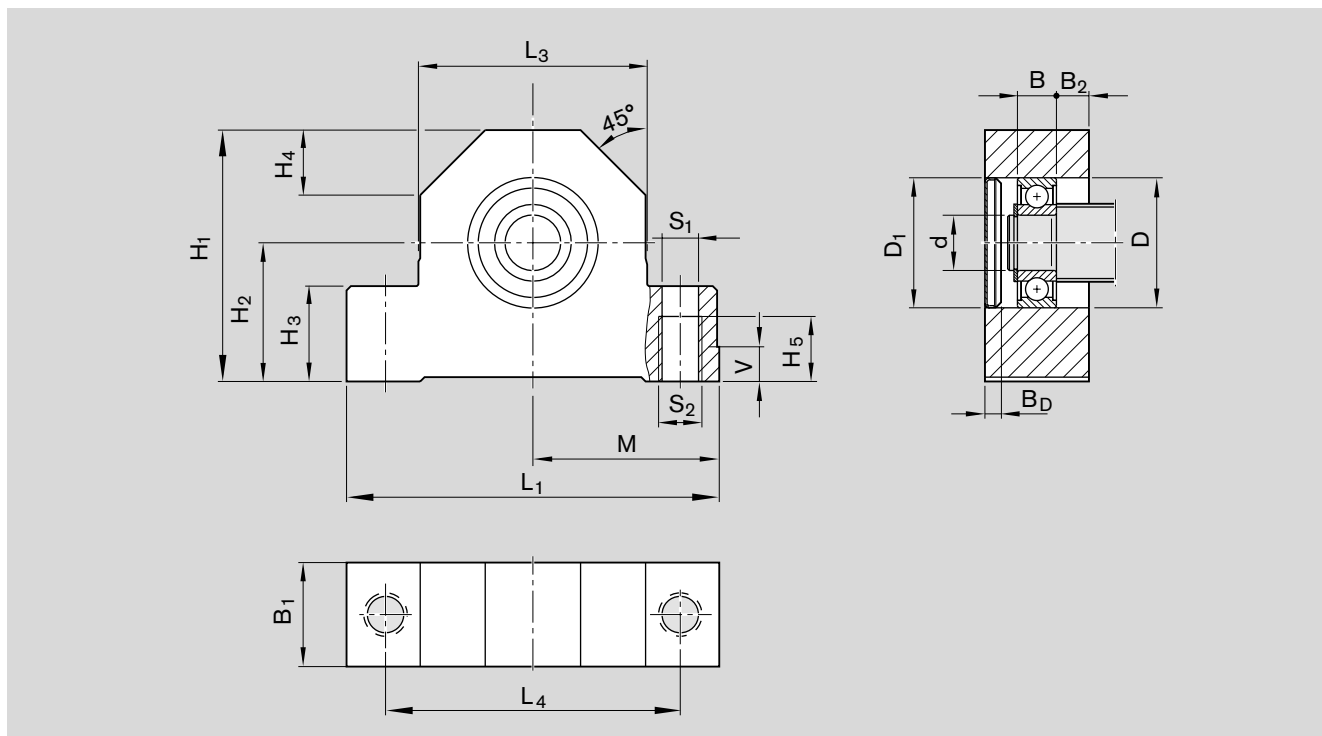


Size	Pillow block unit complete	Deep-groove ball bearing per DIN 625					Retaining ring per DIN 471	Weight complete	
		Load ratings (radial)		Dimensions (mm)		Designation DIN 625...			
d ₀ x P	Part number	dyn. C (N)	stat. C ₀ (N)	d	D		B		(kg)
8x1/2/2.5	R1591 605 00	1900	590	5	16	5	625.2RS	5x0.6	0.14
12x2/5/10	R1591 606 20	2450	900	6	19	6	626.2RS	6x0.7	0.18
16x5/10/16	R1591 610 20	6000	2240	10	30	9	6200.2RS	10x1	0.54
20x5/20/40	R1591 612 20	6950	2650	12	32	10	6201.2RS	12x1	0.73
25x5/10/25	R1591 617 20	9500	4150	17	40	12	6203.2RS	17x1	0.96
32x5/10/20/32	R1591 620 20	12700	5700	20	47	14	6204.2RS	20x1.2	1.24
40x5	R1591 630 20	19300	9800	30	62	16	6206.2RS	30x1.5	1.66
40x10/12/16/20/40	R1591 630 10	19300	9800	30	62	16	6206.2RS	30x1.5	1.82
50x5	R1591 635 10	25500	13200	35	72	17	6207.2RS	35x1.5	2.66
50x10/12/16/20/40	R1591 635 20	25500	13200	35	72	17	6207.2RS	35x1.5	2.87
63x10/20/40	R1591 650 20	36500	20800	50	90	20	6210.2RS	50x2	5.39
80x10/20	R1591 660 20	52000	31000	60	110	22	6212.2RS	60x2	7.09

Suitable for screw ends: Form

For screws 12 x 2: Form 41





Size	Dimensions (mm)															
$d_0 \times P$	L_1	L_3	L_4	H_1	H_2 ± 0.02	H_3	H_4	H_5	B_1	B_2	M $js7$	V	S_1 $H12$	S_2	D_1 $J6$	Cover B_0
8x1/2/2.5	62	38	50	34	18	13	11	9	13	4.0	31.0	6	5.3	M6	16	2.6
12x2/5/10	62	38	50	41	22	13	11	9	15	4.5	31.0	6	5.3	M6	19	2.6
16x5/10/16	86	52	68	58	32	22	15	15	24	7.5	43.0	8	8.4	M10	30	3.8
20x5/20/40	94	60	77	64	34	22	17	15	26	8.0	47.0	8	8.4	M10	32	3.8
25x5/10/25	108	66	88	72	39	27	19	18	28	8.0	54.0	10	10.5	M12	40	3.7
32x5/10/20/32	112	70	92	77	42	27	20	18	34	10.0	56.0	10	10.5	M12	47	4.8
40x5	126	80	105	90	50	32	23	21	38	11.0	63.0	12	12.6	M14	62	4.5
40x10/12/16/20/40	126	80	105	98	58	32	23	21	38	11.0	63.0	12	12.6	M14	62	4.5
50x5	144	92	118	105	58	38	25	22	41	12.0	72.0	12	12.5	M14	72	5.0
50x10/12/16/20/40	144	92	118	112	65	38	25	22	41	12.0	72.0	12	12.5	M14	72	5.0
63x10/20/40	190	130	160	138	73	50	35	22	46	13.0	95.0	16	12.5	M14	90	5.0
80x10/20	205	145	175	165	93	50	40	36	50	14.0	102.5	16	17.3	M20	110	6.0

Bearings

Bearing LAF

Fixed bearing with angular-contact thrust ball bearing LGF

Double-thrust, screw-down,

Series LGF-B-...

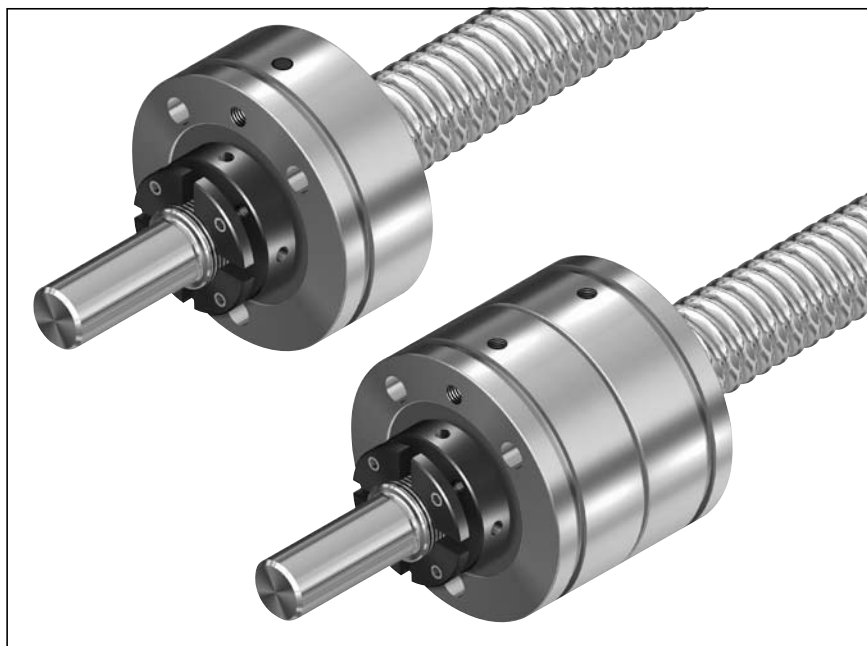
LGF-A-...

Double-thrust, screw-down,

Series LGF-C-...

The fixed bearing consists of:

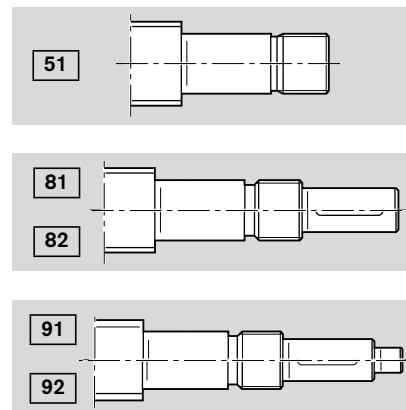
- angular-contact thrust ball bearing LGF
- slotted nut NMA..., NMZ...

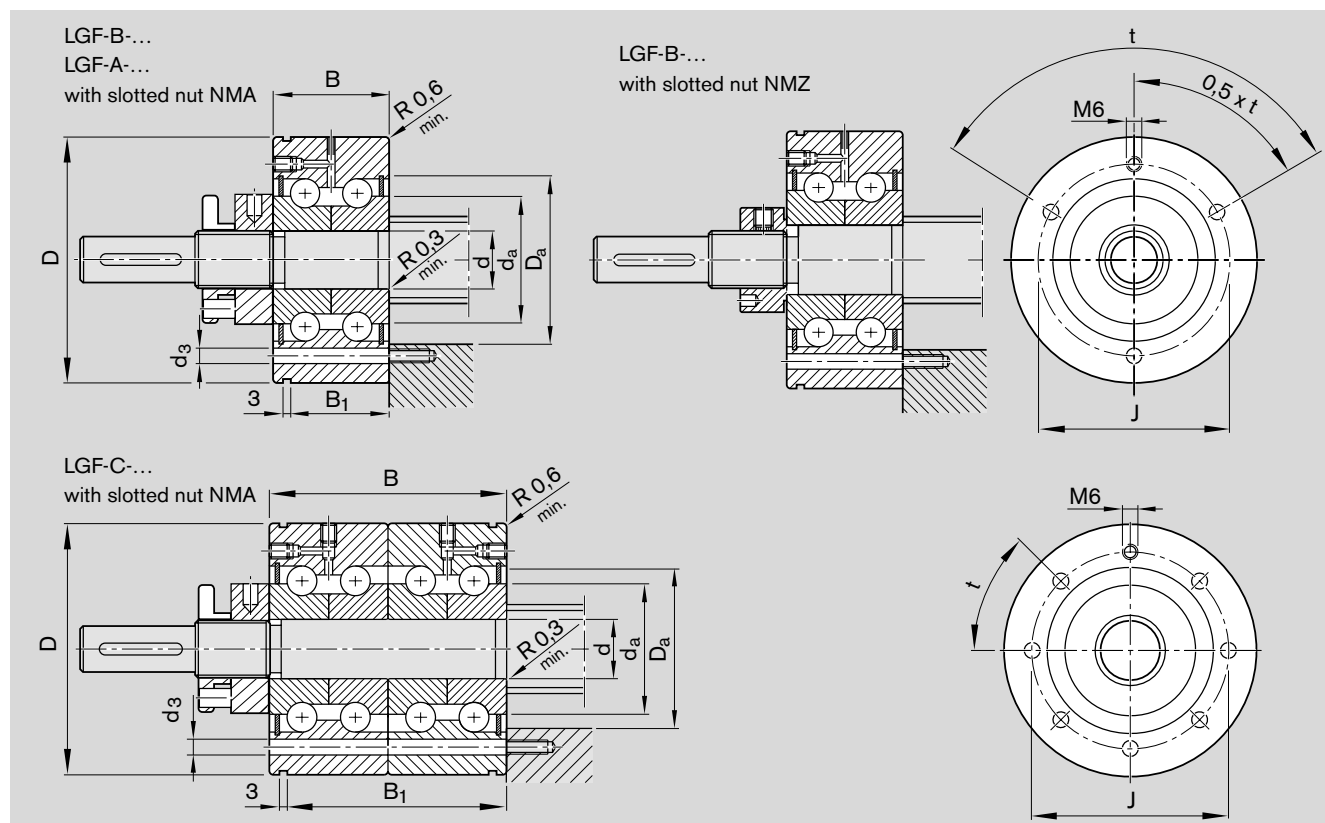


Size	Angular-contact thrust ball bearing with slotted nut	Single parts		Slotted nut		Weight complete (kg)
		Angular-contact thrust ball bearing	Part number	Designation	Part number	
d₀ x P	Part number	Designation	Part number	Designation	Part number	
20x5/20/40	R1590 012 00	LGF-B-1255	R3414 009 06	NMZ 12x1	R3446 003 04	0.385
25x5/10/25	R1590 017 00	LGF-B-1762	R3414 010 06	NMZ 17x1	R3446 004 04	0.485
	R1590 017 30			NMA 17x1	R3446 014 04	0.520
32x5/10/20/32	R1590 020 00	LGF-B-2068	R3414 001 06	NMZ 20x1	R3446 005 04	0.645
	R1590 020 30			NMA 20x1	R3446 015 04	0.740
40x5	R1590 030 00	LGF-B-3080	R3414 011 06	NMZ 30x1.5	R3446 006 04	0.855
	R1590 030 30			NMA 30x1.5	R3446 016 04	0.980
40x10/12/16/20/40	R1590 325 30	LGF-C-2575	R3414 015 06	NMA 25x1.5	R3446 011 04	1.600
50x5	R1590 035 30	LGF-B-3590	R3414 026 06	NMA 35x1.5	R3446 012 04	1.360
50x10/12/16/20/40	R1590 330 30	LGF-C-3080	R3414 027 06	NMA 30x1.5	R3446 016 04	1.760
63x10/20/40	R1590 040 30	LGF-B-40115	R3414 028 06	NMA 40x1.5	R3446 018 04	2.500
80x10/20	R1590 050 30	LGF-A-50140	R3414 029 06	NMA 50x1.5	R3446 019 04	5.130

Size	Load ratings		Bearing friction torque with seal	Rigidity (axial)	Rigidity against tilting	Limit speed (grease)
	dyn. C (N)	stat. C ₀ (N)				
d₀ x P			M_{RL} (Nm)	R_{aL} (N/μm)	R_{kl} (Nm/mrad)	n_G (min ⁻¹)
20x5/20/40	17000	24700	0.16	375	50	3800
25x5/10/25	18800	31000	0.24	450	80	3300
32x5/10/20/32	26000	47000	0.30	650	140	3000
40x5	29000	64000	0.50	850	300	2200
40x10/12/16/20/40	44500	111000	0.60	1300	450	2600
50x5	41000	89000	0.60	900	400	2000
50x10/12/16/20/40	47500	127000	0.75	1500	620	2200
63x10/20/40	72000	149000	1.30	1200	750	1600
80x10/20	113000	250000	2.60	1400	1500	1200

Suitable for screw ends: Form





Size	Dimensions (mm)				Mounting dimensions (mm)						Mounting holes		
	d	D	B	B ₁	J	D _a min.	max.	d _a min.	max.	Number	d ₃ (mm)	t (°)	
d ₀ x P													
20x5/20/40	12 _{-0.010}	55 _{-0.013}	25 _{-0.25}	17	42	30	33	16	29	3	6.8	120	
25x5/10/25	17 _{-0.010}	62 _{-0.013}	25 _{-0.25}	17	48	34	37	23	33	3	6.8	120	
32x5/10/20/32	20 _{-0.010}	68 _{-0.013}	28 _{-0.25}	19	53	40	43	25	39	4	6.8	90	
40x5	30 _{-0.010}	80 _{-0.013}	28 _{-0.25}	19	63	50	53	40	49	6	6.8	60	
40x10/12/16/20/40	25 _{-0.005}	75 _{-0.010}	56 _{-0.50}	47	58	45	48	32	44	8	6.5	45	
50x5	35 _{-0.010}	90 _{-0.015}	34 _{-0.25}	25	75	59	62	45	58	4	8.8	90	
50x10/12/16/20/40	30 _{-0.005}	80 _{-0.010}	56 _{-0.50}	47	63	50	53	40	49	12	6.5	30	
63x10/20/40	40 _{-0.010}	115 _{-0.015}	46 _{-0.25}	36	94	71	80	56	70	12	8.5	30	
80x10/20	50 _{-0.005}	140 _{-0.010}	54 _{-0.25}	45	113	88	100	63	87	12	10.5	30	

Bearings

Bearing LAN

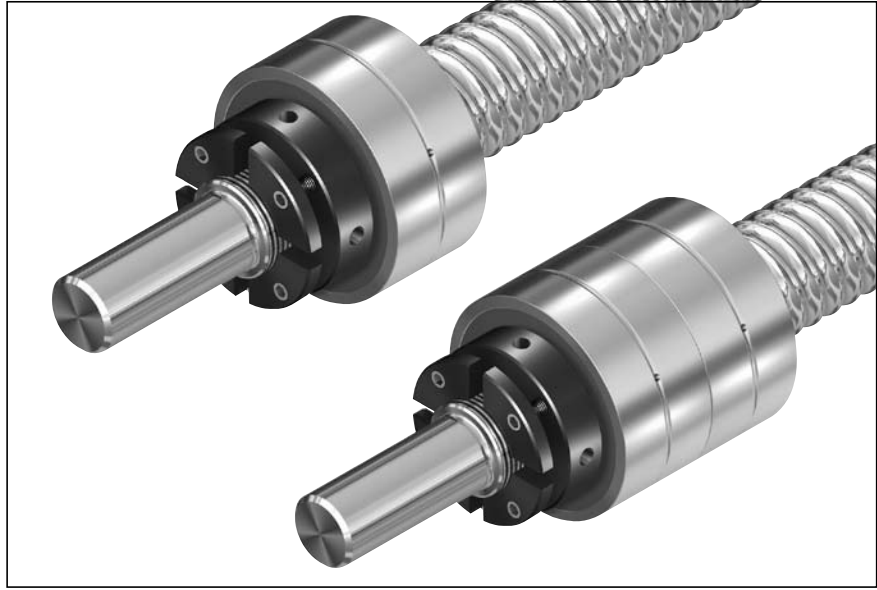
Fixed bearing with angular-contact thrust ball bearing LGN

Double-thrust,
Series LGN-B-...
LGN-A-...

Double-thrust, in pairs,
Series LGN-C-...

The fixed bearing consists of:

- angular-contact thrust ball bearing LGN
- slotted nut NMA..., NMZ...



Size	Angular-contact thrust ball bearing with slotted nut	Single parts				Weight complete
		Angular-contact thrust ball bearing		Slotted nut		
d _o x P	Part number	Designation	Part number	Designation	Part number	(kg)
6x1/2	R1590 106 00	LGN-B-0624	R3414 002 06	NMZ 6x0.5	R3446 001 04	0.040
8x1/2/2.5	R1590 106 00	LGN-B-0624	R3414 002 06	NMZ 6x0.5	R3446 001 04	0.040
12x2/5/10	R1590 106 00	LGN-B-0624	R3414 002 06	NMZ 6x0.5	R3446 001 04	0.040
16x5/10/16	R1590 110 00	LGN-B-1034	R3414 003 06	NMZ 10x1	R3446 002 04	0.110
20x5/20/40	R1590 112 00	LGN-B-1242	R3414 004 06	NMZ 12x1	R3446 003 04	0.215
25x5/10/25	R1590 117 00	LGN-B-1747	R3414 005 06	NMZ 17x1	R3446 004 04	0.248
	R1590 117 30			NMA 17x1	R3446 014 04	0.290
32x5/10/20/32	R1590 120 00	LGN-B-2052	R3414 006 06	NMZ 20x1	R3446 005 04	0.345
	R1590 120 30			NMA 20x1	R3446 015 04	0.440
40x5	R1590 130 00	LGN-B-3062	R3414 007 06	NMZ 30x1.5	R3446 006 04	0.465
	R1590 130 30			NMA 30x1.5	R3446 016 04	0.590
40x10/12/16/20/40	R1590 225 30	LGN-C-2557	R3414 014 06	NMA 25x1.5	R3446 011 04	0.840
50x5	R1590 135 30	LGN-B-3572	R3414 022 06	NMA 35x1.5	R3446 012 04	0.740
50x10/12/16/20/40	R1590 230 30	LGN-C-3062	R3414 023 06	NMA 30x1.5	R3446 016 04	0.980
63x10/20/40	R1590 140 30	LGN-A-4090	R3414 024 06	NMA 40x1.5	R3446 018 04	1.250
80x10/20	R1590 150 30	LGN-A-50110	R3414 025 06	NMA 50x1.5	R3446 019 04	2.930

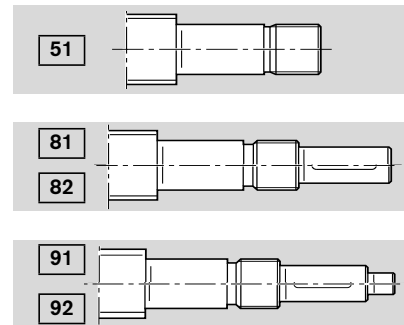
Size	Load ratings		Bearing friction torque with seal M_{RL} (Nm)	Rigidity (axial) R_{aL} N/ μ m	Rigidity against tilting R_{kl} (Nm/mrad)	Limit speed (grease) n_G (min ⁻¹)
	dyn. C (N)	stat. C ₀ (N)				
$d_o \times P$						
6x1/2	6900	8500	0.04	200	8	6800
8x1/2/2.5	6900	8500	0.04	200	8	6800
12x2/5/10	6900	8500	0.04	200	8	6800
16x5/10/16	13400	18800	0.12	325	25	4600
20x5/20/40	17000	24700	0.16	375	50	3800
25x5/10/25	18800	31000	0.24	450	80	3300
32x5/10/20/32	26000	47000	0.30	650	140	3000
40x5	29000	64000	0.50	850	300	2200
40x10/12/16/20/40	44500	111000	0.60	1300	450	2600
50x5	41000	89000	0.60	900	400	2000
50x10/12/16/20/40	47500	127000	0.75	1500	620	2200
63x10/20/40	72000	149000	1.30	1200	750	1600
80x10/20	113000	250000	2.60	1400	1500	1200

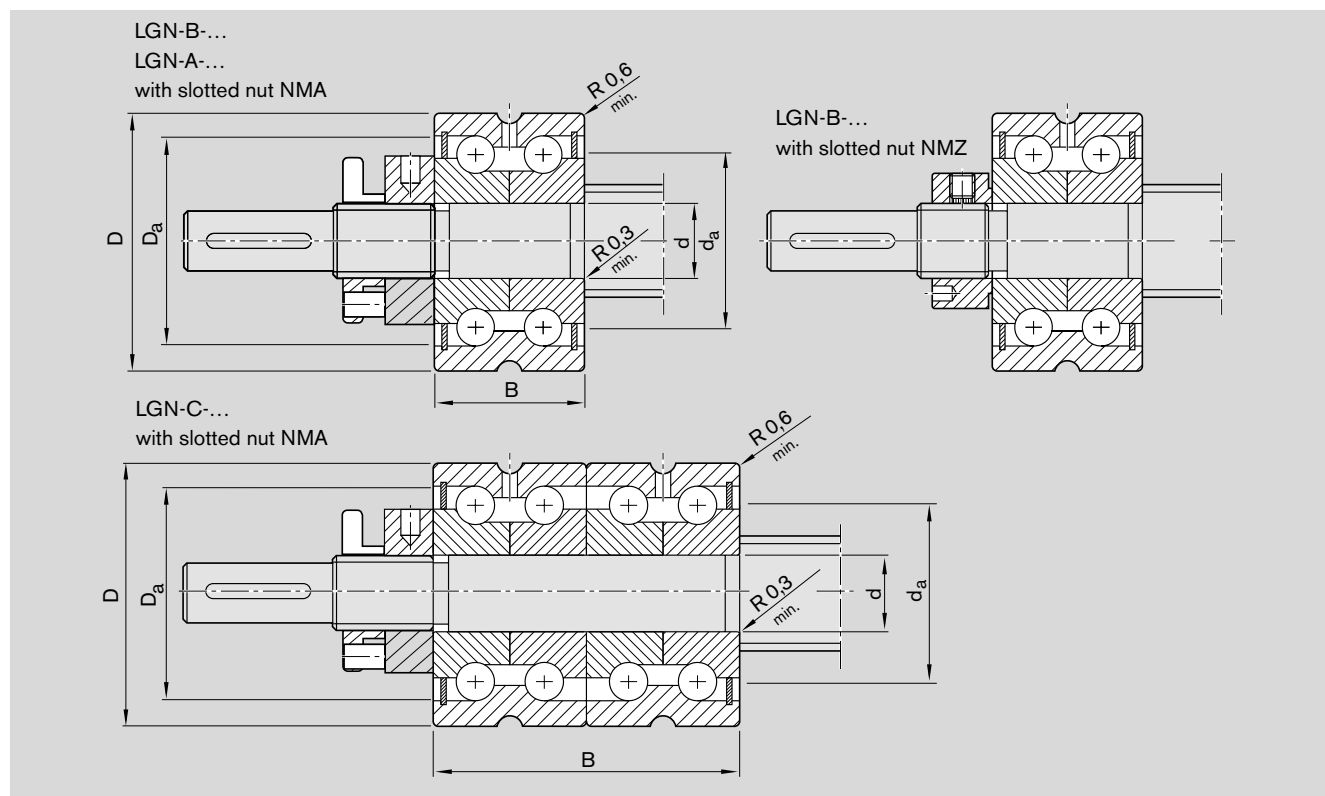
Suitable for screw ends: Form

For screws 8 x 2.5: Form 53, 83, 93

For screws 6 x 1; 6 x 2; 8 x 1; 8 x 2:

Form 83





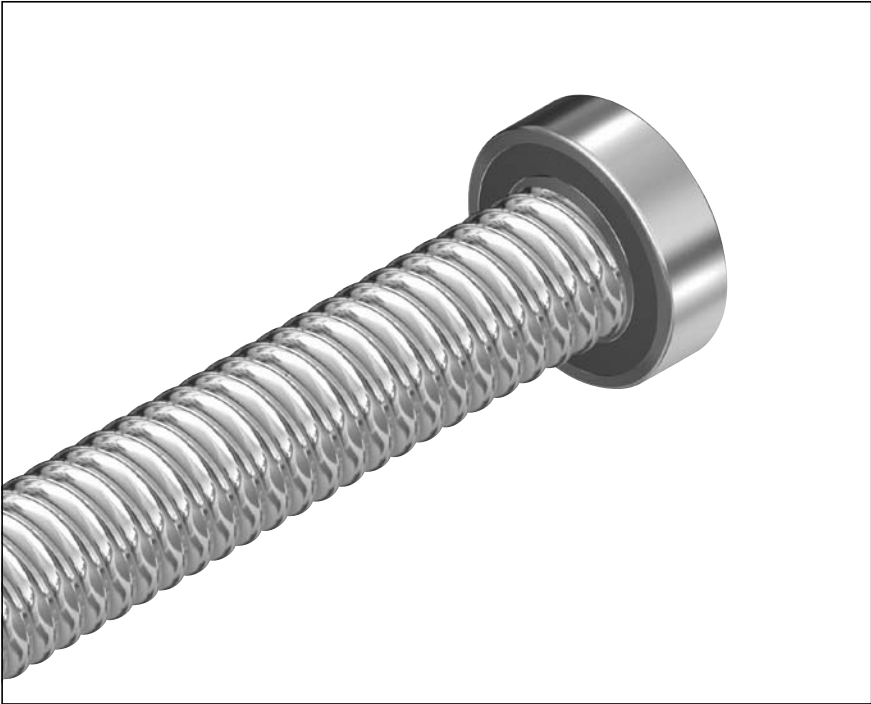
Size	Dimensions (mm)			Mounting dimensions (mm)			
	d	D	B	D _a		d _a	
d ₀ x P				min.	max.	min.	max.
6x1/2	6 _{-0.010}	24 _{-0.010}	15 _{-0.25}	16	19	9	15
8x1/2/2.5	6 _{-0.010}	24 _{-0.010}	15 _{-0.25}	16	19	9	15
12x2/5/10	6 _{-0.010}	24 _{-0.010}	15 _{-0.25}	16	19	9	15
16x5/10/16	10 _{-0.010}	34 _{-0.010}	20 _{-0.25}	25	28	14	24
20x5/20/40	12 _{-0.010}	42 _{-0.010}	25 _{-0.25}	30	33	16	29
25x5/10/25	17 _{-0.010}	47 _{-0.010}	25 _{-0.25}	34	37	23	33
32x5/10/20/32	20 _{-0.010}	52 _{-0.010}	28 _{-0.25}	40	43	25	39
40x5	30 _{-0.010}	62 _{-0.010}	28 _{-0.25}	50	53	40	49
40x10/12/16/20/40	25 _{-0.005}	57 _{-0.010}	56 _{-0.05}	45	48	32	44
50x5	35 _{-0.010}	72 _{-0.011}	34 _{-0.25}	59	62	45	58
50x10/12/16/20/40	30 _{-0.005}	62 _{-0.010}	56 _{-0.50}	50	53	40	49
63x10/20/40	40 _{-0.005}	90 _{-0.010}	46 _{-0.25}	71	80	56	70
80x10/20	50 _{-0.005}	110 _{-0.010}	54 _{-0.25}	88	100	63	87

Bearings

Bearing LAD

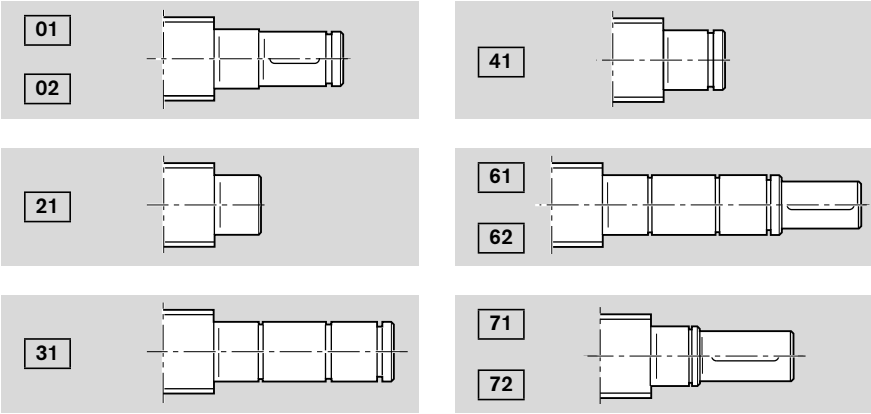
Floating bearing with deep-groove ball bearing

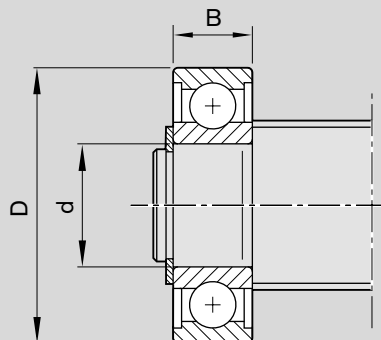
- The floating bearing consists of:
- deep-groove ball bearing per DIN 625... .2RS
 - retaining ring DIN 471 (2 pcs)



Size d ₀ x P	Deep-groove ball bearing with retaining ring Part number	Single parts				Load ratings	
		Deep-groove ball bearing DIN 625		Retaining ring DIN 471		dyn. C (N)	stat. C ₀ (N)
		Designation	Part number	Designation	Part number		
8x1/2/2.5	R1590 605 00	625.2RS	R3414 048 00	5x0.6	R3410 742 00	1900	590
12x2/5/10	R1590 606 00	626.2RS	R3414 043 00	6x0.7	R3410 736 00	2450	900
16x5/10/16	R1590 610 00	6200.2RS	R3414 049 00	10x1	R3410 745 00	6000	2240
20x5/20/40	R1590 612 00	6201.2RS	R3414 042 00	12x1	R3410 712 00	6950	2650
	R1590 615 00	6202.2RS	R3414 074 00	15x1	R3410 748 00	7800	3250
25x5/10/25	R1590 617 00	6203.2RS	R3414 050 00	17x1	R3410 749 00	9500	4150
32x5/10/20/32	R1590 620 00	6204.2RS	R3414 038 00	20x1.2	R3410 735 00	12700	5700
	R1590 625 00	6205.2RS	R3414 063 00	25x1.2	R3410 750 00	14300	6950
40x5/10/12/16/20/40	R1590 630 00	6206.2RS	R3414 051 00	30x1.5	R3410 724 00	19300	9800
50x5/10/12/16/20/40	R1590 635 00	6207.2RS	R3414 075 00	35x1.5	R3410 725 00	25500	13200
63x10/20/40	R1590 650 00	6210.2RS	R3414 077 00	50x2	R3410 727 00	36500	20800
80x10/20	R1590 660 00	6212.2RS	R3414 078 00	60x2	R3410 764 00	52000	31000

Suitable for screw ends: Form
For screws 8 x 1; 8 x 2: Form 41





Size	Dimensions (mm)			Weight complete
$d_o \times P$	d	D	B	(kg)
8x1/2/2.5	5	16	5	0.005
12x2/5/10	6	19	6	0.008
16x5/10/16	10	30	9	0.030
20x5/20/40	12	32	10	0.035
	15	35	11	0.043
25x5/10/25	17	40	12	0.064
32x5/10/20/32	20	47	14	0.106
	25	52	15	0.125
40x5/10/12/16/20/40	30	62	16	0.195
50x5/10/12/16/20/40	35	72	17	0.288
63x10/20/40	50	90	20	0.453
80x10/20	60	110	22	0.783

Bearings

Bearing LAL

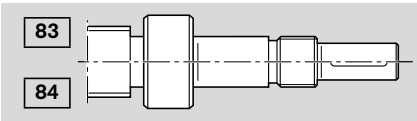
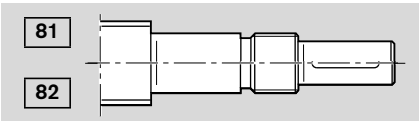
Fixed bearing with angular-contact thrust ball bearing LGL
Double-thrust, screw-down, for economical constructions

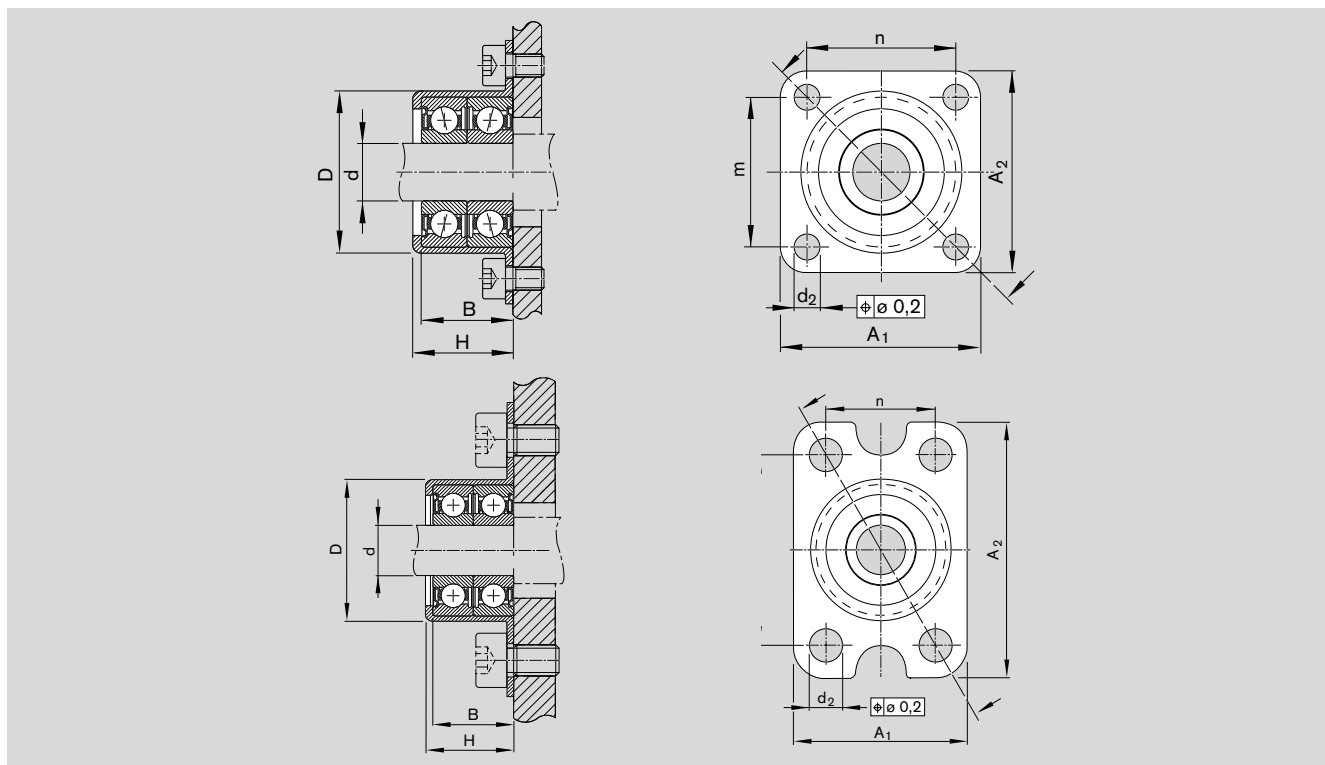
- The fixed bearing consists of:
- angular-contact thrust ball bearing LGL
 - slotted nut NMG..., NMZ...



Size	Angular-contact thrust ball bearing with slotted nut	Single parts				Slotted nut	
		Angular-contact thrust ball bearing		Load ratings			
d _o x P	Part number	Designation	Part number	dyn. C (N)	stat. C ₀ (N)	Designation	Part number
6x1/2	R1590 406 00	LGL-D-0624	R3414 038 06	1340	1250	NMZ 6x0.5	R3446 001 04
8x1/2/2.5	R1590 406 00	LGL-D-0624	R3414 038 06	1340	1250	NMZ 6x0.5	R3446 001 04
12x2/5/10	R1590 406 00	LGL-D-0624	R3414 038 06	1340	1250	NMZ 6x0.5	R3446 001 04
12x5/10	R1590 412 00	LGL-A-1244	R3414 040 06	13200	17900	NMG 12x1	R3446 002 02
16x5/10	R1590 412 00	LGL-A-1244	R3414 040 06	13200	17900	NMG 12x1	R3446 002 02
20x5	R1590 412 00	LGL-A-1244	R3414 040 06	13200	17900	NMG 12x1	R3446 002 02
25x5/10	R1590 415 00	LGL-A-1547	R3414 041 06	16400	22400	NMG 15x1	R3446 011 02
32x5/10	R1590 420 00	LGL-A-2060	R3414 042 06	27500	40000	NMG 20x1	R3446 005 02

Suitable for screw ends: Form





Size	Dimensions (mm)									Weight of bearing (kg)
	d	D +0.03 −0.01	A ₁	A ₂	n	m	H −0.25	B	d ₂	
d _o x P										
6x1/2	6	20.50	24	35	15	26	13	12	4.5	0.023
8x1/2/2.5	6	20.50	24	35	15	26	13	12	4.5	0.023
12x2/5/10	6	20.50	24	35	15	26	13	12	4.5	0.023
12x5/10	12	35.45	44	50	32	38	22	20	6.6	0.120
16x5/10	12	35.45	44	50	32	38	22	20	6.6	0.120
20x5	12	35.45	44	50	32	38	22	20	6.6	0.120
25x5/10	15	38.45	47	51	35	39	24	22	6.6	0.140
32x5/10	20	50.45	60	60	47	47	30	28	6.6	0.300

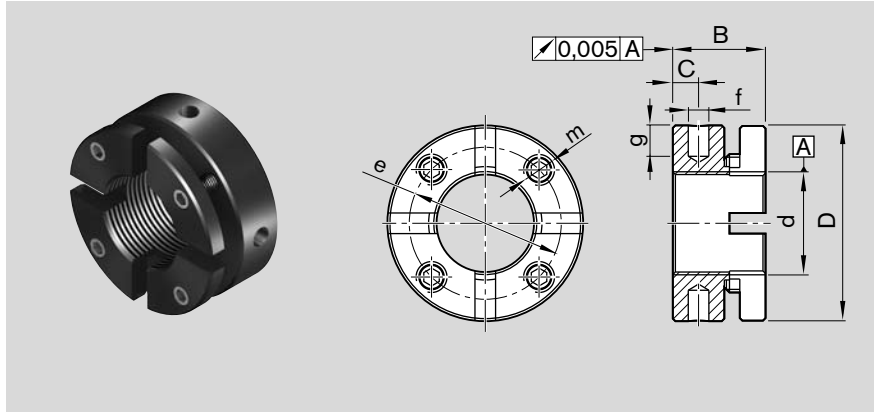
Slotted Nuts and Housing Nuts

Slotted Nuts NMA, NMZ and NMG for Fixed Bearings

Slotted nut NMA

- for maximum vibratory loads
- for new designs

M_A = tightening torque for slotted nut
 F_{aB} = axial breaking load of slotted nut
 M_{AG} = tightening torque for set screw

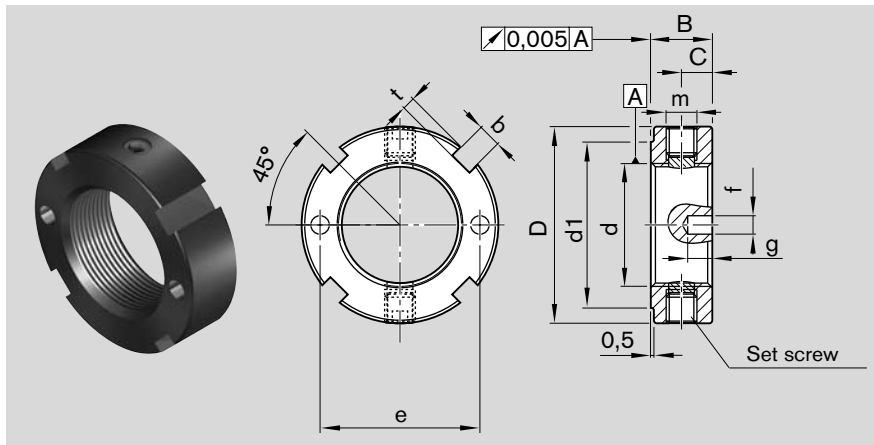


Designation	Part number	Dimensions (mm)								M _A (Nm)	F _{aB} (kN)	M _{AG} (Nm)	Weight (g)
		d	D	B	c	m	e	f	g				
NMA 15x1	R3446 020 04	M15x1	30	18	5	M5	24	4	5	10	100	3	60
NMA 17x1	R3446 014 04	M17x1	32	18	5	M5	26	4	5	15	120	3	70
NMA 20x1	R3446 015 04	M20x1	38	18	5	M6	31	4	6	18	145	5	130
NMA 25x1.5	R3446 011 04	M25x1.5	45	20	6	M6	38	5	6	25	205	5	160
NMA 30x1.5	R3446 016 04	M30x1.5	52	20	6	M6	45	5	7	32	250	5	200
NMA 35x1.5	R3446 012 04	M35x1.5	58	20	6	M6	51	5	7	40	280	5	230
NMA 40x1.5	R3446 018 04	M40x1.5	65	22	6	M6	58	6	8	55	350	5	300
NMA 50x1.5	R3446 019 04	M50x1.5	75	25	8	M6	68	6	8	85	450	5	430

Slotted nut NMZ

- for existing designs
- for side drive with timing belt
- for driven nuts

M_A = tightening torque for slotted nut
 F_{aB} = axial breaking load of slotted nut
 M_{AG} = tightening torque for set screw

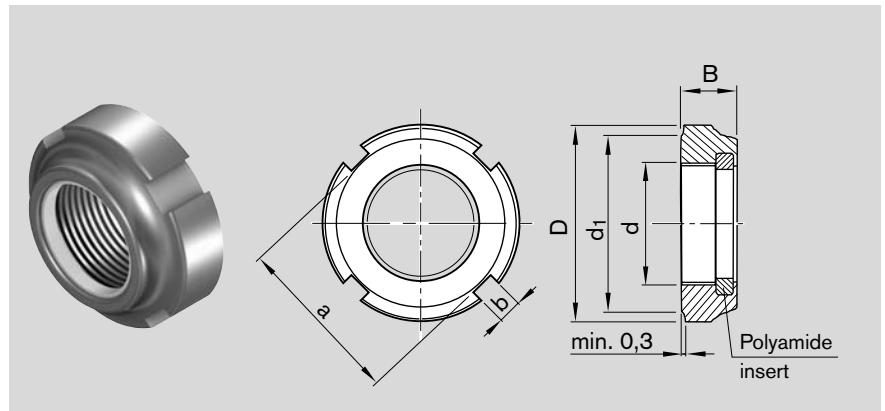


Designation	Part number	Dimensions (mm)												M _A (Nm)	F _{aB} (kN)	M _{AG} (Nm)	Weight (g)
		d	D	B	d _i	c	m	b	t	e	f	g					
NMZ 6x0.5	R3446 001 04	M6x0.5	16	8	12	4	M4	3	2.0	11.0	2.5	3.5	2	17	1	10	
NMZ 10x1	R3446 002 04	M10x1	18	8	14	4	M4	3	2.0	14.0	2.5	3.5	6	31	1	10	
NMZ 12x1	R3446 003 04	M12x1	22	8	18	4	M4	3	2.0	17.0	2.5	3.5	8	38	1	15	
NMZ 17x1	R3446 004 04	M17x1	28	10	23	5	M5	4	2.0	22.5	3.0	4.0	15	57	3	28	
NMZ 20x1	R3446 005 04	M20x1	32	10	27	5	M5	4	2.0	26.0	3.0	4.0	18	69	3	35	
NMZ 30x1.5	R3446 006 04	M30x1.5	45	12	40	6	M6	5	2.0	37.5	4.0	5.0	32	112	5	75	
NMZ 45x1.5	R3446 032 04	M45x1.5	65	14	59	7	M6	6	2.5	–	–	–	65	181	5	170	
NMZ 55x2	R3446 033 04	M55x2	75	16	68	8	M6	7	3.0	–	–	–	95	229	5	230	
NMZ 60x2	R3446 031 04	M60x2	80	16	73	8	M6	7	3.0	–	–	–	100	255	5	250	
NMZ 70x2	R3446 034 04	M70x2	92	18	85	9	M8	8	3.5	–	–	–	130	305	15	360	
NMZ 80x2	R3446 035 04	M80x2	105	18	95	9	M8	8	3.5	–	–	–	160	355	15	460	
NMZ 90x2	R3446 036 04	M90x2	120	20	108	10	M8	10	4.0	–	–	–	200	410	15	700	

Slotted nut NMG

- for economical constructions

M_A = tightening torque of slotted nut



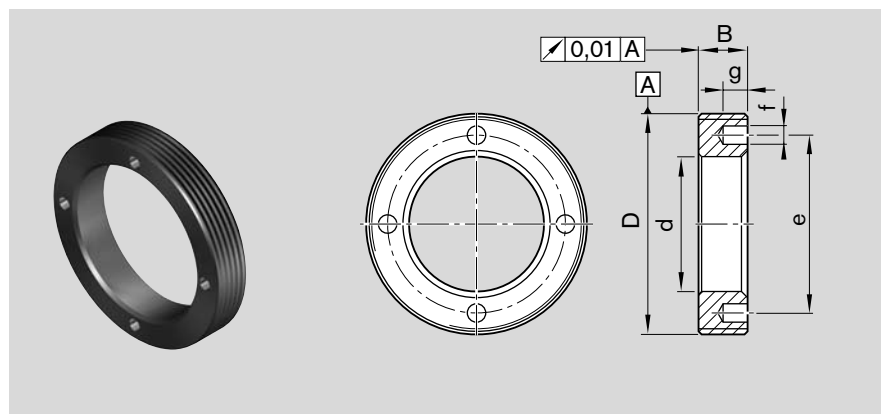
Designation	Part number	Dimensions (mm)							M_A (Nm)	Weight (g)
		d	D	B	d ₁	a	b			
NMG 12x1	R3446 002 02	M12x1	21	7.6	18	18	3		8	10
NMG 15x1	R3446 011 02	M15x1	24	8.6	21	21	4		10	13
NMG 20x1	R3446 005 02	M20x1	32	9.6	27	27	4		18	24

Housing nut GWR

- for angular-contact thrust ball bearing LGN
- for cylindrical single nut ZEM-E-S

Note:

Use a threadlocker (e.g. Loctite 638) to secure against loosening.



Designation	Part number	Dimensions (mm)							Weight (g)
		D	d	B	e	f	g		
GWR 18x1	R1507 040 33	M18x1	8.5	8	12.5	2.5	3		10.0
GWR 23x1	R1507 240 35	M23x1	13.0	8	18.0	2.5	3		15.0
GWR 26x1.5	R1507 240 22	M26x1.5	16.5	8	20.5	2.5	3		16.5
GWR 30x1.5	R1507 340 34	M30x1.5	17.0	8	23.0	3.0	4		29.0
GWR 36x1.5	R1507 040 23	M36x1.5	22.0	8	29.0	3.0	4		35.0
GWR 40x1.5	R1507 140 03	M40x1.5	25.0	8	33.0	3.0	4		39.5
GWR 45x1.5	R1507 240 04	M45x1.5	28.0	8	38.0	3.0	4		55.0
GWR 50x1.5	R1507 240 25	M50x1.5	31.0	10	40.0	4.0	5		86.0
GWR 55x1.5	R1507 340 05	M55x1.5	36.0	10	46.0	4.0	5		96.0
GWR 58x1.5	R1507 440 32	M58x1.5	43.0	10	50.0	4.0	5		84.0
GWR 60x1	R1507 440 28	M60x1	43.0	10	51.0	4.0	5		97.0
GWR 62x1.5	R1507 440 29	M62x1.5	43.0	12	53.0	5.0	6		127.0
GWR 65x1.5	R1507 440 26	M65x1.5	47.0	12	55.0	4.0	5		136.0
GWR 70x1.5	R1507 440 06	M70x1.5	42.0	12	58.0	4.0	5		216.0
GWR 78x2	R1507 540 07	M78x2	52.0	15	67.0	6.0	7		286.0
GWR 92x2	R1507 640 09	M92x2	65.0	16	82.0	6.0	7		385.0
GWR 112x2	R1507 740 11	M112x2	82.0	18	100.0	8.0	8		596.0

Technical Data

Technical Notes

DIN 69 051, Part 1 defines a ball screw as follows:

An assembly comprising a ball screw shaft and a ball nut and which is capable of converting rotary motion into linear motion and vice versa. The rolling elements of the assembly are balls.

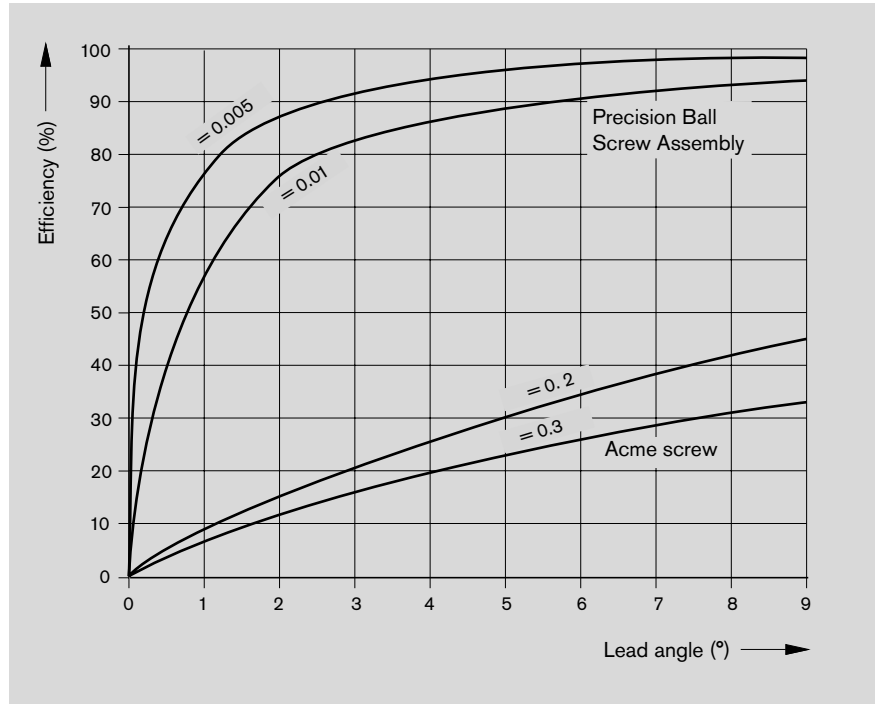
Advantages over the Acme screw drive

- The mechanical efficiency of an Acme screw drive is a maximum 50%, whereas a ball screw can reach a mechanical efficiency of up to 98%.
- Higher life expectancy due to negligible wear during operation
- Less drive power required
- No stick-slip effect
- More precise positioning
- Higher travel speed
- Less heat-up

Due to their high mechanical efficiency, ball screws are in principle not self-locking.

Safety information

We recommend that a safety nut be installed for particularly critical applications in vertical set-ups. Please ask.



Selection criteria for ball screws

The following factors should be considered when selecting the ball screw for a given application:

- degree of accuracy required (lead deviation)
- in-service load conditions
- service life
- critical speed
- buckling load
- rigidity/permissible clearance or desired preload
- characteristic speed (max. permissible linear speed)

The following points should be taken into consideration when selecting a ball screw assembly that is to be both cost-efficient and optimally designed:

- The lead is a decisive factor for the load-carrying capacity (depending on the maximum possible ball diameter) and the drive moment.
- The calculation of the service life should be based on average loads and average speeds, not on maximum values.
- In order for us to provide you with a customized solution, installation drawings or sketches of the ball nut environment should be enclosed with your inquiry.

Note

Radial and eccentric forces relative to the screw must be avoided as they have a negative effect on the life and proper function of the ball screw.

Where special conditions of use are involved, please ask.

Load-carrying capacities and service life

We calculate load-carrying capacities and service life in accordance with DIN 69 051, Part 4 and ISO 3408-4 (P5).

Basic static load rating C_0

The static load rating is an axial, concentrically acting force that induces a permanent deformation of $0.0001 \times$ the ball diameter between the ball and the ball raceway.

Basic dynamic load rating C

The dynamic load rating is an axial, concentrically acting force of constant magnitude and direction under which 90% of a sufficiently large amount of identical ball screws can achieve a nominal service life of one million revolutions.

Service life

The nominal life is expressed by the number of revolutions (or number of operating hours at constant speed) that will be attained or exceeded by 90% of a representative sample of identical ball screws before the first signs of material fatigue become evident. The nominal life is designated as L or L_n , depending on whether it is specified in revolutions or hours.

Short stroke

During a short stroke, the ball does not make a real turn. It is therefore impossible for an adequate lubricating film to form. This may result in premature wear. In the chart, the minimum required stroke (travel) for a 10% lower load rating is shown as a function of the number of turns and lead of the nut. Hence the most favorable range lies above each curve. It may help to have occasional longer strokes, which are performed with simultaneous relubrication as "lubricating strokes". If in doubt, please ask.

Critical speed and buckling load

The critical speed and buckling load can be checked using the corresponding charts.

For precise calculations see formula 12 15, in "Design Calculations"

Characteristic speed $d_0 \cdot n$

Rexroth ball screws can be operated at very high speeds due to their internal ball recirculation system. Characteristic speeds of up to 150,000 are possible depending on the nut type.

$$d_0 \cdot n \leq 150,000$$

$$d_0 \cdot n \leq 80,000 \text{ (in the case of the ECO series)}$$

$$d_0 = \text{nominal diameter (mm)}$$

$$n = \text{speed (min}^{-1}\text{)}$$

The theoretically possible maximum linear speed v_{\max} (m/min) is specified on the page featuring the relevant nut. Actually attainable speeds are heavily dependent among other factors on preload and duty cycle. They are generally restricted by the critical speed. (See "Design Calculations")

Material, hardness

Our standard ball screw assemblies are made of high-quality, heat-treatable steel, carbon chrome alloy steels or case-hardened steels. The screw and nut raceways have a minimum Rockwell hardness of HRC 60. Ball screw assemblies made of corrosion-resistant steel (DIN EN ISO 683-17) are also available upon request. Unless otherwise specified, the screw ends are not hardened.

Sealing

Ball screws are precision assemblies that require protection against contamination. Flat protective covers and bellows type dust boots or the drive

unit AGK are particularly suitable for this purpose. As there are many applications in which these methods do not provide sufficient protection, we have developed a gapless lip-type seal which ensures an optimal sealing effect and maintains high efficiency due to the low friction level. Our ball screws are therefore supplied with seals in their standard versions. At the customer's request, these seals can be omitted or special seals used in their place. A reinforced version of the standard seal has been developed for those applications where heavy contamination of the screw appears inevitable. The sealing effect has been improved further by increasing the preload. What must be borne in mind is the significantly higher friction torque in comparison with the standard friction torque (see Technical Data) and the associated increased heat build-up. The reinforced seal can be easily recognized externally by its dark green color.

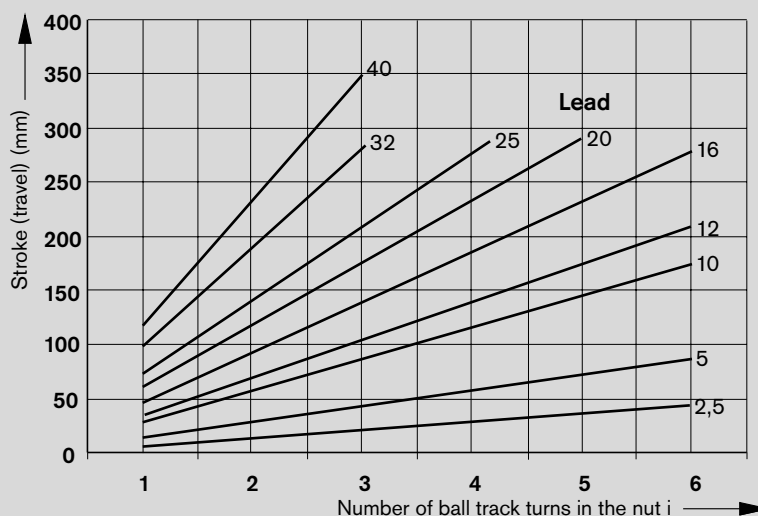
Permissible operating temperatures

Ball screws are suitable for continuous operation at temperatures up to 80°C with temporary peaks of 100°C (measurements taken on the outer shell of the nut).

Permissible operating temperatures:
 $-10^\circ\text{C} \leq T_{\text{operating}} \leq 80^\circ\text{C}$

Permissible bearing temperature:
 $-15^\circ\text{C} \leq T_{\text{bearing}} \leq 80^\circ\text{C}$

Short stroke limit (load rating reduced by less than 10%)



Technical Data

Acceptance Conditions and Tolerance Grades

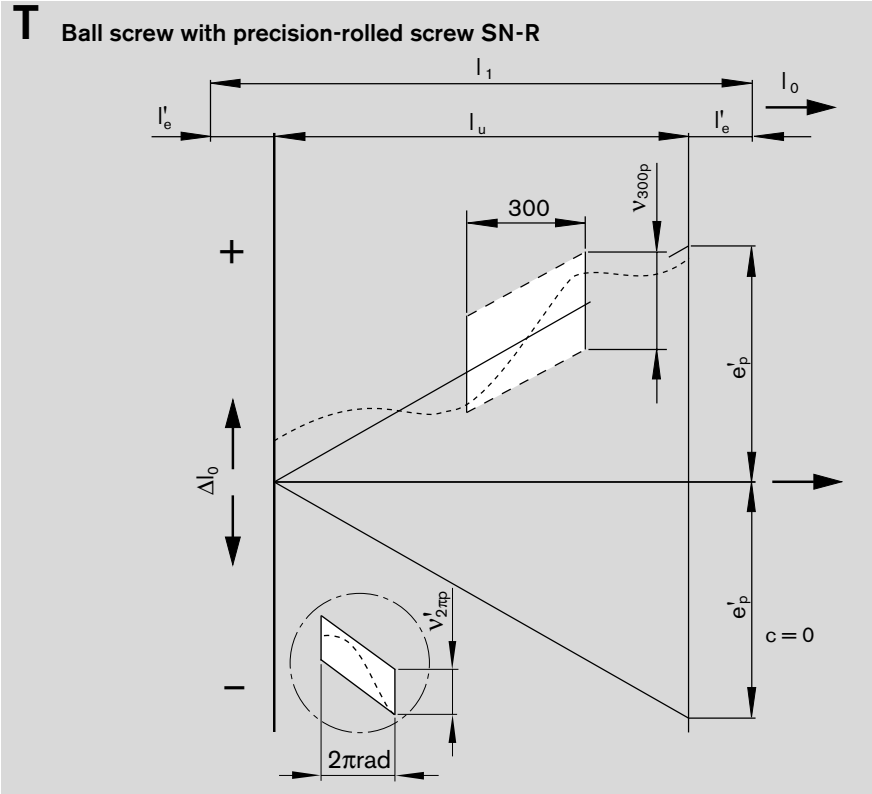
Permissible travel deviation

in accordance with DIN 69 051, Part 3 and ISO 3408-3

Many values are significantly more accurate than those defined in DIN 69 051, Part 3 and ISO 3408-3.

Symbol definitions (excerpt):

- l_0 = nominal travel
- l_1 = thread length
- Δl_0 = travel deviation
- l_u = useful travel
- l'_e = excess travel (the closer tolerances for travel and hardness do not apply here)
- c = travel compensation (target travel deviation) (standard: $c = 0$)
- e'_p = tolerance mean actual travel deviation
- v_{300p} = permissible travel deviation within 300 mm travel
- $v'_{2\pi p}$ = permissible travel deviation within one revolution



Improved values

compared with DIN 69 051, Part 3 and ISO 3408-3 (tolerance reduced by half)

l_u		e'_p (μm)		
		Tolerance grade		
		5	7	9
>	0	18	44	110
	100	20	48	130
	200	23	52	150
	315			
		$e'_p = \frac{l_u}{300} \cdot v_{300p}$		

For precision screws SN-R the following values apply in all cases:

v_{300p} (μm)		
Tolerance grade		
5	7	9
23	52	130

$v'_{2\pi p}$ (μm)		
Tolerance grade		
5	7	9
8	10	10

Non-usable length l'_e
(Excess travel)

d_0 (mm)	l'_e (mm)
8	15
12, 16	20
20, 25, 32, 40	40
50, 63, 80	50

Minimum number of measurements within 300 mm (measuring interval) and excess travel to be taken into consideration

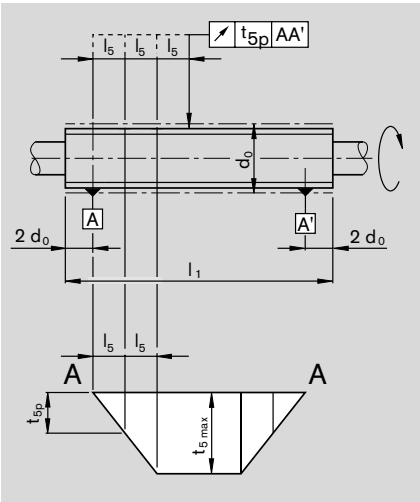
Lead P (mm)	Minimum number of measurements for tolerance grade		
	5	7	9
2.5	10	5	5
5	6	3	3
10	3	1	1
16	3	1	1
20	3	1	1
25	3	1	1
32	2	1	1
40	1	1	1

Technical Data

Acceptance Conditions and Tolerance Grades

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'.

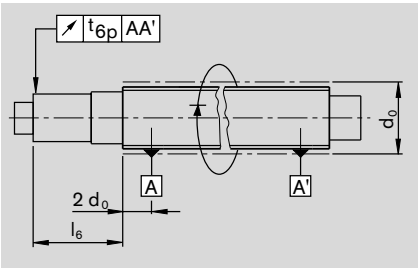


d_0		l_5	t_{5p} in μm for l_5 for tolerance grade	
above	up to		5	7; 9
= 6	12	80	32	40
12	25	160		
25	50	315		
50	100	630		
100	200	1250		

l_1/d_0		$t_{5\text{max}}$ in μm for $l_1 \geq 4l_5$ for tolerance grade	
above	up to	5	7; 9
	40	64	80
40	60	96	120
60	80	160	200
80	100	256	320

Radial run-out t_6 of the bearing diameter in relation to AA' for $l_6 \leq l$.
Table value t_{6p} applies when $l_6 \leq$ reference length l .

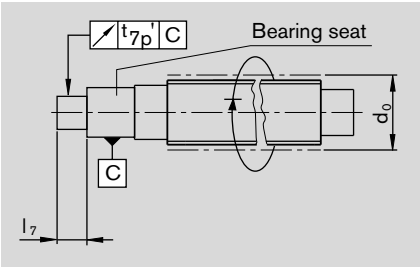
Where $l_6 > l$ then $t_{6a} \leq t_{6p} \cdot \frac{l_{6a}}{l}$



Nominal diameter d_0		Reference length l	t_{6p} in μm for $l_6 \leq l$ for tolerance grade
above	up to		5; 7; 9
= 6	20	80	20
20	50	125	25
50	125	200	25
125	200	315	25

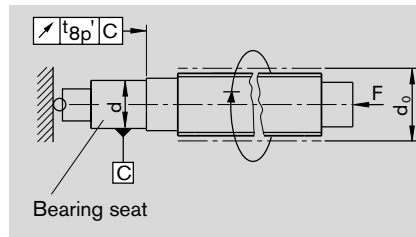
Coaxial deviation t_7' of the journal diameter of the ball screw shaft in relation to the bearing diameter for $l_7 \leq l$.
Table value t_{7p} applies when $l_7 \leq$ reference length l .

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



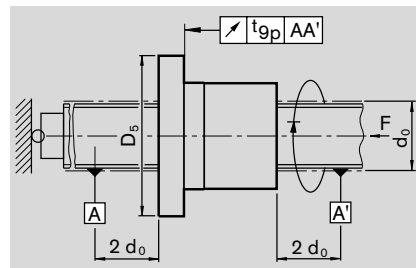
Nominal diameter d_0		Reference length l	t_{7p}' in μm for $l_7 \leq l$ for tolerance grade
above	up to		5; 7; 9
= 6	20	80	6
20	50	125	6
50	125	200	7
125	200	315	12

Axial run-out t_{8p}' of the shaft (bearing) face of the ball screw shaft in relation to the bearing diameter.



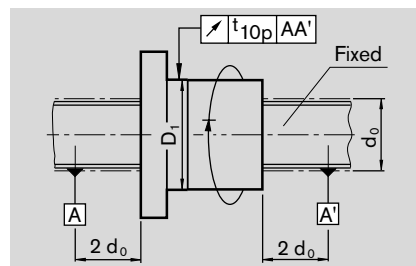
Nominal diameter d_0		t_{8p}' in μm for tolerance grade 5; 7; 9
above	up to	
= 6	63	5
63	125	6
125	200	8

Axial run-out t_{9p} of the ball nut location face in relation to A and A' (for preloaded ball nuts only).



Flange diameter D_5		t_{9p} in μm for tolerance grade 5; 7; 9
above	up to	
16	32	16
32	63	20
63	125	25
125	250	32
250	500	40

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



Outer diameter D_1		t_{10p} in μm for tolerance grade 5; 7; 9
above	up to	
16	32	16
32	63	20
63	125	25
125	250	32
250	500	40

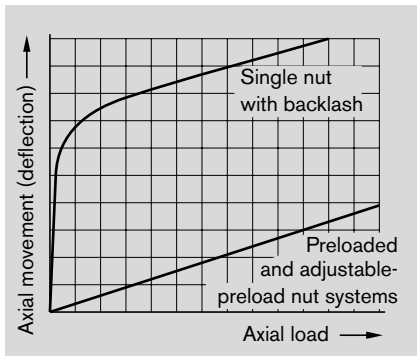
Please ask for details of permissible axial and radial run-out for driven nuts.

Technical Data

Preload and Rigidity

Nut system preload

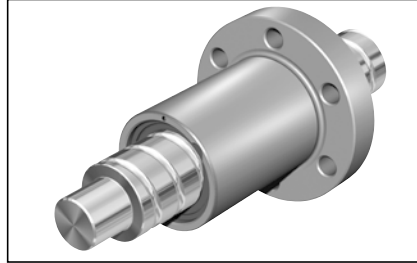
In addition to single nuts with reduced backlash, Rexroth supplies preloaded or adjustable-preload nut systems.



The rigidity of these types of Rexroth nut systems is approximately the same. This is because the adjustable-preload single nut and the preloaded single nut have a much more compact design and are thus only half as long as a double nut system. The screw is typically far less rigid than the nut unit (for details see "Overall axial rigidity...").

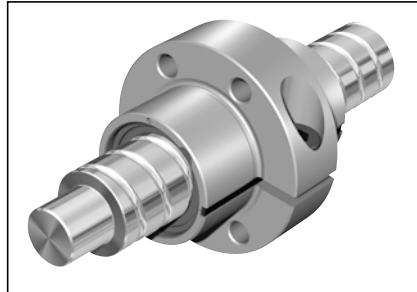
Preloaded single nut

Single nuts can be preloaded to 2% or 5% of the basic dynamic load rating by means of optimized ball size selection.



Adjustable-preload single nut

The adjustable-preload single nut allows cost-efficient design techniques to be implemented in a large number of applications. The radial clearance and preload are adjusted radially via a slot approx. 0.1 mm wide, see section "Mounting". Depending on the application, we will preload the nut system to 2% or 5% of the basic dynamic load rating. The maximum preload equals approx. 5% of the basic dynamic load rating.



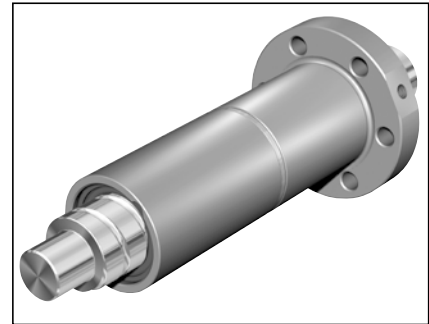
2-start single nut with flange

The 2-start single nut with flange can be optimally preloaded to 2% or 5% of the dynamic load rating by means of ball size selection.



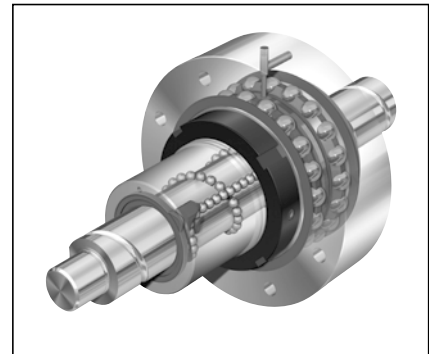
Double nut

Tensioning two nuts against each other eliminates the inherent backlash of the ball screw, increases rigidity and thus improves positioning accuracy. As excessive preload can cause a reduction in service life, we recommend that it not be more than $\frac{1}{3}$ of the average operating load. Depending on the application, we will preload the nut system to 7% or 10% of the basic dynamic load rating.



Driven nut

Like the single nut, the driven nut from the "Drive Units" catalog R310EN 3304 can be preloaded to 2%, 3% or 5% of the basic dynamic load rating by means of ball size selection.



Overall rigidity

The rigidity of a ball screw is also influenced by all adjoining parts such as bearings, housing bores, nut housings etc.

Overall axial rigidity R_{bs} of the ball screw

The overall axial rigidity R_{bs} is comprised of the component rigidity of the bearing R_{fb} , the screw R_S and the nut unit R_{nu} .

$$\frac{1}{R_{bs}} = \frac{1}{R_{fb}} + \frac{1}{R_S} + \frac{1}{R_{nu}} \quad 16$$

Note:

Please note that in most cases the rigidity R_S of the screw will be significantly lower than the rigidity R_{nu} of the nut unit. In an assembly with a diameter of 40 x 10, for example, the rigidity R_{nu} of the nut unit is 2 to 3 times higher than the rigidity R_S of a screw with a length of 500 mm.

Rigidity of the bearing R_{fb}

The rigidity of the bearings corresponds to the values found in the bearing manufacturer's catalog.

See the corresponding tables in this catalog for rigidity values of the bearings offered by Rexroth.

Rigidity in the area of the nut unit R_{nu}

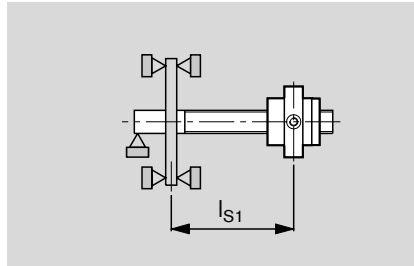
The rigidity in the area of the nut unit is calculated according per DIN 69 051 (P5).

See the corresponding tables for rigidity values.

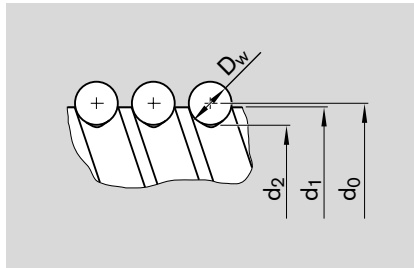
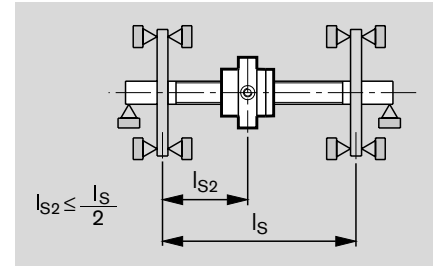
Rigidity of the screw R_S

The rigidity of the screw R_S depends on the type of bearing used. See the corresponding tables for rigidity values.

1 Ball screw shaft is fixed at one end.



2 Ball screw shaft is fixed at both ends.



$$R_{S2} = 165 \cdot \frac{(d_0 - 0.71 \cdot D_w)^2}{l_{S2}} \cdot \frac{l_S}{l_S - l_{S2}} \quad (\text{N}/\mu\text{m}) \quad 18$$

The lowest screw rigidity R_{S2min} occurs at the center of the screw ($l_{S2} = l_S/2$) and thus equals:

$$R_{S1} = 165 \cdot \frac{(d_0 - 0.71 \cdot D_w)^2}{l_{S1}} \quad (\text{N}/\mu\text{m}) \quad 17$$

$$R_{S2min} = 660 \cdot \frac{(d_0 - 0.71 \cdot D_w)^2}{l_S} \quad (\text{N}/\mu\text{m}) \quad 19$$

R_{S1} = rigidity of the screw (N/μm)
 d_0 = nominal diameter (mm)
 D_w = ball diameter (mm)
 l_{S1} = distance between bearing and nut (mm)

R_{S2} = rigidity of the screw (N/μm)
 d_0 = nominal diameter (mm)
 D_w = ball diameter (mm)
 l_S = distance between bearing and bearing (mm)
 l_{S2} = distance between bearing and nut (mm)

Technical Data

Preload and Overall Rigidity of Single Nuts

Dynamic drag torque, preload and rigidity for screws of tolerance grade 5-7 with single nuts from diameter 16 mm (smaller diameters without backlash only)
FSZ-E-S, FEP-E-S (2% only), FEM-E-S, FEM-E-C, ZEM-E-S; SEM-E-S and SEM-E-C (consider centering diameter D_1 to be set) (ZEV-E-S and FBZ-E-S with backlash only)

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
 D_w = ball diameter
 i = number of ball track turns

The values given for dynamic drag torque are proven practical indicators for the nut preloading.

Note:
 Measurement of the dynamic load torque, see "Mounting."

Size $D_0 \times P \times D_w - i$	Load ratings		Backlash of single nut		Overall rigidity of the screw R_S ($\frac{N \cdot m}{\mu m}$)
	dyn. C (N)	stat. C_0 (N)	Standard	Reduced	
6 x 1R x 0.8 - 4	900	1290	0.01	0.000	5
6 x 2R x 0.8 - 4	890	1280	0.01	0.000	5
8 x 1R x 0.8 - 4	1020	1740	0.01	0.000	9
8 x 2R x 1.2 - 4	1870	2760	0.01	0.000	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	0.000	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
16 x 5R x 3 - 4	12300	16100	0.04	0.020	32
16 x 10R x 3 - 3	9600	12300	0.04	0.020	32
16 x 16R x 3 - 2	6300	7600	0.04	0.020	32
16 x 16R x 3 - 3	9300	12000	0.04	0.020	32
20 x 5R/L x 3 - 4	14300	21500	0.04	0.020	53
20 x 5R x 3 - 5	17500	27300	0.04	0.020	53
20 x 10R x 3 - 4	14100	21300	0.04	0.020	53
20 x 20R/L x 3.5 - 2	9100	12100	0.04	0.020	52
20 x 20R x 3.5 - 3	13300	18800	0.04	0.020	52
20 x 40R x 3.5 - 1x4	14000	26200	0.04	0.020	52
25 x 5R/L x 3 - 4	15900	27200	0.04	0.020	86
25 x 10R x 3 - 4	15700	27000	0.04	0.020	86
25 x 25R/L 3.5 - 2	10100	15100	0.04	0.020	84
25 x 25R x 3.5 - 3	14700	23300	0.04	0.020	84
25 x 25R x 3.5 - 1.2x4	19700	39400	0.04	0.020	84
32 x 5R/L x 3.5 - 4	21600	40000	0.04	0.020	144
32 x 10R x 3.969 - 5	31700	58300	0.04	0.020	141
32 x 20R x 3.969 - 2	13500	21800	0.04	0.020	141
32 x 20R x 3.969 - 3	19700	33700	0.04	0.020	141
32 x 32R x 3.969 - 2	13400	22000	0.04	0.020	141
32 x 32R x 3.969 - 3	19500	34000	0.04	0.020	141
32 x 32R x 3.969 - 1.2 x 4	26300	57600	0.04	0.020	141
40 x 5R/L x 3.5 - 5	29100	64100	0.04	0.020	232
40 x 10R/L x 6 - 4	50000	86400	0.07	0.035	211
40 x 10R x 6 - 6	72100	132200	0.07	0.035	211
40 x 12R x 6 - 4	49900	86200	0.07	0.035	211
40 x 16R x 6 - 4	49700	85900	0.07	0.035	211
40 x 20R x 6 - 3	37900	62800	0.07	0.035	211
40 x 20R x 6 - 8 x 2	76400	171100	0.07	0.035	211
40 x 40R x 6 - 2	25500	40300	0.07	0.035	211
40 x 40R x 6 - 3	37000	62300	0.07	0.035	211
40 x 40R x 6 - 6 x 2	57200	124500	0.07	0.035	211
50 x 5R x 3.5 - 5	32000	81300	0.04	0.020	373
50 x 10R x 6 - 4	55400	109000	0.07	0.035	345
50 x 10R x 6 - 6	79700	166500	0.07	0.035	345
50 x 12R x 6 - 6	79600	166400	0.07	0.035	345
50 x 16R x 6 - 6	79400	166000	0.07	0.035	345
50 x 20R x 6.5 - 3	47900	87900	0.07	0.035	340
50 x 20R x 6.5 - 5	75700	149700	0.07	0.035	340
50 x 20R x 6.5 - 8 x 2	93200	228000	0.07	0.035	340
50 x 25R x 6.5 - 6 x 2	74100	175100	0.07	0.035	340
50 x 40R x 6.5 - 2	32100	55800	0.07	0.035	340
50 x 40R x 6.5 - 6 x 2	71400	171500	0.07	0.035	340
50 x 40R x 6.5 - 3	46500	85900	0.07	0.035	340
63 x 10R x 6 - 4	61800	140500	0.07	0.035	569
63 x 10R x 6 - 6	88800	214300	0.07	0.035	569
63 x 20R x 6.5 - 3	53200	112100	0.07	0.035	563
63 x 20R x 6.5 - 5	83900	190300	0.07	0.035	563
63 x 20R x 6.5 - 8 x 2	104600	292000	0.07	0.035	563
63 x 40R x 6.5 - 2	36900	74300	0.07	0.035	563
63 x 40R x 6.5 - 3	53400	114100	0.07	0.035	563
63 x 40R x 6.5 - 6 x 2	80000	217000	0.07	0.035	563
80 x 10R x 6.5 - 6	108400	291700	0.07	0.035	938
80 x 20R x 12.7 - 6	262700	534200	0.11	0.055	832

Size	Screws with single nuts									
	2% preload		3% preload		5% preload					
	R_{nu} (N/μm)	T_{pr0} (Nm)	R_{nu} (N/μm)	T_{pr0} (Nm)	R_{nu} (N/μm)	T_{pr0} (Nm)				
$D_0 \times P \times D_W - i$	max.	Tolerance grade 5; 7 max.		Tolerance grade 5; 7 min.		Tolerance grade 5; 7 max.		Tolerance grade 5 min.	Tolerance grade 7 max.	
6 x 1R x 0.8 - 4	—	—	—	—	—	—	—	—	—	—
6 x 2R x 0.8 - 4	—	—	—	—	—	—	—	—	—	—
8 x 1R x 0.8 - 4	—	—	—	—	—	—	—	—	—	—
8 x 2R x 1.2 - 4	—	—	—	—	—	—	—	—	—	—
8 x 2.5R x 1.588 - 3	70	0.004	—	—	—	—	—	—	—	—
12 x 2R x 1.2 - 4	110	0.005	—	—	—	—	—	—	—	—
12 x 5R x 2 - 3	100	0.009	—	—	—	—	—	—	—	—
12 x 10R x 2 - 2	60	0.006	—	—	—	—	—	—	—	—
16 x 5R x 3 - 4	210	0.040	240	0.020	0.10	280	0.05	0.15	0.04	0.16
16 x 10R x 3 - 3	160	0.030	190	0.010	0.08	220	0.04	0.12	0.03	0.12
16 x 16R x 3 - 2	100	0.020	120	0.005	0.06	140	0.03	0.08	0.02	0.08
16 x 16R x 3 - 3	160	0.030	180	0.010	0.08	210	0.04	0.11	0.03	0.12
20 x 5R/L x 3 - 4	260	0.060	300	0.030	0.14	350	0.07	0.21	0.06	0.23
20 x 5R x 3 - 5	330	0.070	375	0.040	0.17	440	0.09	0.26	0.07	0.28
20 x 10R x 3 - 4	260	0.060	300	0.030	0.14	350	0.07	0.21	0.06	0.23
20 x 20R/L x 3.5 - 2	130	0.040	150	0.020	0.09	180	0.05	0.14	0.04	0.15
20 x 20R x 3.5 - 3	200	0.050	220	0.030	0.13	270	0.07	0.20	0.05	0.21
20 x 40R x 3.5 - 1 x 4	215	0.060	—	—	—	—	—	—	—	—
25 x 5R/L x 3 - 4	310	0.080	350	0.040	0.2	410	0.10	0.30	0.08	0.32
25 x 10R x 3 - 4	320	0.080	360	0.040	0.19	430	0.10	0.29	0.08	0.31
25 x 25R/L x 3.5 - 2	160	0.050	180	0.030	0.12	210	0.06	0.19	0.05	0.20
25 x 25R x 3.5 - 3	240	0.070	270	0.040	0.18	320	0.09	0.28	0.07	0.29
25 x 25R x 3.5 - 1.2 x 4	350	0.100	—	—	—	—	—	—	—	—
32 x 5R/L x 3.5 - 4	380	0.140	420	0.100	0.31	500	0.24	0.45	0.21	0.48
32 x 10R x 3.969 - 5	500	0.200	570	0.150	0.46	670	0.36	0.66	0.30	0.71
32 x 20R x 3.969 - 2	200	0.090	230	0.050	0.21	270	0.15	0.28	0.13	0.30
32 x 20R x 3.969 - 3	300	0.130	340	0.070	0.31	410	0.22	0.41	0.19	0.44
32 x 32R x 3.969 - 2	200	0.090	220	0.050	0.21	260	0.15	0.28	0.13	0.30
32 x 32R x 3.969 - 3	300	0.120	340	0.070	0.31	400	0.22	0.41	0.19	0.44
32 x 32R x 3.969 - 1.2 x 4	440	0.170	—	—	—	—	—	—	—	—
40 x 5R/L x 3.5 - 5	550	0.230	620	0.170	0.52	720	0.41	0.76	0.35	0.81
40 x 10R/L x 6 - 4	500	0.400	570	0.360	0.84	670	0.75	1.25	0.70	1.30
40 x 10R x 6 - 6	760	0.580	860	0.520	1.21	1010	1.08	1.80	1.01	1.87
40 x 12R x 6 - 4	510	0.400	580	0.300	0.90	680	0.75	1.25	0.70	1.30
40 x 16R x 6 - 4	510	0.400	580	0.300	0.89	680	0.75	1.24	0.70	1.29
40 x 20R x 6 - 3	380	0.300	430	0.230	0.68	510	0.57	0.95	0.53	0.99
40 x 20R x 6 - 8 x 2	—	—	1005	0.55	1.28	—	—	—	—	—
40 x 40R x 6 - 2	240	0.200	280	0.150	0.46	330	0.36	0.66	0.31	0.71
40 x 40R x 6 - 3	370	0.300	420	0.220	0.67	490	0.56	0.93	0.52	0.96
40 x 40R x 6 - 6 x 2	—	—	723	0.41	0.96	—	—	—	—	—
50 x 5R x 3.5 - 5	640	0.320	720	0.240	0.72	830	0.60	1.00	0.56	1.04
50 x 10R x 6 - 4	590	0.550	670	0.500	1.16	780	1.04	1.73	0.97	1.80
50 x 10R x 6 - 6	890	0.800	1000	0.720	1.67	1180	1.49	2.49	1.39	2.59
50 x 12R x 6 - 6	900	0.800	1020	0.720	1.67	1190	1.49	2.49	1.39	2.59
50 x 16R x 6 - 6	910	0.790	1030	0.710	1.67	1210	1.49	2.48	1.39	2.58
50 x 20R x 6.5 - 3	470	0.480	540	0.430	1.01	630	0.90	1.50	0.84	1.56
50 x 20R x 6.5 - 5	780	0.760	880	0.680	1.59	1050	1.42	2.37	1.32	2.46
50 x 20R x 6.5 - 8 x 2	—	—	1192	0.84	1.96	—	—	—	—	—
50 x 25R x 6.5 - 6 x 2	—	—	928	0.67	1.56	—	—	—	—	—
50 x 40R x 6.5 - 2	300	0.320	340	0.240	0.72	410	0.60	1.00	0.56	1.04
50 x 40R x 6.5 - 3	450	0.470	520	0.420	0.98	610	0.87	1.45	0.81	1.51
50 x 40R x 6.5 - 6 x 2	—	—	900	0.64	1.50	—	—	—	—	—
63 x 10R x 6 - 4	700	0.780	790	0.700	1.64	920	1.46	2.43	1.36	2.53
63 x 10R x 6 - 6	1050	1.120	1190	1.010	2.35	1380	2.24	3.36	2.10	3.50
63 x 20R x 6.5 - 3	560	0.670	640	0.600	1.41	750	1.26	2.09	1.17	2.18
63 x 20R x 6.5 - 5	930	1.060	1060	0.950	2.22	1250	2.11	3.17	1.98	3.30
63 x 20R x 6.5 - 8 x 2	—	—	1448	1.19	2.77	—	—	—	—	—
63 x 40R x 6.5 - 2	380	0.460	440	0.420	0.98	510	0.87	1.45	0.81	1.51
63 x 40R x 6.5 - 3	570	0.670	660	0.610	1.41	770	1.26	2.10	1.18	2.19
63 x 40R x 6.5 - 6 x 2	—	—	1095	0.91	2.12	—	—	—	—	—
80 x 10R x 6.5 - 6	1240	1.730	1390	1.820	3.38	1610	3.47	5.20	3.25	5.42
80 x 20R x 12.7 - 6	1400	4.200	1590	4.410	8.20	1870	8.41	12.61	7.88	13.14

Technical Data

Preload and Rigidity of Double Nuts

Dynamic drag torque, preload and rigidity for screws of tolerance grade 5-7 with double nuts FDM-E-S, FDM-E-C

- 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
 D_w = ball diameter
 i = number of ball track turns

The values given for dynamic drag torque are proven practical indicators for the nut preloading.

Note:

Measurement of the dynamic load torque, see "Mounting."

Size $D_0 \times P \times D_w - i$	Load ratings		Rigidity of the screw R_S $\left(\frac{N \cdot m}{\mu m}\right)$
	dyn. C (N)	stat. C_0 (N)	
16 x 5R x 3 - 4	12300	16100	32
20 x 5R x 3 - 4	14300	21500	53
25 x 5R x 3 - 4	15900	27200	86
25 x 10R x 3 - 4	15700	27000	86
32 x 5R x 3.5 - 4	21600	40000	144
32 x 10R x 3.969 - 5	31700	58300	141
40 x 5R x 3.5 - 5	29100	64100	232
40 x 10R x 6 - 4	50000	86400	211
40 x 10R x 6 - 6	72100	132200	211
40 x 20R x 6 - 3	37900	62800	211
50 x 5R x 3.5 - 5	32000	81300	373
50 x 10R x 6 - 4	55400	109000	345
50 x 10R x 6 - 6	79700	166500	345
50 x 20R x 6.5 - 5	75700	149700	340
63 x 10R x 6 - 4	61800	140500	569
63 x 10R x 6 - 6	88800	214300	569
63 x 20R x 6.5 - 5	83900	190300	563
80 x 10R x 6.5 - 6	108400	291700	938
80 x 20R x 12.7 - 6	262700	534200	832

Size	Screws with double nuts FDM-E-S, FDM-E-C									
	R _{nu} (N/μm)	7% preload				R _{nu} (N/μm)	10% preload			
				T _{pr0} (Nm)					T _{pr0} (Nm)	
		Tolerance grade 5		Tolerance grade 7			Tolerance grade 5		Tolerance grade 7	
D ₀ x P x D _W - i		min.	max.	min.	max.		min.	max.	min.	max.
16 x 5R x 3 - 4	310	0.03	0.08	0.02	0.09	350	0.04	0.12	0.03	0.13
20 x 5R x 3 - 4	390	0.04	0.12	0.03	0.13	430	0.06	0.17	0.05	0.18
25 x 5R x 3 - 4	460	0.06	0.17	0.04	0.18	510	0.08	0.24	0.06	0.25
25 x 10R x 3 - 4	470	0.05	0.16	0.04	0.18	530	0.08	0.24	0.06	0.25
32 x 5R x 3.5 - 4	550	0.10	0.29	0.08	0.31	610	0.19	0.36	0.17	0.39
32 x 10R x 3.969	750	0.20	0.37	0.17	0.40	830	0.28	0.53	0.24	0.57
40 x 5R x 3.5 - 5	790	0.23	0.42	0.20	0.46	870	0.33	0.61	0.28	0.65
40 x 10R x 6 - 4	740	0.39	0.73	0.34	0.78	830	0.60	1.00	0.56	1.04
40 x 10R x 6 - 6	1120	0.61	1.01	0.57	1.05	1250	0.87	1.44	0.81	1.50
40 x 20R x 6 - 3	570	0.30	0.55	0.25	0.59	630	0.45	0.76	0.42	0.79
50 x 5R x 3.5 - 5	920	0.31	0.58	0.27	0.63	1010	0.48	0.80	0.45	0.83
50 x 10R x 6 - 4	870	0.58	0.97	0.54	1.01	960	0.83	1.39	0.78	1.44
50 x 10R x 6 - 6	1300	0.84	1.39	0.78	1.45	1450	1.20	1.99	1.12	2.07
50 x 20R x 6.5 - 5	1170	0.79	1.32	0.74	1.38	1310	1.14	1.89	1.06	1.97
63 x 10R x 6 - 4	1020	0.82	1.36	0.76	1.42	1120	1.17	1.95	1.09	2.02
63 x 10R x 6 - 6	1520	1.17	1.96	1.10	2.04	1690	1.68	2.80	1.57	2.91
63 x 20R x 6.5 - 5	1390	1.11	1.85	1.04	1.92	1560	1.59	2.64	1.48	2.75
80 x 10R x 6.5 - 6	1770	1.82	3.04	1.70	3.16	1950	2.78	4.16	2.60	4.34
80 x 20R x 12.7 - 6	2070	4.71	7.06	4.41	7.36	2320	6.73	10.09	6.30	10.51

Technical Data

Friction Torques of Seals

Seal torque for single and double nuts

(ZEV-E-S is supplied without a seal)

 T_0 = overall dynamic drag torque $T_0 = T_{pr0} + T_{RD}$ T_{RD} = dynamic drag torque of 2 seals T_{pr0} = dynamic drag torque without a seal d_0 = nominal diameter P = lead D_w = ball diameter

Note:

Measurement of the dynamic load torque, see "Mounting."

Size $d_0 \times P \times D_w$	Dynamic drag torque		Low-friction seal	Standard seal for 2-start single nuts with flange T_{RD} approx. (Nm)
	Standard seal T_{RD} approx. (Nm)	Reinforced seal T_{RD} approx. (Nm)		
6 x 1R x 0.8	0.010	–	–	
6 x 2R x 0.8	0.010	–	–	
8 x 1R x 0.8	0.010	–	–	
8 x 2R x 1.2	0.020	–	–	
8 x 2.5R x 1.588	0.015	–	✓	
12 x 2R x 1.2	0.030	–	✓	
12 x 5R x 2	0.030	–	✓	
12 x 10R x 2	0.030	–	✓	
16 x 5R x 3	0.080	–	✓	
16 x 10R x 3	0.080	–	✓	
16 x 16R x 3	0.080	–	x	
20 x 5R x 3	0.100	–	x	
20 x 5L x 3	0.100	–	x	
20 x 10R x 3	0.120	–	–	
20 x 20R x 3.5	0.120	–	✓	
20 x 20L x 3.5	0.120	–	–	
20 x 40R x 3.5	0.040	–	✓	
25 x 5R x 3	0.120	0.34	✓	
25 x 5L x 3	0.120	–	✓	
25 x 10R x 3	0.150	0.29	✓	
25 x 25R x 3.5	0.200	–	✓	
25 x 25L x 3.5	0.200	–	✓	
32 x 5R x 3.5	0.250	0.51	x	
32 x 5L x 3.5	0.250	–	x	
32 x 10R x 3.969	0.250	0.46	x	
32 x 20R x 3.969	0.250	0.49	x	
32 x 32R x 3.969	0.250	0.45	x	
40 x 5R x 3.5	0.400	0.85	x	
40 x 5L x 3.5	0.400	–	–	
40 x 10R x 6	0.400	0.91	x	
40 x 10L x 6	0.400	–	x	
40 x 12R x 6	0.400	–	–	
40 x 16R x 6	0.400	–	–	
40 x 20R x 6	0.400	0.54	x	0.40
40 x 40R x 6	0.400	–	x	0.40
50 x 5R x 3.5	0.500	–	–	
50 x 10R x 6	0.600	0.95	–	
50 x 12R x 6	0.600	–	–	
50 x 16R x 6	0.600	–	–	
50 x 20R x 6.5	0.600	–	–	0.60
50 x 25R x 6.5	0.600	–	–	0.70
50 x 40R x 6.5	0.700	–	–	0.70
63 x 10R x 6	1.200	–	–	
63 x 20R x 6.5	1.200	1.00	–	1.20
63 x 40R x 6.5	1.200	1.40	–	1.20
80 x 10R x 6.5	1.400	–	–	
80 x 20R x 12.7	2.200	–	–	

Gap seal (0 Nm)

✓ Seal available

x Seal in preparation

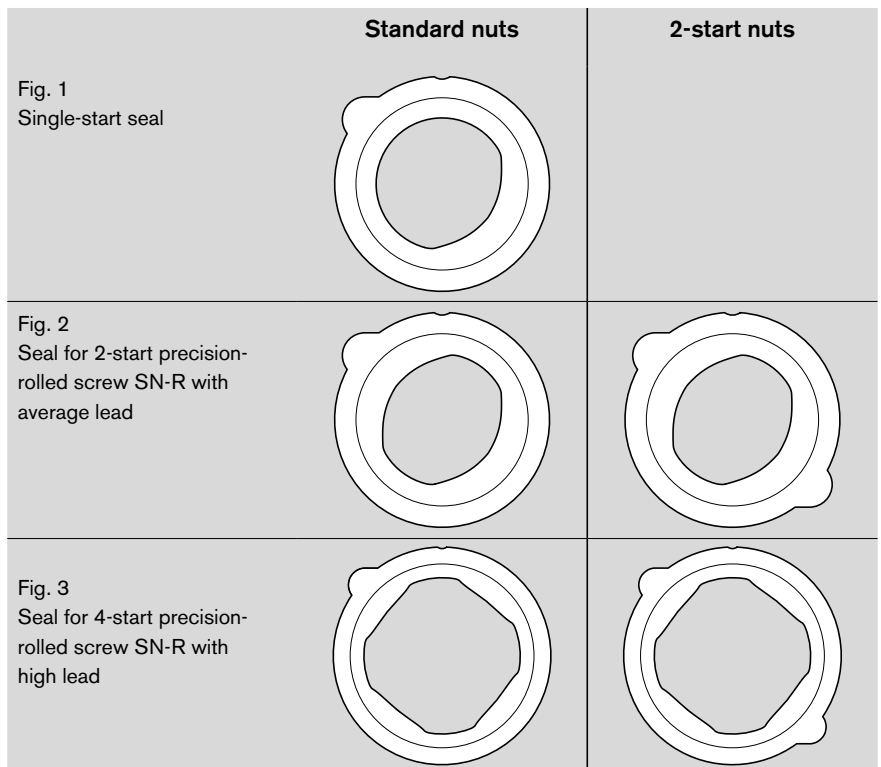
Please bear in mind the following when changing or retrofitting the seals:

All precision-rolled screws SN-R with small leads are designed as single-start screws (Fig. 1). There is therefore only one ball track on the screw.

However precision-rolled screws SN-R with higher leads are designed as 2-start or 4-start screws (Figs. 2 and 3).

“Reinforced seals” for precision-rolled screws SN-R are available as an option. These are identified by their opal-green color and their part number.

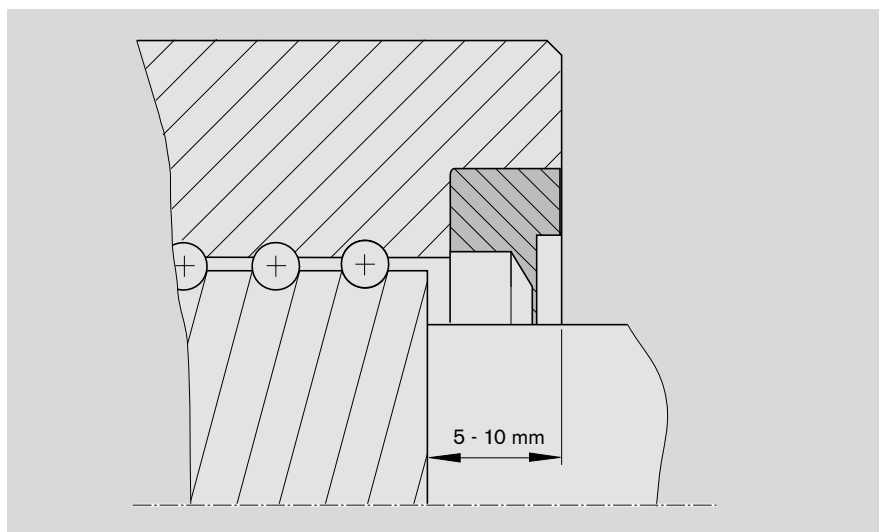
Low-friction seals for precision-rolled screws SN-R are available upon request. This version is currently in preparation. The seals are identified by their red-brown color and their part number.



Inserting the seal

Position the nut on the screw as illustrated in the diagram. Insert the seal so that its projection is in the recess and press it in until it snaps into the groove. While turning the nut on the screw, watch the sealing lip carefully and straighten it if necessary by applying pressure to the end surface. Ensure that the lip is not damaged.

Detailed mounting instructions are delivered along with the parts.



Mounting

Mounting

Condition as delivered

Rexroth Ball Screws are normally delivered with an initial supply of grease type Rexroth Dynalub. Relubrication with grease or oil is thus possible, and cartridges and cans of this grease are available. If another lubricant is used, you will need to check that it is compatible with the initial supply.

For special cases, the ball screws can also be supplied with only a preservative coating. This can be indicated by choosing the appropriate option number in the ordering code.



Important

The selected lubricant must be in the nut before the machine is started.

Cleaning

Various cleaning agents can be used to degrease and wash the assembly:

- aqueous cleaning agents
- organic cleaning agents

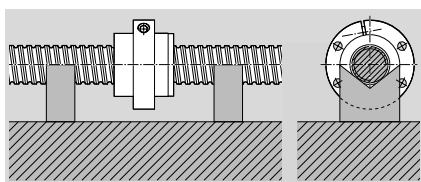


Important

Immediately after cleaning, thoroughly dry all parts, then apply a preservative coating or anti-corrosion oil. In all cases, take care to observe the appropriate legal regulations (environmental protection, health and safety at work, etc.) as well as the specifications for the cleaning agent (e.g. handling).

Storage

Ball screw assemblies are high-quality systems that must be treated with due care. In order to prevent damage and contamination, the elements should not be removed from the protective wrapping until immediately before installation. Once they have been removed from the packaging, they must be set down on V-shaped cradles.



Nut mounting

Preloaded single nut Double nut

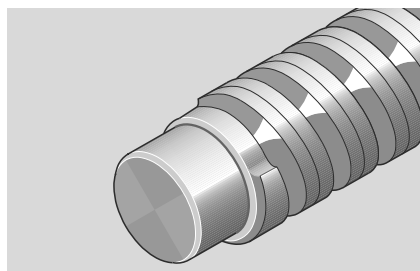
These models are always supplied with premounted nut units.

The nut unit and screw must not be disassembled. Should this become necessary for any reason, please ask.

Nut mounting

Single nut with standard backlash Single nut with reduced backlash Adjustable-preload single nut

The nut unit may only be mounted on a screw with machined ends using a mounting arbor. In this case, the screw spigot serves to center the mounting arbor. On a screw end form "00", a centering hole "Z" can be used to fit an auxiliary spigot as a mounting aid. The outer diameter of the arbor should be approx. 0.1 mm smaller than the root diameter of the screw. In most cases, the transport arbor on which the nuts are delivered may be used to mount the nut. The end of the screw thread must be carefully chamfered in order to prevent damage to the seal and the internal components of the nut unit.

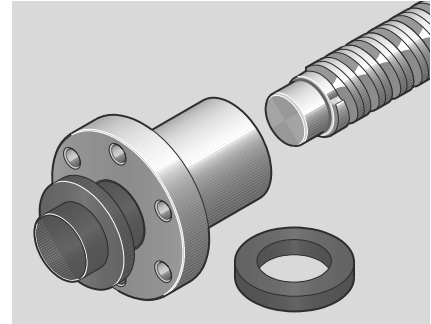


The various mounting steps are described below.

Proceed in reverse order when removing the nut from the screw. Take particular care not to damage the nut, screw or internal components, as this could result in the premature failure of the ball screw assembly.

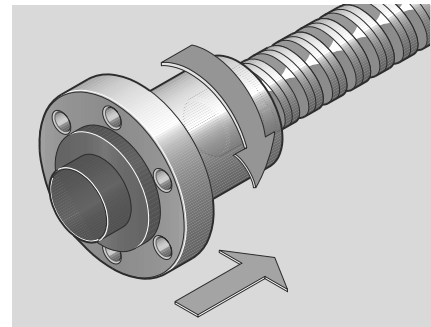
Mounting steps

The nut is to be mounted as follows: Remove the rubber ring from one end of the mounting arbor.

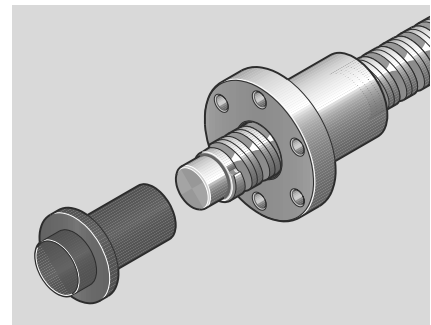


Push the mounting arbor with nut until it bears against the end of the thread. The arbor must make contact with no axial clearance.

Carefully turn the nut unit onto the thread, applying only slight thrust.



Remove the arbor only when the nut unit is fully located on the screw thread.

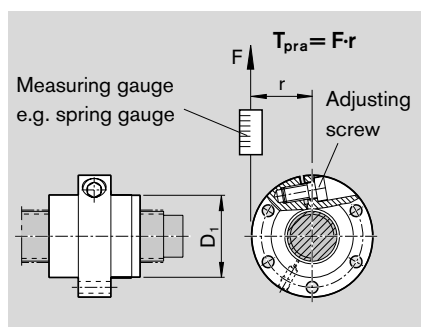


Preload of adjustable-preload single nuts

Measurement of the dynamic drag torque for SEM-E-C and SEM-E-S. Using the adjusting screw, reduce the clearance of the nut mounted on the screw until the corresponding dynamic drag torque T_{pra} specified in the table ➔ page 109, has been attained (ball screw lightly oiled).

Check this torque along the entire length of the thread; if the torque deviates from the value specified in the table at any point along the thread, adjust accordingly.

Once the torque has been properly adjusted, the centering diameter D_1 must correspond to the values specified in the table ➔ pages 34 and 38. Cover the head of the screw with a protective cap.



T_{pra} = currently measured dynamic drag torque

Mounting instructions are supplied as standard along with every unit. Please ask for extra copies if needed.

Installation in the machine

It is not normally necessary to remove the preservative coating before installation.

- If the ball screw is contaminated it must first be cleaned (see “Cleaning”) and re-oiled
- Push the nut unit into the mounting bore, taking care to avoid any impact force or misalignment.
- Tighten the mounting screws using a torque wrench if necessary. Maximum tightening torque for the steel/steel material pairing ($R_m \geq 370 \text{ N/mm}^2$), see table.

Steel/steel material pairing			
Screw diameter (mm)	Tightening torque (Nm)		
	Strength class per DIN ISO 898:		
	8.8	10.9	12.9
M3	1.3	1.8	2.1
M4	2.7	3.8	4.6
M5	5.5	8.0	9.5
M6	9.5	13.0	16.0
M8	23.0	32.0	39.0
M10	46.0	64.0	77.0
M12	80.0	110.0	135.0
M14	125.0	180.0	215.0
M16	195.0	275.0	330.0
M18	280.0	400.0	470.0
M20	390.0	560.0	650.0

- For the steel/aluminum and aluminum/aluminum material pairings ($R_m \geq 280 \text{ N/mm}^2$) the maximum tightening torques specified in the follow table apply. When driving screws into aluminum, the length of thread engagement should be at least 1.5 times the screw diameter.

Steel/aluminum and aluminum/aluminum material pairings			
Screw diameter (mm)	Tightening torque (Nm)		
	Strength class per DIN ISO 898:		
	8.8	10.9	12.9
M3	1.2	1.2	1.2
M4	2.4	2.4	2.4
M5	4.8	4.8	4.8
M6	8.5	8.5	8.5
M8	20.0	20.0	20.0
M10	41.0	41.0	41.0
M12	70.0	70.0	70.0
M14	110.0	110.0	110.0
M16	175.0	175.0	175.0
M18	250.0	250.0	250.0
M20	345.0	345.0	345.0

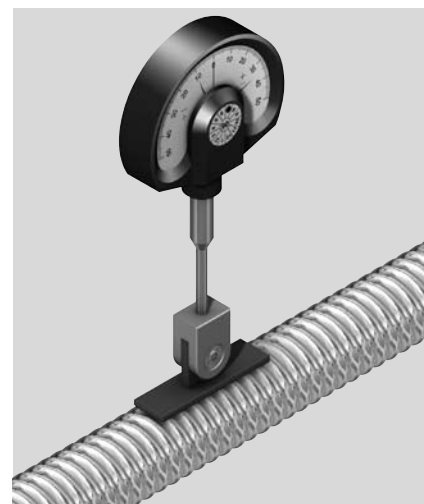
Tightening torques for fastening screws according to VDI 2230 for $\mu_G = \mu_K = 0.125$

Alignment of the precision ball screw assembly in the machine

A gauge with a self-aligning contact pad is available from Rexroth for easy alignment of the ball screw assembly.

Two pads of different lengths are available, which can be used depending on the screw lead:

- Part number R3305 131 19
Length 33 mm for leads < 20
- Part number R3305 131 21
Length 50 mm for leads > 20



Lubrication

Lubrication

Standard lubrication practices for ball bearings also apply to ball screws. Lubricant loss is, however, greater than that from conventional ball bearings, for instance, due to the axial motion between the screw and the nut.

Oil lubrication

The influence of the temperature on the performance of the ball screw is very significant, as the thermal expansion of the ball screw interferes with the positioning accuracy of the assembly.

One of the advantages of oil lubrication over grease lubrication is therefore the minimized heat build-up of the ball screw, particularly at high speeds.

As a rule, commercially available mineral base oils used for ball bearings are suitable. The necessary viscosity depends on the speed, temperature and load

conditions of the respective application (see DIN 51517, 51519 and GfT Worksheet 3).

Oils ranging from ISO VG 68 to approx. ISO VG 460 are used in practice. The high viscosity grades (e.g. ISO VG 460) should be preferred in general and particularly for slow running screws. A maximum relubrication interval of up to 10 operating hours can be attained with small quantities from the adjacent table.

Please ask for details for driven nuts.

Relubrication quantity and intervals for oil

d ₀	Lubricating quantity		Lubricating interval ¹⁾												
	Initial lubrication V _e (ml)	Relubrication V _n (ml/10 h)	Time (h)	Revolutions (mill.)	Travel (km) with lead P =										
6	0.300	0.030	10	1.3	1.3	2.6									
8	0.300	0.030	10	1.3	1.3	2.6	3.3								
12	0.300	0.030	10	1.3		2.6		6.5	13.0						
16	0.300	0.030	10	1.3				6.5	13.0		20.8				
20	0.600	0.060	10	1.0				5.0				20.0			40.0
25	0.600	0.060	10	1.0				5.0	10.0				25.0		
32	0.600	0.060	10	1.0				5.0	10.0			20.0		32.0	
40	2.000 ²⁾	0.400 ²⁾	10	1.0				5.0	10.0	12.0	16.0	20.0			40.0
50	4.000 ²⁾	0.800 ²⁾	10	1.0				5.0	10.0	12.0	16.0	20.0	25.0		40.0
63	4.000 ²⁾	0.800 ²⁾	10	1.0					10.0			20.0			40.0
80	8.000	1.600	10	1.0					10.0			20.0			40.0

d₀ = nominal diameter

1) The value first reached defines the lubricating interval.

2) For 2-start single nut FED-E-B: use double the quantity of lubricant

Limit conditions:

Load	=	≤ 0.2 C
n _{min}	=	100 min ⁻¹
Temp _{max. nut}	=	80 °C
Temp _{continuous nut}	=	60 °C

Orientation:	– any
Operating mode:	– driven screw
	– no short stroking or hypercritical operation
Sealing:	– standard

Grease lubrication

The advantage of grease lubrication is that the ball screw can run long distances on one supply of grease.

As a result, a lubricating system is not required in many cases. The amount of grease used should fill the nuts to approximately half of their capacity.

All commercially available high-quality ball bearing lubricating greases may be used.

Read the lubricant manufacturer's specifications carefully! Never use greases with solid lubricant components (e.g. graphite or MoS₂).

For relubrication, grease cartridges containing Dynalub 510 and 520 are available from Rexroth.

Greases in accordance with DIN 51825-K2K and, for higher loads, KP2K of NLGI Class 2 in accordance with DIN 51818 are recommended for the longest possible lubrication intervals. Tests have shown that greases of NLGI Class 00 achieve only about 50% of the running performance of Class 2 at higher loads. The relubrication interval depends on many factors such as the degree of contamination, operating temperature, load, etc. The following values can thus serve only as a guideline.

Relubrication intervals for NLGI-2 greases

d ₀	Lubricating quantity Relubrication V _e (ml)	Lubricating interval										
		Revolutions (mill.)	Travel (km) with lead P =									
≤ 40	see table for	50	50	100	125	250	500	800	1000	1250	1600	2000
> 40	NLGI-2 greases	10				50	100	160	200			400

d₀ = nominal diameter

Relubrication quantities for Standard series

For NLGI Class 2 and NLGI Class 00 greases:

The nut has to be lubricated with lubricant via the lube port before the ball screw is started.

Twice the relubrication quantity of grease is to be used when lubricating for the first time.

Size $d_0 \times P \times D_W - i$	Relubrication quantity of grease (g)		Double nut FDM-E-C / FDM-E-S Precision screw SN-R
	Single nut FEM-E-C / FEM-E-S / SEM-E-C SEM-E-S / ZEM-E-A / ZEM-E-S / FED-E-B Precision screw SN-R		
8 x 2.5R x 1.588 - 3	0.10	–	NLGI Class 00 Dynalub 520
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	–	
16 x 5R x 3 - 4	0.60	1.7	
16 x 10R x 3 - 3	0.80	–	
16 x 16R x 3 - 2	0.90	–	
16 x 16R x 3 - 3	1.10	–	
20 x 5R/L x 3 - 4	0.90	2.7	
20 x 5R x 3 - 5	1.00	–	
20 x 10R x 3 - 4	1.40	–	NLGI Class 2 Dynalub 510
20 x 20R/L x 3.5 - 2	1.70	–	
20 x 20R x 3.5 - 3	2.20	–	
25 x 5R/L x 3 - 4	1.40	3.2	
25 x 10R x 3 - 4	1.70	3.8	
25 x 25R/L x 3.5 - 2	2.40	–	
25 x 25R x 3.5 - 3	3.10	–	
32 x 5L x 3.5 - 4	2.30	–	
32 x 5R x 3.5 - 4	2.00	4.5	
32 x 10R x 3.969 - 5	2.80	6.0	
32 x 20R x 3.969 - 2	2.50	–	
32 x 20R x 3.969 - 3	3.20	–	
32 x 32R x 3.969 - 2	3.70	–	
32 x 32R x 3.969 - 3	4.90	–	
40 x 5L x 3.5 - 5	3.10	–	
40 x 5R x 3.5 - 5	2.70	6.9	
40 x 10L x 6 - 4	6.00	–	
40 x 10R x 6 - 4	6.00	15.1	
40 x 10R x 6 - 6	7.30	17.7	
40 x 12R x 6 - 4	6.10	–	
40 x 16R x 6 - 4	8.30	19.3	
40 x 20R x 6 - 3	7.80	18.5	
40 x 20R x 6 - 8 x 2	8.60	–	
40 x 40R x 6 - 2	9.40	–	
40 x 40R x 6 - 3	12.90	–	
40 x 40R x 6 - 6 x 2	13.80	–	
50 x 5R x 3.5 - 5	3.90	7.1	
50 x 10R x 6 - 4	8.00	19.7	
50 x 10R x 6 - 6	9.70	23.0	
50 x 12R x 6 - 6	10.40	–	
50 x 16R x 6 - 6	14.60	–	
50 x 20R x 6.5 - 3	11.40	–	
50 x 20R x 6.5 - 5	15.60	31.3	
50 x 20R x 6.5 - 8 x 2	9.10	–	
50 x 25R x 6.5 - 6 x 2	9.60	–	
50 x 40R x 6.5 - 2	13.90	–	
50 x 40R x 6.5 - 3	18.60	–	
50 x 40R x 6.5 - 6 x 2	17.60	–	
63 x 10R x 6 - 4	9.00	23.0	
63 x 10R x 6 - 6	11.00	27.0	
63 x 20R x 6.5 - 3	13.90	–	
63 x 20R x 6.5 - 5	19.20	39.4	
63 x 20R x 6.5 - 8 x 2	13.20	–	
63 x 40R x 6.5 - 2	17.00	–	
63 x 40R x 6.5 - 3	22.90	–	
63 x 40R x 6.5 - 6 x 2	24.80	–	
80 x 10R x 6.5 - 6	16.30	39.0	
80 x 20R x 12.7 - 6	59.00	119.5	

Lubrication

Lubrication

Relubrication quantities for
Miniature and ECO seriesFor NLGI Class 2 and
NLGI Class 00 greases:

The nut has to be lubricated with lubricant via the lube port before the ball screw is started.

Twice the relubrication quantity of grease is to be used when lubricating for the first time.

Size	Relubrication quantity of grease (g)				
	Single nut, precision-rolled screw SN-R				
d ₀ x P x D _W - i	FEM-E-B Miniature	FSZ-E-S	FEP-E-S	ZEV-E-S	
6 x 1R x 0,8- 4	0,06	–	–	–	NLGI Class 00
6 x 2R x 0,8- 4	0,12	–	–	–	Dynalub 520
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	–	–	0,30	
12 x 10R x 2- 2	0,30	–	–	0,30	
16 x 5L x 3- 3	–	–	–	0,85	NLGI Class 2
16 x 5R x 3- 3	–	–	–	0,85	Dynalub 510
16 x 10R x 3- 3	–	–	–	1,00	
20 x 5R x 3- 4	–	0,7	–	1,20	
20 x 5R x 3- 5	–	–	–	–	
20 x 40R x 3,5 - 1 x 4	–	–	1,6	–	
25 x 5R x 3- 4	–	1,1	–	–	
25 x 10R x 3- 4	–	1,3	–	–	
25 x 25R x 3,5 - 1,2 x 4	–	–	1,5	–	
32 x 5R x 3,5- 4	–	1,6	–	–	
32 x 10R x 3,969 - 5	–	2,3	–	–	
32 x 20R x 3,969 - 2	–	2,0	–	–	
32 x 32R x 3,969 - 1,2 x 4	–	–	2,6	–	
40 x 5R x 3,5- 5	–	2,2	–	–	
40 x 10R x 6- 4	–	5,2	–	–	
40 x 20R x 6- 3	–	6,7	–	–	

High-performance lubricant for Linear Motion Systems

(not released for the USA)

Product description Dynalub 510

Dynalub 510 is an NLGI Class 2 lithium-based high-performance grease specially developed for linear motion systems. It is notable for offering excellent water resistance and protection against corrosion, and is suited for use at temperatures of between $-20\text{ }^{\circ}\text{C}$ and $80\text{ }^{\circ}\text{C}$.

Applications

Under conventional environmental conditions this ground-fiber, homogeneous grease is ideally suitable for the lubrication of linear elements:

- for loads of up to $0.5\text{ }C_{\text{dyn}}$
- also for short-stroke applications $\geq 1\text{ (mm)}$

Technical data

For further details, see
"Safety Data Sheet Dynalub 510"
R310EN 2052 (2004.04)

Chemical composition	Mineral oil, special lithium soap, agents	
Designation	KP2K-20	DIN 51 825
Appearance	Light-brown/beige, ground-fiber	
Service temperature range	$-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$	
NLGI Class	2	
Worked penetration	265-295 1/10 mm	DIN ISO 2137
Water resistance	0-60, 1-90	DIN 51 807 P1
Melting point in $^{\circ}\text{C}$	> 165	DIN ISO 2176
Flash point in $^{\circ}\text{C}$	> 200 – base oil	DIN ISO 2592
Basic oil viscosity	100 mm^2/s $40\text{ }^{\circ}\text{C}$	DIN 51 562
	10 mm^2/s $100\text{ }^{\circ}\text{C}$	
Flow pressure at $-20\text{ }^{\circ}\text{C}$	$< 1400\text{ hPa}$	DIN 51 805
EMCOR test	0/0	DIN 51 802
Density at $+25\text{ }^{\circ}\text{C}$	approx. 0.92 g/cm^3	DIN 51 757
Copper corrosion	2 (24 h/120 $^{\circ}\text{C}$)	DIN 51 811
Four ball tester welding load	$> 2000\text{ N}$	DIN 51 350 P4
Four ball tester impression diameter	0.93 (400 N, 1 h)	DIN 51 350 P5
Shelf life in original container	2 years	

Product description Dynalub 520

Dynalub 520 is an NLGI Class 00 lithium-based high-performance grease specially developed for linear motion systems. It is notable for offering excellent water resistance and protection against corrosion, and is suited for use at temperatures of between $-20\text{ }^{\circ}\text{C}$ and $+80\text{ }^{\circ}\text{C}$.

Applications

Under conventional environmental conditions this ground-fiber, homogeneous grease is ideally suited for the lubrication of miniature linear elements and for use in centralized lubrication systems.

Technical data

For further details, see
"Safety Data Sheet Dynalub 520"
R310EN 2053 (2004.04)

Chemical composition	Mineral oil, special lithium soap, agents	
Designation	KP00K-20	DIN 51 825
Appearance	Light-brown/beige, ground-fiber	
Service temperature range	$-20\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$	
NLGI Class	00	
Worked penetration	400-430 1/10 mm	DIN ISO 2137
Water resistance	1-90	DIN 51 807 P1
Melting point in $^{\circ}\text{C}$	> 160	DIN ISO 2176
Flash point in $^{\circ}\text{C}$	> 200 – base oil	DIN ISO 2592
Basic oil viscosity	100 mm^2/s $40\text{ }^{\circ}\text{C}$	DIN 51 562
	10 mm^2/s $100\text{ }^{\circ}\text{C}$	
Flow pressure at $-20\text{ }^{\circ}\text{C}$	$< 700\text{ hPa}$	DIN 51 805
EMCOR test	0	DIN 51 802
Density at $+25\text{ }^{\circ}\text{C}$	approx. 0.92 g/cm^3	DIN 51 757
Copper corrosion	0-1 (24 h/100 $^{\circ}\text{C}$)	DIN 51 811
Four ball tester welding load	1800 N	DIN 51 350 P4
Four ball tester impression diameter	0.80 (400 N, 1 h)	DIN 51 350 P5
Shelf life in original container	2 years	

Design Calculations

Upon request, we can perform all calculations to your specifications.

Average speed and average load

- where the speed fluctuates, the average speed n_m is calculated as follows:

See “Design Calculation Service Form”, page 130.

Where the speed and load fluctuate, the service life must be calculated using the averages F_m and n_m .

$$n_m = \frac{|n_1| \cdot q_{t1} + |n_2| \cdot q_{t2} + \dots + |n_n| \cdot q_{tn}}{100\%} \quad 1$$

n_1, n_2, \dots, n_n = speeds in phases 1 ... n (min⁻¹)
 n_m = average speed (min⁻¹)
 $q_{t1}, q_{t2}, \dots, q_{tn}$ = discrete time step in phases 1 ... n (%)

The following applies for the effective equivalent bearing load:

$$F > 2,8 X_{pr} \cdot C \quad F_{eff\ n} = |F_n|$$

$$F \leq 2,8 X_{pr} \cdot C \quad F_{eff\ n} = \left[\frac{|F_n|}{2,8 \cdot X_{pr} \cdot C} + 1 \right]^{\frac{3}{2}} \cdot X_{pr} \cdot C$$

C = dynamic load rating (N)
 $F_{eff\ n}$ = effective equivalent axial load during phase n (N)
 F_n = axial load during phase n (N)
 X_{pr} = preload factor (–)

- where the load fluctuates and the speed is constant, the average load F_m is calculated as follows:

$$F_m = \sqrt[3]{|F_{eff\ 1}|^3 \cdot \frac{q_{t1}}{100\%} + |F_{eff\ 2}|^3 \cdot \frac{q_{t2}}{100\%} + \dots + |F_{eff\ n}|^3 \cdot \frac{q_{tn}}{100\%}} \quad 2$$

$F_{eff\ 1}, F_{eff\ 2}, \dots, F_{eff\ n}$ = effective equivalent axial load during phases 1 ... n (N)
 F_m = equivalent dynamic axial load (N)
 $q_{t1}, q_{t2}, \dots, q_{tn}$ = discrete time step for $F_{eff\ 1}, \dots, F_{eff\ n}$ (%)

- Where both the load and the speed fluctuate, the average load F_m is calculated as follows:

$$F_m = \sqrt[3]{|F_{eff\ 1}|^3 \cdot \frac{|n_1|}{n_m} \cdot \frac{q_{t1}}{100\%} + |F_{eff\ 2}|^3 \cdot \frac{|n_2|}{n_m} \cdot \frac{q_{t2}}{100\%} + \dots + |F_{eff\ n}|^3 \cdot \frac{|n_n|}{n_m} \cdot \frac{q_{tn}}{100\%}} \quad 3$$

$F_{eff\ 1}, F_{eff\ 2}, \dots, F_{eff\ n}$ = effective equivalent axial load during phases 1 ... n (N)
 F_m = equivalent dynamic axial load (N)
 n_1, n_2, \dots, n_n = speeds during phases 1 ... n (min^{-1})
 n_m = average speed (min^{-1})
 $q_{t1}, q_{t2}, \dots, q_{tn}$ = discrete time step for $F_{eff\ 1}, \dots, F_{eff\ n}$ (%)

Nominal life

Service life in revolutions L

$$L = \left[\frac{C}{F_m} \right]^3 \cdot 10^6 \quad 4 \Rightarrow C = F_m \cdot \sqrt[3]{\frac{L}{10^6}} \quad 5 \Rightarrow F_m = \frac{C}{\sqrt[3]{\frac{L}{10^6}}} \quad 6$$

C = dynamic load rating (N)
 F_m = equivalent dynamic axial load (N)
 L = service life (revolutions) (-)

Service life in hours L_h

$$L_h = \frac{L}{n_m \cdot 60} \quad 7$$

L_h = service life (h)
 L = service life (revolutions) (-)
 n_m = average speed (min^{-1})

$$L_{h\ machine} = L_h \cdot \frac{DC_{machine}}{DC_{ball\ screw}} \quad 8$$

$DC_{machine}$ = duty cycle of the machine (%)
 $DC_{ball\ screw}$ = duty cycle of the ball screw (%)
 $L_{h\ machine}$ = nominal service life of the machine (h)
 L_h = nominal service life of the ball screw drive (h)

Drive torque and drive power

Drive torque M_{ta}

for conversion of rotary motion into linear motion:

$$M_{ta} = \frac{F_L \cdot P}{2000 \cdot \pi \cdot \eta} \quad 9$$

$M_{ta} \leq M_p$

F_L = thrust force (N)
 M_p = maximum permissible drive torque (Nm)
 M_{ta} = drive torque (Nm)
 P = lead (mm)
 η = mech. efficiency (approx. 0.9) (-)

Transmitted torque M_{te}

for conversion of linear motion into rotary motion:

$$M_{te} = \frac{F_L \cdot P \cdot \eta'}{2000 \cdot \pi} \quad 10$$

$M_{te} \leq M_p$

F_L = thrust force (N)
 M_p = maximum permissible drive torque (Nm)
 M_{te} = transmitted torque (Nm)
 P = lead (mm)
 η' = mech. efficiency (approx. 0.9) (-)

The dynamic drag torque must be taken into account for preloaded nuts.

Drive power P_a

$$P_a = \frac{M_{ta} \cdot n}{9550} \quad 11$$

M_{ta} = drive torque (Nm)
 n = speed (min^{-1})
 P_a = drive power (kW)

Calculation example Service life

Operating conditions

The service life of the machine should be 40,000 operating hours with the ball screw operating 60% of the time.

Proposed ball screw: 63 x 10

$$\begin{aligned} F_1 &= 50\,000 \text{ N at } n_1 = 10 \text{ min}^{-1} \text{ for } q_1 = 6\% \text{ of the duty cycle} \\ F_2 &= 25\,000 \text{ N at } n_2 = 30 \text{ min}^{-1} \text{ for } q_2 = 22\% \text{ of the duty cycle} \\ F_3 &= 8\,000 \text{ N at } n_3 = 100 \text{ min}^{-1} \text{ for } q_3 = 47\% \text{ of the duty cycle} \\ F_4 &= 2\,000 \text{ N at } n_4 = 1\,000 \text{ min}^{-1} \text{ for } q_4 = \frac{25\%}{100\%} \text{ of the duty cycle} \end{aligned}$$

Calculation procedure

Average speed n_m

$$n_m = \frac{6}{100} \cdot |10| + \frac{22}{100} \cdot |30| + \frac{47}{100} \cdot |100| + \frac{25}{100} \cdot |1000| \quad 1$$

$$n_m = 304 \text{ min}^{-1}$$

Average load F_m for variable load and variable speed

$$F_m = \sqrt[3]{\left| \frac{50000}{304} \right|^3 \cdot \frac{6}{100} + \left| \frac{25000}{304} \right|^3 \cdot \frac{22}{100} + \left| \frac{8000}{304} \right|^3 \cdot \frac{47}{100} + \left| \frac{2000}{304} \right|^3 \cdot \frac{25}{100}} \quad 3$$

$$F_m = 8757 \text{ N}$$

Required service life L
(revolutions)

The service life L can be calculated by transposing the formulas 7 and 8 :

$$\begin{aligned} L &= L_h \cdot n_m \cdot 60 \\ L_h &= L_{h \text{ machine}} \cdot \frac{DC_{\text{ball screw}}}{DC_{\text{machine}}} \\ L_h &= 40000 \cdot \frac{60}{100} = 24000 \text{ h} \\ L &= 24000 \cdot 304 \cdot 60 \\ L &= 437\,760\,000 \text{ revolutions} \end{aligned}$$

Basic dynamic load rating C

$$C = 8757 \cdot \sqrt[3]{\frac{437\,760\,000}{10^6}} \quad 5 \quad C \approx 66492 \text{ N}$$

Result and selection

The ball screw can now be selected from the Dimension Tables:

e.g. ball screw,
size 63 x 10R x 6 - 6, with preloaded
single nut with flange FEM-E-S,
dynamic load rating $C = 88\,800 \text{ N}$,
part number R1512 640 13.

Note:
Take into account the dynamic load
rating of the screw bearing used!

Cross check

Service life of the selected ball screw
in revolutions

$$L = \left(\frac{88\,800}{8757} \right)^3 \cdot 10^6 \quad 4 \quad L \approx 1042 \cdot 10^6 \text{ revolutions}$$

Service life in hours L_h

$$L_h = \frac{1042 \cdot 10^6}{304 \cdot 60} \quad 7$$

$$L_h \approx 57\,167 \text{ hours}$$

The life of the selected ball screw
assembly is thus greater than the
required service life of 24,000 hours
(including operating hours). A smaller
ball screw could therefore be selected.

Design Calculations

Critical speed n_{cr}

The critical speed n_{cr} depends on the diameter of the screw, the type of end fixity and the free length l_{cr} . No allow-

ance must be made for guidance by a nut without preload.
The operating speed should not reach more than 80% of the critical speed.

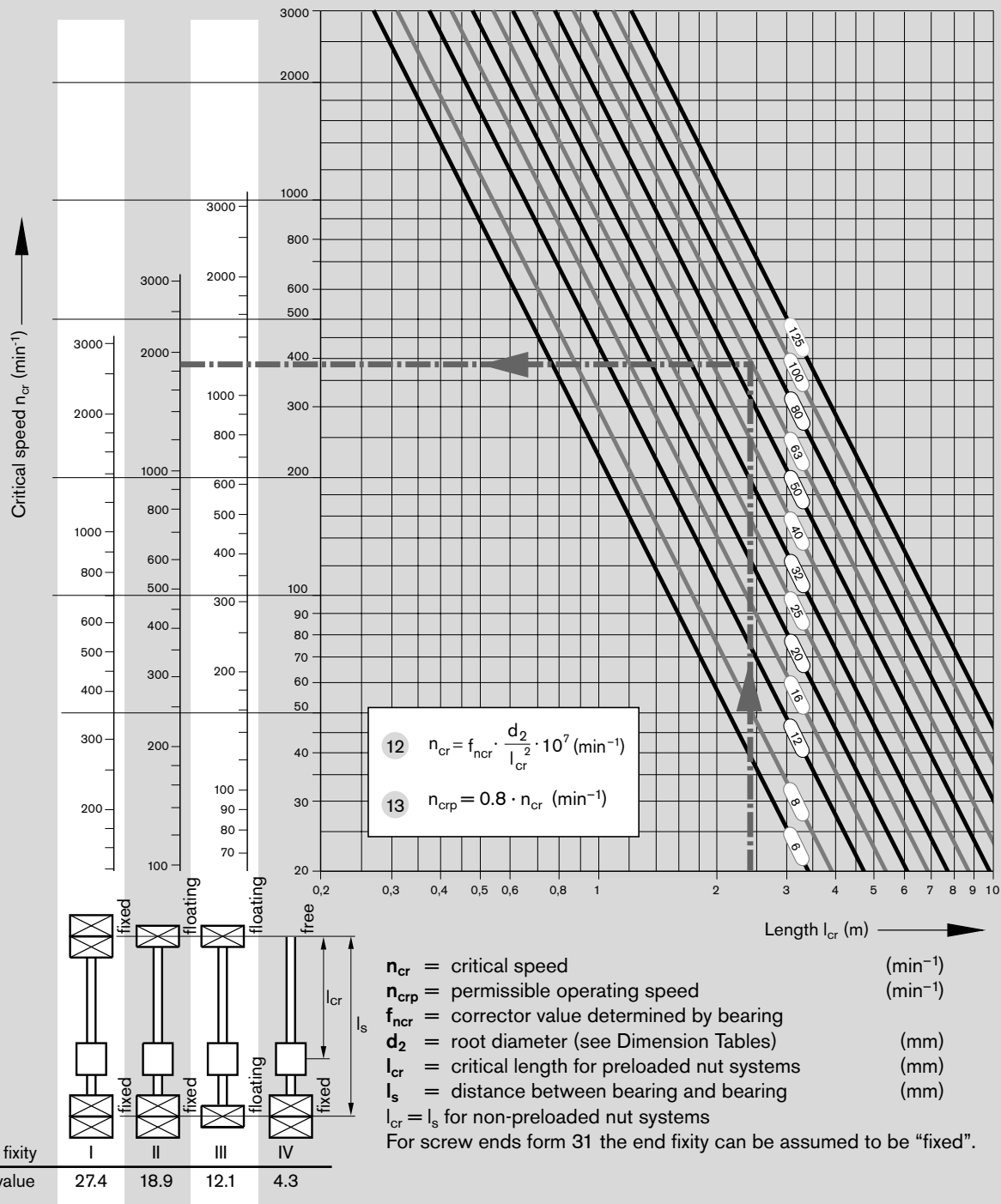
The characteristic speed and the max. permissible linear speed must be taken into account, see "Technical Notes".

Example

Screw diameter = 63 mm
Length l_{cr} = 2.4 m
End fixity II (fixed – supported)

According to the graph, the critical speed is 1850 min^{-1} .
The permissible operating speed is thus $1850 \text{ min}^{-1} \times 0.8 = 1480 \text{ min}^{-1}$.

The maximum operating speed in our calculation example of $n_4 = 1000 \text{ min}^{-1}$ is therefore below the permissible operating speed.



Permissible axial load on screw F_c (buckling load)

The permissible axial load on the screw F_c depends on the diameter of the screw, the type of end fixity and the effective free (unsupported) length l_c .

A safety factor of $s \geq 2$ should be taken into consideration when determining the permissible axial load.

Example

Screw diameter = 63 mm
 Lead = 10 mm
 Length l_c = 2.4 m
 End fixity II (fixed – supported)
 According to the graph, the theoretically permissible axial load is 360 kN.
 A permissible axial load on the screw of $360 \text{ kN} : 2 = 180 \text{ kN}$ is achieved when applying the safety factor 2. This therefore lies above the maximum operating load of $F_1 = 50 \text{ kN}$ used in our calculation example.

$$14 \quad F_c = f_{Fc} \cdot \frac{d_2^4}{l_c^2} \cdot 10^4 \text{ (N)}$$

$$15 \quad F_{cp} = \frac{F_c}{2} \text{ (N)}$$

F_c = theoretically permissible axial load on screw

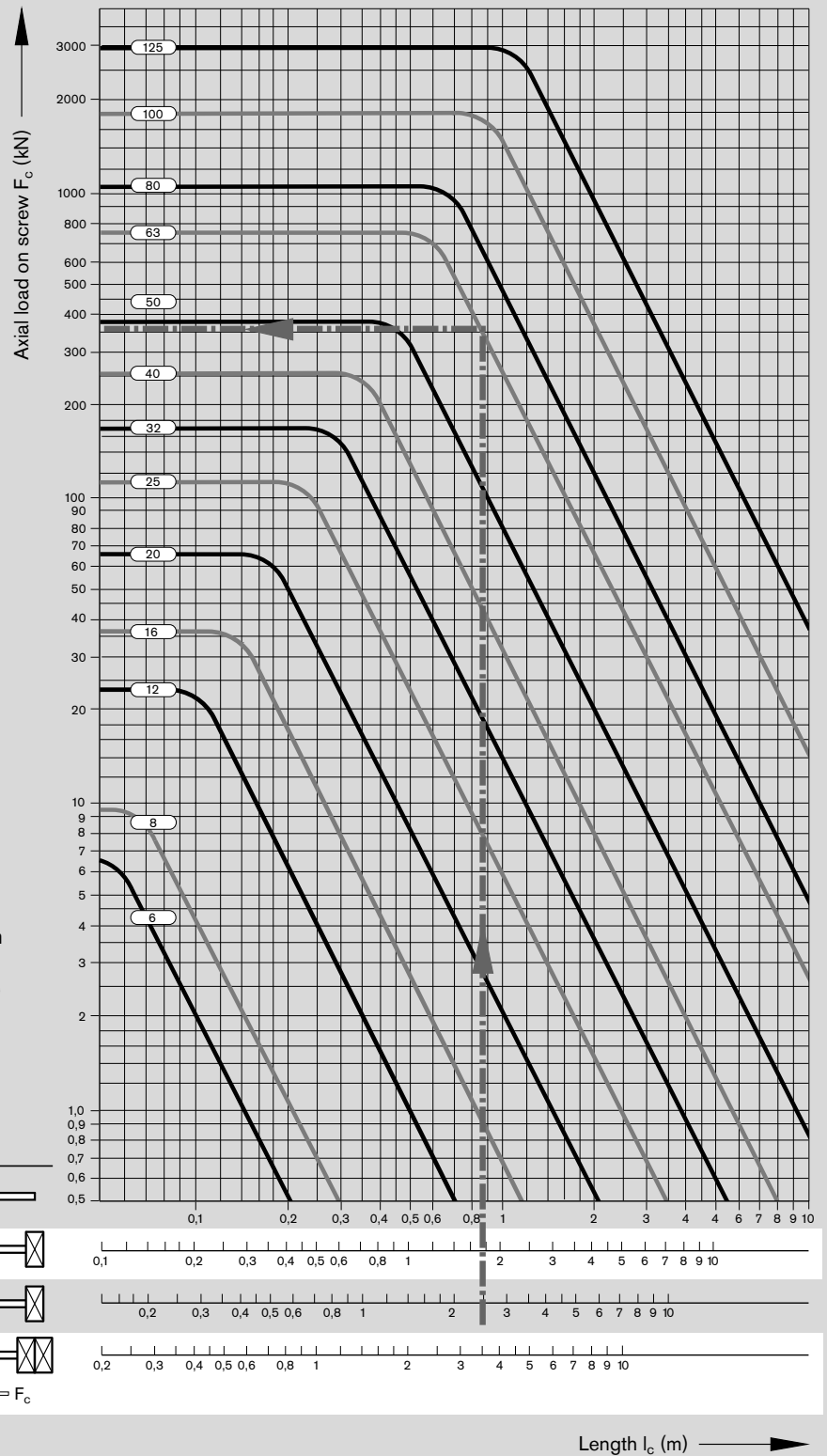
F_{cp} = permissible axial load during operation

f_{Fc} = corrector value determined by bearing

d_2 = root diameter (mm), see Dimension Tables

l_c = unsupported threaded length (mm)

f_{Fc} value	End fixity
2.6	IV
10.2	III
20.4	II
40.6	I



Length l_c (m) →

End Bearings

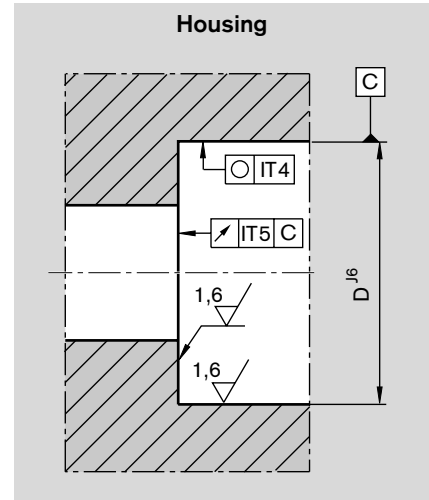
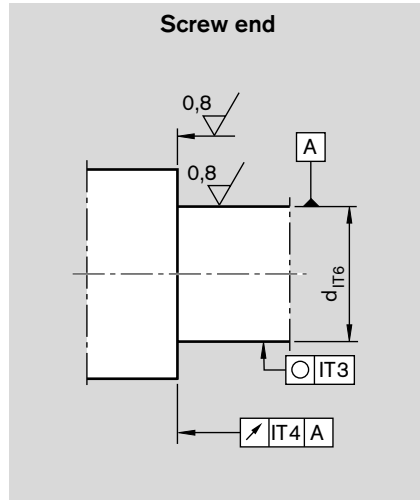
Design Notes, Mounting Instructions

Bearing design

For customer-machined screw ends, please consider the design notes given for screw ends and housings.

For Rexroth screw end designs, see "End Machining Details."

Rexroth delivers complete drive systems, including the end bearings. Calculations are performed with the formulas used in the antifriction bearing industry.



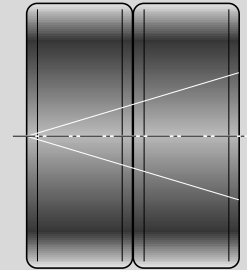
Mounting

Angular-contact thrust ball bearings and deep-groove ball bearings

When mounting the angular-contact thrust ball bearings LGF and LGN, ensure that the mounting forces are exerted only on the bearing rings. Never apply mounting forces via the anti-friction bearing elements or the seal rings! The two sections of the inner raceway may not be separated during assembly or disassembly for any reason! Tighten the mounting screws for screw-down or flange-mounted bearings in crosswise sequence. The mounting screws may be

subjected only to tension amounting to a maximum of 70% of their yielding point. The screw-down (LGF) bearings have a groove on the cylindrical surface of the outer raceway for disassembly. The individual bearings of the bearing pair series LGF-C... and LGN-C... are marked on the cylindrical surfaces of the outer raceways (see Figure). The markings reveal the bearing sequence. The sealing rings should face outward after proper mounting.

Outer raceway markings for paired bearings



Slotted nut NMA, NMZ

The bearings are preloaded by tightening the nuts.

In order to prevent settling phenomena, we recommend first tightening the slotted nut by twice the value of the tightening torque M_A and then easing the load. Only then should the slotted nut be retightened to the specified tightening

torque M_A . The two set screws are then alternately tightened using a hexagon socket wrench.

The components are disassembled in the reverse order, i.e. the set screws are to be removed before the slotted nut. The slotted nuts can be used several times when properly assembled and

disassembled by competent personnel. The inner raceways of the bearings are dimensioned in such a way as to achieve a defined bearing preload sufficient for most applications when the slotted nut is tightened (M_A in accordance with Dimension Table).

Lubrication, Mounting the Housing

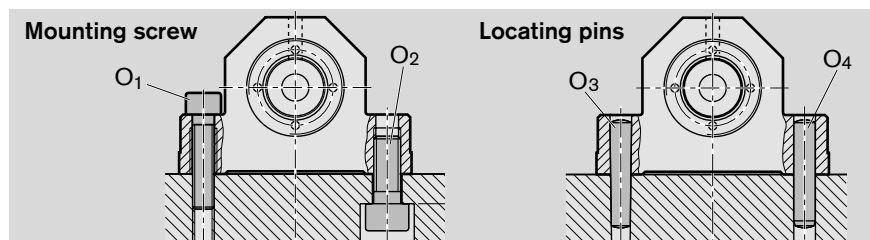
Mounting the housing SEB

Tighten the pillow block mounting screws in crosswise sequence. See table for max. tightening torque. The housing nut fixes the entire bearing unit in the housing. Use a threadlocking adhesive to secure the housing nut in place.

Note:



Take care to align the screw and nut assembly, the bearings and the guideway precisely with one another. The Rexroth gauge is a useful aid here.

Size $d_o \times P$	h (mm)	O ₁ DIN 912	O ₂ DIN 912	O ₃ – Tapered pin (hardened) O ₄ – Straight pin (DIN 6325)
8 x 2,5	8	M5 x 20	M6 x 16	4 x 20
12 x 5	8	M5 x 20	M6 x 16	4 x 20
16 x 5	11	M8 x 35	M10 x 25	8 x 40
16 x 10	11	M8 x 35	M10 x 25	8 x 40
16 x 16	11	M8 x 35	M10 x 25	8 x 40
20 x 5	11	M8 x 35	M10 x 25	8 x 40
20 x 20	11	M8 x 35	M10 x 25	8 x 40
25 x 5	14	M10 x 40	M12 x 30	10 x 50
25 x 10	14	M10 x 40	M12 x 30	10 x 50
25 x 25	14	M10 x 40	M12 x 30	10 x 50
32 x 5	14	M10 x 40	M12 x 30	10 x 50
32 x 10	14	M10 x 40	M12 x 30	10 x 50
32 x 20	14	M10 x 40	M12 x 30	10 x 50
32 x 32	14	M10 x 40	M12 x 30	10 x 50
40 x 5	16	M12 x 50	M14 x 35	10 x 50
40 x 10	16	M12 x 50	M14 x 35	10 x 50
40 x 20	16	M12 x 50	M14 x 35	10 x 50
40 x 40	16	M12 x 50	M14 x 35	10 x 50





Tightening torques for fastening screws according to VDI 2230 for $\mu_G = \mu_K = 0.125$

Steel/steel material pairing

	Strength class for O ₁ ; O ₂	M5	M6	M8	M10	M12	M14
 (Nm)	8.8	5.5	9.5	23	46	80	125
	12.9	9.5	16.0	39	77	135	215

Steel/aluminum and aluminum/aluminum material pairings

	Strength class for O ₁ ; O ₂	M5	M6	M8	M10	M12	M14
 (Nm)	8.8	4.8	8.5	20	41	70	110
	12.9	4.8	8.5	20	41	70	110

Lubrication of the end bearings

Bearings for ball screw assemblies are lubricated with grease for a lifetime of reliable service. It should be noted, however, that grease lubrication does not facilitate the dissipation of heat in the bearings. The bearing temperature should therefore not exceed 50°C,

particularly in machine tool applications. Angular-contact thrust ball bearings of the series LGF, LGN are lubricated for life with grease KE2P-35 per DIN 51825. For regreasing, the quantities stated in the table below can be applied via the lube ports provided on the bearings.

The maximum interval can be assumed to be 350 million revolutions, in which case the larger of the two quantities should be used. As a rule, the initial grease quantity will therefore last for the entire service life of a ball screw assembly.

Relubrication quantities for angular-contact thrust ball bearings					
Designation	Quantity (g)	Designation	Quantity (g)	Designation	Quantity (g)
LGN-B-0624	0.3 / 0.2				
LGN-B-1034	0.3 / 0.2				
LGN-B-1242	LGF-B-1255				
LGN-B-1747	LGF-B-1762				
LGN-B-2052	LGF-B-2068				
LGN-B-2557	LGF-B-2575	LGN-C-2557	LGF-C-2575		
LGN-B-3062	LGF-B-3080	LGN-C-3062	LGF-C-3080		
LGN-B-3572	LGF-B-3590				
LGN-A-4075				LGN-A-4090	LGF-B-40115
LGN-A-5090				LGN-A-50110	LGF-A-50140

End Bearings

Design Calculations

Resulting and equivalent bearing loads

For angular-contact thrust ball bearings LGN and LFG

Angular-contact thrust ball bearings are preloaded. The chart shows the resulting axial bearing load F_{ax} as a function of preload and axial operating load F_{Lax} . For a purely axial load $F_{comb} = F_{ax}$.

$\alpha = 60^\circ$	X	Y
$\frac{F_{ax}}{F_{rad}} \leq 2.17$	1.90	0.55
$\frac{F_{ax}}{F_{rad}} > 2.17$	0.92	1.00

- α = pressure angle
- F_{ax} = resulting bearing load
- F_{Lax} = operating load
- X, Y = dimensionless factor

If the radial operating forces are not insignificant, the equivalent bearing loads are calculated according to formula 20.

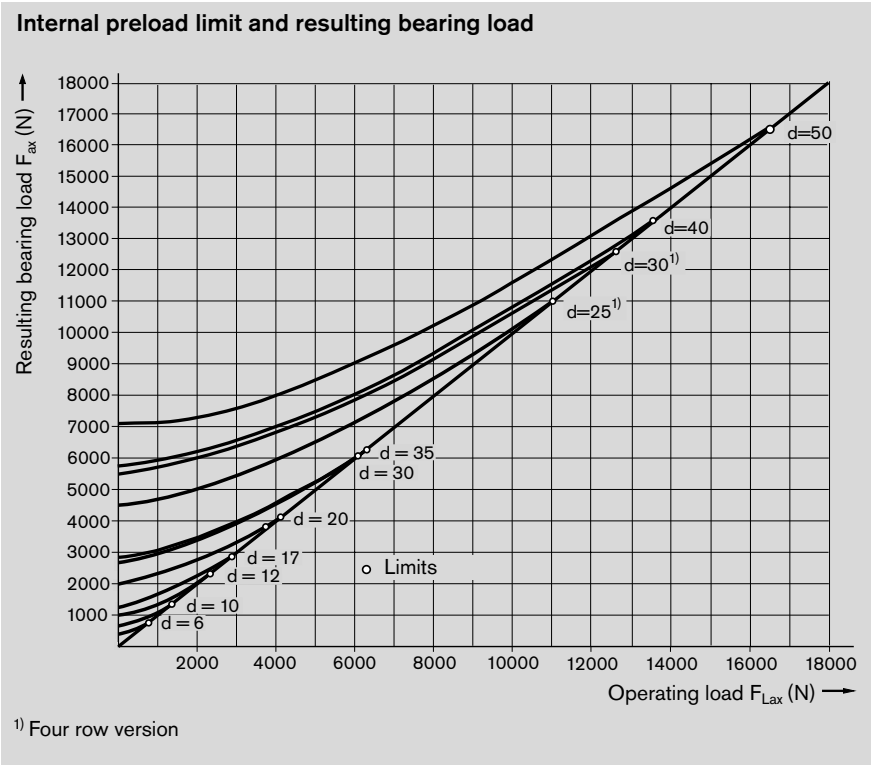
Bearings for ball screw assemblies are also able to accommodate tilting moments. As a rule, the moments that usually occur due to the weight and drive motion of the screw do not need to be incorporated in the calculation of the equivalent bearing load.

Permissible static axial load for bearing series LGF

The permissible static axial load of LGF-series bearings in screw-down direction is:

$$F_{comb} = X \cdot F_{rad} + Y \cdot F_{ax} \quad 20$$

- F_{ax} = resulting axial bearing load (N)
- F_{comb} = combined equivalent bearing load (N)
- F_{rad} = radial bearing load (N)



$$F_{0ax\ p} \leq \frac{C_0}{2}$$

- $F_{0ax\ p}$ = permissible static axial bearing load (N)

The static axial load rating C_0 is stated in the Dimension Tables.

Resulting and equivalent bearing loads

For angular-contact thrust ball bearings LGL

Before determining the combined equivalent load F_{comb} , the bearing size must be checked against the chart for static load limits.

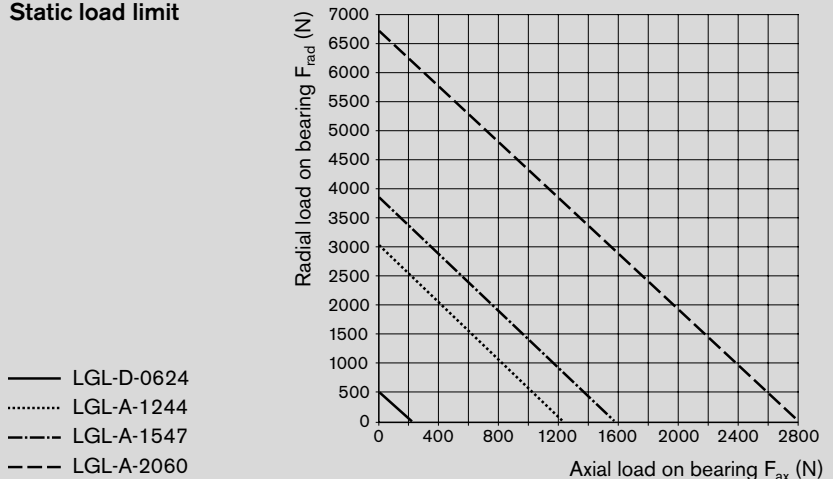
A bearing will only be suitable for a particular application when the intersection point between the axial and radial bearing loads lies below the load limit curve.

$$F_{\text{comb}} = X \cdot F_{\text{rad}}^A + Y \cdot F_{\text{ax}}^B + Z \quad 21$$

Bearing size	X	Y	Z	A	B
LGL-D-0624	0.003	0.1300	140	1.90	1.40
LGL-A-1244	0.076	0.0460	580	1.28	1.30
LGL-A-1547	0.022	0.0110	540	1.45	1.50
LGL-A-2060	0.017	0.0082	960	1.45	1.50

F_{ax} = axial bearing load (N)
 F_{comb} = combined equivalent bearing load (N)
 F_{rad} = radial bearing load (N)
 X, Y, Z = calculation factors (–)
 A, B = exponents (–)

Static load limit



Average speed and average bearing load

When the bearing load varies in steps over a specific period of time, calculate the dynamic equivalent bearing load using formula 22.

When the speed varies, use formula 23. In these formulas q_t denotes the discrete time steps for the individual phases in %.

$$F_m = \sqrt[3]{F_{\text{comb}1}^3 \cdot \frac{|n_1|}{n_m} \cdot \frac{q_{t1}}{100} + F_{\text{comb}2}^3 \cdot \frac{|n_2|}{n_m} \cdot \frac{q_{t2}}{100} + \dots + F_{\text{comb}n}^3 \cdot \frac{|n_n|}{n_m} \cdot \frac{q_{tn}}{100}} \quad 22$$

$$n_m = \frac{q_{t1}}{100} \cdot |n_1| + \frac{q_{t2}}{100} \cdot |n_2| + \dots + \frac{q_{tn}}{100} \cdot |n_n| \quad 23$$

$F_{\text{comb}1} \dots F_{\text{comb}n}$ = combined equivalent axial load in phases 1 ... n (N)
 F_m = dynamic equivalent bearing load (N)
 $n_1 \dots n_n$ = speeds in phases 1 ... n (min^{-1})
 n_m = average speed (min^{-1})
 $q_{t1} \dots q_{tn}$ = discrete time steps in phases 1 ... n (%)

Service life and load safety factor

Nominal life

The nominal life is calculated as follows:

Note:

Take into account the dynamic load rating of the nut!

$$L = \left(\frac{C}{F_{\text{comb}}} \right)^3 \cdot 10^6 \quad 24$$

$$L_h = \frac{16666}{n_m} \left(\frac{C}{F_{\text{comb}}} \right)^3 \quad 25$$

C = dynamic bearing load rating (N)
 F_{comb} = combined equivalent bearing load (N)
 L = nominal service life in revolutions (–)
 L_h = nominal service life in operating hours (h)
 n_m = average speed (min^{-1})

Static load safety factor

The static load safety factor for machine tools should not be lower than 4.

$$S_0 = \frac{C_0}{F_{0\text{max}}} \quad 26$$

$F_{0\text{max}}$ = maximum static load (N)
 C_0 = static load rating (N)
 S_0 = static load safety factor (–)

Design Calculation Service Form

Bosch Rexroth AG
Linear Motion and
Assembly Technologies
97419 Schweinfurt / Germany

Telephone +49 9721 937-0
Fax +49 9721 937-288
e-mail screws.br@boschrexroth.de

To: Precision Ball Screw
Assemblies Department

Alternatively, technical design calculation
can be performed by the customer with
our WINKGT software.

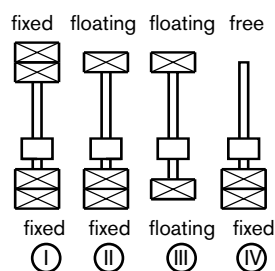
Application: New design ☐ Revised design ☐

Operating conditions

Loads (N)	Speeds (1/min)	Discrete time steps (%)
$F_1 =$	at $n_1 =$	for $q_1 =$
$F_2 =$	at $n_2 =$	for $q_2 =$
$F_3 =$	at $n_3 =$	for $q_3 =$
$F_4 =$	at $n_4 =$	for $q_4 =$
$F_5 =$	at $n_5 =$	for $q_5 =$
$F_6 =$	at $n_6 =$	for $q_6 =$
Average load (see p. 120)	Average speed (see p. 120)	Sum of time steps
$F_m =$	$n_m =$	$Q = 100\%$
Maximum static load:	N	
Required service life	Operating hours or	$\times 10^6$ ball screw revolutions

Screw end fixity: horizontal ☐ vertical ☐

Screw end fixity



(see pages 124/125)

Selected:

Installation conditions (enclose
drawings/sketches if possible!)

Drawing enclosed ☐

Type of lubrication:

Operating temperature: °C - min/max. / °C

Exceptional operating conditions:

Sender

OEM ☐ User ☐ Distributor ☐

Company

Address

Name

Department

Telephone

Fax

e-mail

Bosch Rexroth AG
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97419 Schweinfurt / Germany

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Fax +49 9721 937-288
e-mail screws.br1@boschrexroth.de

To: Precision Ball Screw
Assemblies Department

Inquiry/Order Form

For elucidations, see page 20/21.

Note: The processing of INQUIRIES/Orders based on customer drawings is also possible of course.

Example of an order

Ball screw assembly	SEM-E-S	20 x 5R x 3 - 4	1	2	T7	R	81Z120	41Z120	1250	1	1	
Screw	SN-R	20 x 5R x3		X	X	T7	R	00T200	00T200	1250	1	0

Ball screw assembly		x	x	-								
Screw	SN-R	x	x		X	X						

Ball screw assembly		x	x	-								
Screw	SN-R	x	x		X	X						

Ball screw assembly		x	x	-								
Screw	SN-R	x	x		X	X						

Comments:

[illegible]

Sender

OEM ☐ User ☐ Distributor ☐

Company _____

Company _____
Address _____

Address _____

Name _____

Department _____

Department _____
Telephone _____

Fax _____

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Your sales partner

Subject to technical modifications