Power Transmission

Ball Screws

Internal Ball Return

UltraSpeed Ball Return

Nominal Diameter 16 - 100 mm

Steinmeyer


STEINMEYER

The production plant in Albstadt / Germany. Together with sister companies in Suhl and Dresden, the Steinmeyer group represents one of the leading makers of ballscrews and precision gauging instruments.

The company ***Steinmeyer*** was established in 1920, and was originally concerned exclusively with the production of precision measuring instruments.

Almost 40 years ago, a second line was launched with the development of what was then an almost unknown technology: the ball screw and nut assembly, now the company's most important product line.

Steinmeyer is seen as one of the pioneers in this sector. Ballscrews were produced largely in those early days with nominal diameters between 5 and 16 mm for instrument engineering and for research equipment applications.

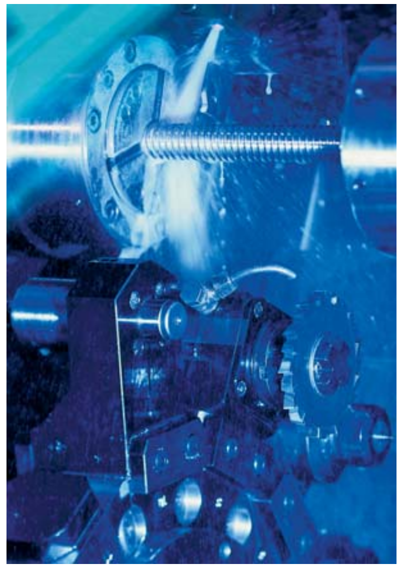
With the advent of numerical controls in the machine tools sector, the production range was successively extended to take in larger sizes.

Today, ***Steinmeyer*** offers a wide product program ranging from 3 to 100 mm in diameter which sets whole new standards of quality. Experience and flexibility, as well as continually updated production facilities have made the name ***Steinmeyer*** synonymous with quality and reliability the world over.

The company's continued expansion reflects the success of our close cooperation with our customers.

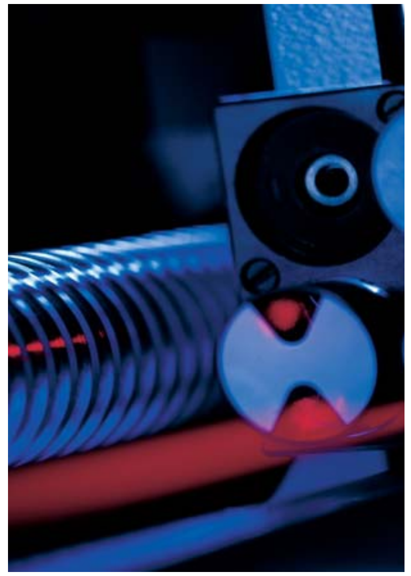
EQ ZERT ISO 9001:2000 ISO 9001 DIN EN ISO 9001 CERTIFIED certified quality system reg.-no. 23 798-01

Up to Date with Steinmeyer



Ball screw and nut technology is not a new field in the world of industry. However, the system-related properties of the ball screw and nut such as minimal friction, preloading capability and non-stickslip effects, to name but a few, are nowadays no longer sufficient as such to equip today's high-tech machines and plants with adequate transmission systems. In practically every case of application, the ball screw and nut has an essential role to play in determining overall plant and equipment performance. It also represents a considerable factor in the cost of the final product, as it is usually one of the most expensive purchase parts.

Steinmeyer has gained an outstanding reputation in this field. We supply top quality components



at internationally competitive prices to the most renowned names in the mechanical engineering industry. In cooperation with our customers, we provide individual solutions for a widely varying range of applications. Highly developed production engineering and our many decades of experience in this field ensure that we stay technically and economically up to date.

Steinmeyer flexibility and the scope of our production range are unique in the field. Our production program includes a standard program of miniature ballscrews in the range of 3 mm to 16 mm nominal diameter, and different shapes of standardized nuts for the range of 16 mm to 100 mm. Screw journals for this part of the program are always machined in accordance to our customers' drawings. Most commonly used flange nuts according to the ISO standard are part of our program as well as cylindrical nuts with fitting keys. Also, we feature a range of flanged nuts in combination with inch leads.

As our nut design allows us to meet almost any possible requirement regarding nut outside dimensions, we can provide our customers with customized nuts, too.

Nonstandard nuts still use our unique design features, such as our sophisticated ball return and preloading systems. Thus our customers will benefit from the outstanding performance of our ballscrews without changing the design of their machines.

Our understanding is, that quality is a never ending process. This is why we seek proximity to our customers.

Quality means to us, that we use our knowledge to transform the needs of our customers into an individual solution to meet even the most demanding specifications - not less, but sometimes even a bit more.

Directory

Please see also our web page at
http://www.steinmeyer.com
for latest changes and news.

Symbols

A:	Screw cross section [mm^2]
α:	Coefficient of thermal expansion [1/ °C]
B_{10}:	Nominal service life [10^6 inches of travel]
c:	Specified lead deviation
C_{0a}:	Static axial load capacity [N]
C_a:	Dynamic axial load capacity [N]
Δl_p:	Elongation [mm]
Δl_T:	Thermal expansion [mm]
d_N:	Nominal diameter of screw [mm]
D_N:	D_N-value
Δt:	Temperature gradient [°C]
"E":	Perm. deviation for travel compensation (JIS)
E:	Young´s modulus [N/mm^2]
ε:	Extension
e_{0a}:	Mean lead deviation at the length l_u
$e_{2\pi}$:	Variation of lead within one revolution (JIS)
e_{300}:	Variation of lead within 300 mm of travel (JIS)
e_p:	Perm. deviation for travel compensation
e_{sa}:	Mean lead deviation at the length l_s
k:	Coefficient of bearing configuration
F_i:	Actual load [N]
F_i*:	Modified actual load [N]
F_m:	Dynamic equivalent axial load [N]
F_m*:	Modified dynamic equivalent axial load [N]
F_{m1}:	Dynamic equivalent axial load [LBS]
F_{pr}:	Preload [N]
F_T:	Screw pretension force [N]
i:	Number of circuits
JIS:	Japan Industry Standard
L_{10}:	Nominal service life [10^6 rev.]
l_s:	Length of unsupported shaft [mm]
l_u:	Full travel
m:	Coefficient of bearing configuration
ni:	Actual speed [rpm]
n_k:	Critical speed [rpm]
n_m:	Average speed [rpm]
n_{max}:	Maximum speed [rpm]
P:	Lead [mm]
P_B:	Buckling load [N]
P_i:	Dynamic axial load capacity [LBS]
q_i:	Time of each duty cyclus [%]
R_b:	Axial stiffness of thrust bearing [N/μm]
$R_{nu,ar}$:	Reduced stiffness of nut [N/μm]
R_s:	Stiffness of screw [N/μm]
R_t:	Total stiffness of ballscrew/bearing unit [N/μm]
T:	Specified lead deviation (JIS)
T_{pr}:	Preloaded idling torque [Ncm]
$v_{2\pi a}$:	Variation of lead within one revolution
$v_{2\pi p}$:	Perm. variation of lead within one revolution
v_{300a}:	Variation of lead within 300 mm of travel
v_{300p}:	Perm. variation of lead within 300 mm of travel
v_{ua}:	Variation of lead over full travel
v_{up}:	Perm. variation of lead over full travel

General Properties

As ballscrews are an indispensable element in today's machinery and apparatus construction, ***Steinmeyer*** has developed a wide program of standardized ball nuts for various purposes. This catalog shows standardized sizes from a nominal diameter of 16 mm through 100 mm. For miniature ballscrews with nominal diameters ranging from 3 to 16 mm, a separate catalog is available.

We edited this catalog to best suit the demands of the users, hence it is divided into two sections, providing you with a broad selection of technical background and design hints, and a listing of standard ball nut designs, respectively. This catalog is not intended to include all possible designs, and ***Steinmeyer*** will design any reasonable ballscrew according to your needs. Our engineering service is available to users worldwide through our distribution partners, and we shall be grateful to discuss your needs to provide you with the best ballscrew solution available.

Ballscrews provide power transmission from rotational to linear motion, or vice versa. Their main properties are high efficiency, durability and high precision. ***Steinmeyer*** has improved the basic design by introducing many detail solutions to improve performance of this product. As the needs in modern industries are increased speeds, reliability and precision along with better economics, the design in detail has changed reasonably.

In general, every ballscrew shows an efficiency of approx. 90%, due to rolling ball contact between screw and nut. However, the demands today are more complex than simply transforming a rotational movement into a linear movement.

Steinmeyer ballscrews use a very complex profile of thread grooves of the screw and inside the nut. It is designed to meet requirements of increased stiffness, smooth motion and low friction.

These profiles, developed from the so-called **„gothic arch" profile**, allow for optimum control of contact angle, track conformity and backlash of single nuts.

Steinmeyer uses different ball return systems, based on which system provides an optimum solution for the ball screw size and application. They are all flush mounted with no external parts protruding from the outer diameter of the nut. Ball deflectors, manufactured in a special, computer controlled milling process, provide smooth motion and less wear on balls than external systems do.

The extreme low profile of our ball return allows for nuts to be designed in very small envelopes. This enables the use of larger screw nominal diameters, maintaining the same nut outside diameter, compared with conventional tube return nuts.

Standard Sizes

Table 1
Metric Sizes

If your desired combination of diameter and lead is not listed here, please inquire. **This shows only part of the program available**. However, please select from this list, as these designs are often less expensive, and available with shorter lead time.

Nominal Diameter [mm]

Lead [mm]	3	5	8	12	16	20	25	32	40	50	60	63	80	100
0.5	●	●	●											
1	●	●	●	●										
1.5		●	❍											
2		●	●	●	●	●	●	❍	❍					
2.5			●	❍	●									
3			❍	●										
4			●	●	●	●	●	●						
5			●	●	●	●	●	●	●	●		●	●	
6								❍						
8								❍	❍	❍				
10				●	●	●	●	●	●	●		●	●	●
12							❍	❍	❍	❍				
15							●	●	●	●		●	●	
20					●	●	●	●	●	●		●	●	❍
25							●	❍	●	●	●			
30					●			●	●	●	●	●	●	●
35										●				
40									●	●	●		❍	

See separate catalog (diameters 5–16)

● Standard Size
❍ Please inquire

Inch Sizes

A large selection of inch sizes is available, too. However, they are not included in this catalog. Please inquire.

Maximum threaded length

Table 2

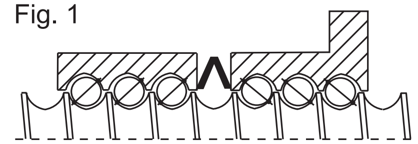
Nominal diameter [mm]	Recommended max. threaded length[mm] Accuracy grade 0 - 5	Accuracy grade 7 and 10
3	100 (150)	–
5	150 (250)	500
8	300 (450)	800
12	450 (700)	1200
16	650 (1000)	1600
20	800 (1200)	2000
25	1000 (1500)	2500
32	1300 (1900)	3000
40	1600 (2400)	–
50	2000 (3000)	–
60/63	2500 (3600)	–
80	3200	–
100	3500	–

For accuracy grades 0 to 5, the values shown represent the maximum lengths for screws with preloaded single nuts. The values in parenthesis can be used, if larger-than-standard preload torque tolerances (see page 10) are acceptable, or if the ballscrew will be equipped with a double nut.
If your required length exceeds these values, please contact our applications engineering department for recommendations or for a detailed specification in this individual case.

Preloading Systems

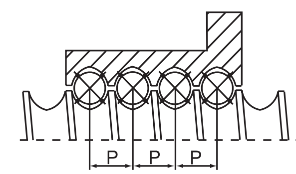
Steinmeyer uses four different systems for preloading to meet all requirements. Basically, preload serves to eliminate backlash and to increase stiffness. Since the preload also affects the friction torque and represents at the same time a load that has to be accounted for service life aspects, it needs to be controlled accurately.

Fig. 1



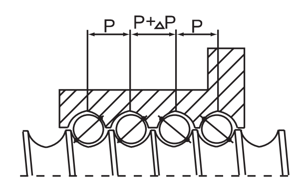
Especially for miniature ballscrews ***Steinmeyer*** has developed a spring loaded double nut to meet most demanding requirements of low torque along with high accuracy in position. Please refer to our **Miniature Ballscrew Catalog** for details on our 1510 / 1530 series double nuts.

Fig. 2



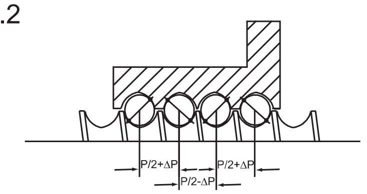
Single nuts are available either with backlash or preloaded by ball oversize. As preloaded single nuts always use a fourpoint contact between balls and ball race, the efficiency is reduced slightly compared to nuts with two-point contact. However, this design offers a good cost/performance ratio and allows economic solutions. The ***Steinmeyer*** ball return system, optimized for this purpose, does not need any spacer balls to improve smoothness. Hence, our preloaded single nut shows similar load capacities to double nut configurations.

Fig. 3.1



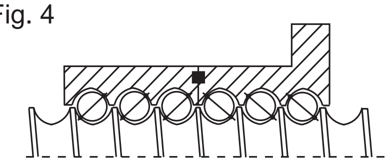
For improved efficiency and stiffness the two-point contact offers optimum solutions. The lead offset needed to enable two-point contact can be achieved by shifting the grinding wheel a certain amount in axial direction in the middle of the nut's internal thread, dividing the nut into two parts where the balls are contacting on different sides of the balltrack. Both parts of the nut can be equipped with three or more full ballcircles according to the desired load capacity.

Fig. 3.2



Steinmeyer UltraSpeed nuts are available with ball oversize preload (see Fig. 2). As an additional option for all such nuts with dual start threads, they can be supplied with a pitch offset between the two threads, enabling 2-point contact just like in a conventional double nut. However, these nuts are significantly more compact than 2-piece double nuts or lead offset nuts and provide increased stiffness.

Fig. 4



The patented ***Steinmeyer*** double nut configuration with UNILOCK preloading system uses two nuts directly preloaded against each other and locked by means of an integral bonding system, avoiding the need of adjusting the distance between both nuts using shims. UNILOCK allows for reduced envelope double nuts with increased stiffness of the nut body and improved precision due to absence of extra parts. The factory set preload is maintained securely, along with a perfect alignment of the nuts. The UNILOCK system has proven its reliability in thousands of applications.

DIN / ISO / JIS or ANSI Standard

All designations used in this catalog fully comply to the German DIN 69 051/ part I-VI, and the European ISO/DIS 3408 standard. This applies especially to the calculation of load capacity and stiffness. When comparing, be sure to interpret values stated according to ANSI B5.48 standard correctly. If uncertain, please contact our engineering service for assistance.

Standard Lead Accurancy Grades

Steinmeyer ballscrews are available as a standard in five different accuracy grades, according to the ISO standard (grades 1, 3, 5 for high precision ballscrews and grades 7 and 10 for normal precision ballscrews). Two accuracy grades have been added to meet requirements as per JIS standard grades 0 and 2. Regarding lead accuracy, both standards use five different values to define limits for mean travel deviation, travel variations and specified travel deviation. The respective designations that refer to the JIS standard are given in parenthesis.

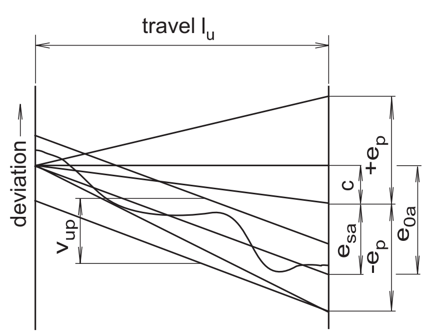


Fig. 5

- c: Specified lead deviation, is used to compensate heat effects or if the screw shall be held under tension (T).
- e_p: Represents the deviation of a straight line, which is to be drawn as an average of the actual lead deviation over the full travel (E).
- v_{up}: Permissible variation of lead over full travel, which is defined as vertical distance of two straight lines parallel to the average (e_p), which include maximum and minimum of the lead graph (e).
- v_{300p}: Same as v_{up}, but refers to the maximum within any interval of 300 mm (e_{300}).
- $v_{2\pi a}$: Variation of lead within one revolution ($e_{2\pi}$).

Tolerance of Torque

Table 3

Tolerances ΔT_{prp} for torque variations T_{pr0} for double nuts or pitch-shift nuts, testing speed 100 min^{-1}

ΔT_{prp} in % of T_{pr0} for $l_u \le 40 \cdot d_0$								
T_{pr0} [Ncm]		Grade						
from	to	0	1	2	3	5	7	10
5	10	40	45	45	50	60	–	–
10	20	35	40	40	45	50	–	–
20	40	30	35	35	40	50	70	–
40	60	20	25	35	40	40	60	–
60	100	20	25	25	30	35	40	–
100	250	15	20	25	25	30	35	–

ΔT_{prp} in % of T_{pr0} for $l_u > 40 \cdot d_0$								
T_{pr0} [Ncm]		Grade						
from	to	0	1	2	3	5	7	10
5	10	–	–	–	–	–	–	–
10	20	50	50	60	60	60	–	–
20	40	40	50	50	50	60	–	–
40	60	35	40	50	50	50	70	–
60	100	35	40	40	40	45	50	–
100	250	30	35	35	35	40	45	–

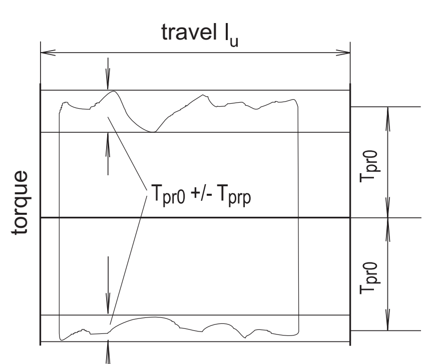


Fig. 6

Reduced tolerances and other testing specifications, as well as tolerances for single nuts upon request

Accuracy Grades

Fig. 6: The mean lead deviation e_{0a} with tolerances ± e_p at the length l_u.

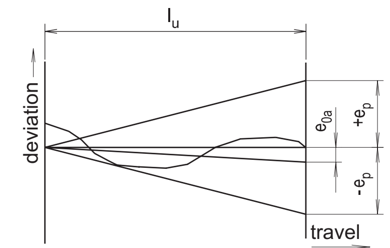


Fig. 7: The variation v_{ua} with tolerance v_{up} at the length l_u.

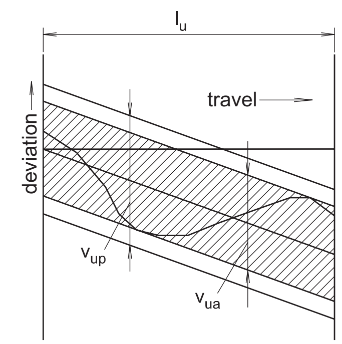


Fig. 8: The variation v_{300a} with tolerance v_{300p} at the length of 300 mm.

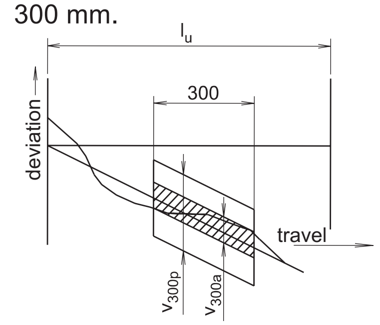


Fig. 9: The variation $v_{2\pi a}$ within 2π rad.(=1 rev.)

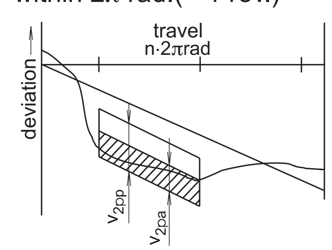


Table 3

		Tolerances e_p for mean lead deviation e_{0a} [µm]						
l_u		Grade						
from	to	0	1	2	3	5	7	10
–	200	3	5	7	10	20	48	190
200	315	4	6	8	12	23	52	210
315	400	5	7	9	13	25	57	230
400	500	6	8	10	15	27	63	250
500	630	6	9	11	16	30	70	280
630	800	7	10	13	18	35	80	320
800	1000	8	11	15	21	40	90	360
1000	1250	9	13	18	24	46	105	420
1250	1600	11	15	21	29	54	125	500
1600	2000	–	18	25	35	65	150	600
2000	2500	–	22	30	41	77	175	700
2500	3150	–	26	36	50	93	210	860
3150	4000	–	32	44	62	115	260	1050

		Tolerances v_{up} for variation v_{ua} [µm]						
l_u		Grade						
from	to	0	1	2	3	5	7	10
–	200	3	5	7	10	20	–	–
200	315	4	6	8	12	23	–	–
315	400	4	6	8	12	25	–	–
400	500	4	7	8	13	26	–	–
500	630	4	7	8	14	29	–	–
630	800	5	8	9	16	31	–	–
800	1000	6	9	10	17	35	–	–
1000	1250	6	10	11	19	39	–	–
1250	1600	7	11	13	22	44	–	–
1600	2000	–	13	15	25	51	–	–
2000	2500	–	15	18	29	59	–	–
2500	3150	–	17	21	34	69	–	–
3150	4000	–	21	25	41	82	–	–

Tolerances v_{300p} for variations v_{300a} [µm]						
Grade						
0	1	2	3	5	7	10
4	6	8	12	23	52	210

Tolerances $v_{2\pi p}$ for variations $v_{2\pi a}$ [µm]						
Grade						
0	1	2	3	5	7	10
3	4	5	6	8	–	–

Quality inspection

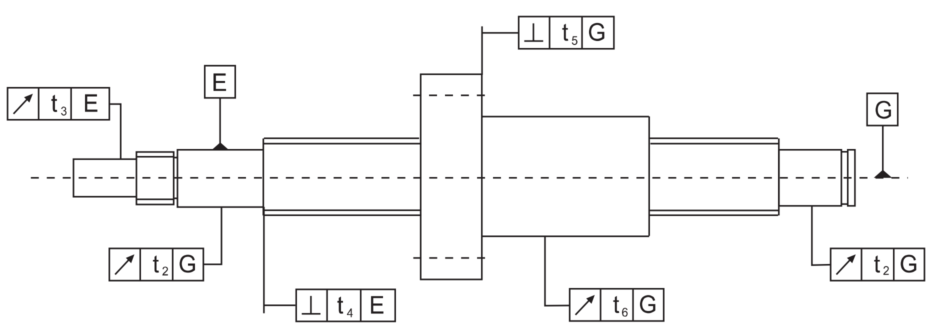
Steinmeyer uses an in-factory quality management system which uses the latest national and international standards available. For full documentation and traceability, every ballscrew can be supplied as an option with test records regarding:

1. Lead accuracy
2. Preload drag torque
3. Stiffness

Since ***Steinmeyer*** is a manufacturer of high precision gauging instruments as well, our environmentally controlled gauging rooms are equipped with the latest developments in gauging equipment, including a laser interferometric lead measuring machine.
Every ballscrew with 20 mm nominal diameter and larger will be marked with a unique series number to ensure full traceability of the product.

Tolerances of Run-out and Perpendicularity

Fig. 10



The method of supporting the ballscrew during measuring should ensure that the values taken are free of influences of a possible bending of the screw due to its weight. Generally supporting the screw between centres is appropriate. However, for very long screws it is recommended to take care for such influences and choose a different method.

The values listed below represent general rules. For distinct applications tolerances may vary.

Run-out t_2

Table 3.1

nominal dia.		run-out tolerance t_2 [µm]						
d_N [mm]		Grade						
over	to	0	1	2	3	5	7	10
16	20	5	7	9	10	13	16	19
20	32	6	8	10	11	14	17	20
32	50	7	9	12	13	16	19	22
50	80	8	10	13	14	18	20	24

Accuracy Grades

Run-out t_3

Table 3.2

nominal dia.		run-out tolerance t_3 [µm]						
d_N [mm]		Grade						
over	to	0	1	2	3	5	7	10
16	20	4	6	8	9	12	15	18
20	32	5	7	9	10	13	16	19
32	50	6	8	11	12	15	18	21
50	80	7	9	12	13	17	20	23

Perpendicularity t_4

Table 3.3

nominal dia.		perpendicularity tolerance t_4 [µm]						
d_N [mm]		Grade						
over	to	0	1	2	3	5	7	10
16	20	2	3	3	4	5	7	9
20	32	2	3	4	4	5	7	9
32	50	2	3	4	4	5	7	9
50	80	3	4	5	5	7	10	13

Perpendicularity t_5

Table 3.4

nominal dia.		perpendicularity tolerance t_5 [µm]						
d_N [mm]		Grade						
over	to	0	1	2	3	5	7	10
16	20	7	8	9	10	12	15	18
20	32	7	8	9	10	12	15	18
32	50	8	9	10	10	13	16	19
50	80	9	10	11	12	15	18	21

Run-out t_6

Table 3.5

nominal dia.		run-out tolerance t_6 [µm]						
d_N [mm]		Grade						
over	to	0	1	2	3	5	7	10
16	20	5	6	7	8	10	13	16
20	32	5	6	7	8	10	13	16
32	50	6	7	8	8	11	14	17
50	80	7	8	9	10	13	16	19

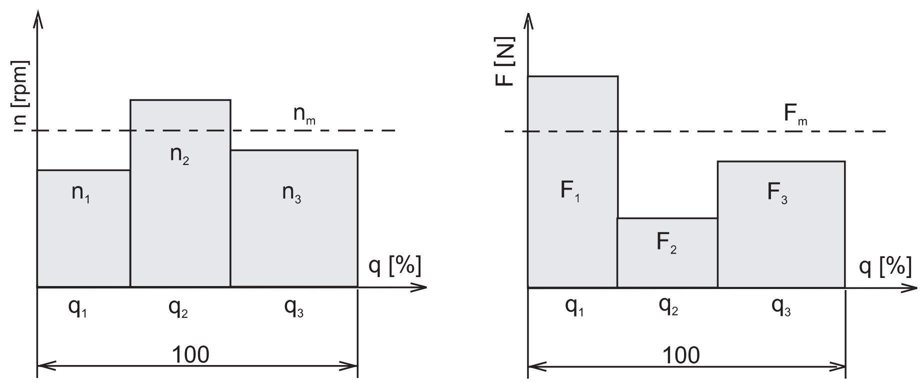
Load Capacity Selection

Ballscrews usually will be used carrying axial loads under dynamic conditions. The selection therefore has to take into consideration the load and the travel - or number of revolutions - made under this load. The normal service life expectancy is based on the fatigue of the material of the balls.

Basically, travel made under higher load will determine the actual service life more than travel made under lower loads. As any application will give a constant load, a mean load must be calculated, which will result in the same service life. This so-called dynamic equivalent axial load F_m is then to be compared with the dynamic axial load capacity C_a.

For simplification, a typical work cycle of the machine under design should be described along with load and load direction, percentage of time and speed for every step.

Fig. 11



In the simplest case-non-preloaded single nut - these values can be converted to the dynamic equivalent axial load F_m and the average speed n_m by means of the following Equations:

Equation 1.1

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

Equation 1.2

$$n_m = \frac{q_1 \cdot n_1 + q_2 \cdot n_2 + \ldots + q_n \cdot n_n}{q_1 + q_2 + \ldots + q_n}$$

F_m = Dynamic equivalent axial load [N]
F_i = Actual load [N]
n_i = Actual speed [rpm]
q_i = Time of each duty cycle [%]
n_m = Average speed [rpm]

Single nut with preload

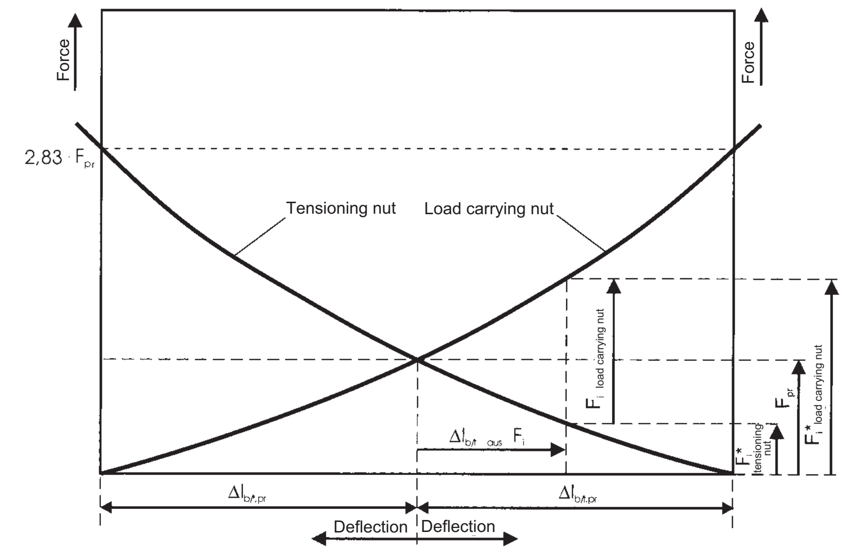
In all other cases the influence of the preload must be accounted for by calculating the modified dynamic equivalent axial load F_m^*.
In case of single nuts preloaded by ball oversize approximate values can be calculated by means of following approximation:

Equation 2

$$F_i^* = \frac{5}{4} F_{pr} + \left| \frac{F_i}{2} \right|$$

Double nut or pitch-shift nut

Fig. 12: Preload Graph



The preload graph demonstrates, how external loads cause a load increase in one nut, and a load decrease in the other one. At an external load of 2.83 times the preload, the tensioning nut is released completely. Even though this may happen without damaging the ballscrew, in most applications the preload should be set in order to keep all external loads within the preload range.
To evaluate the resulting axial forces a computer program is needed. However, approximate values can be calculated by means of the following rule of thumb:

Equation 3

$$F_i^* = F_{pr} + \frac{F_i}{2}$$

The resulting axial loads F_i^* now can be used for calculating the dynamic equivalent axial load F_m^* by means of Equation 1.1. The load capacity for a ballscrew listed in the catalog is based on the ISO 3408 / DIN 69051 calculations. This dynamic load capacity is the axial load F_m^*, under which the ballscrew will show a service life of 1 million revolutions (L_{10} rating).
To compare the ISO 3408/DIN 69051 with the ANSI 5.48 1977, load capacity C_a and service life must be converted in P_i and B_{10} rating.

Equation 4.1

$$F_m = \frac{C_a}{\sqrt[3]{\frac{L_{10}}{10^6}}}$$

Equation 4.2

$$C_a = F_m \cdot \sqrt[3]{\frac{L_{10}}{10^6}}$$

Equation 4.3

$$L_{10} = \left(\frac{C_a}{F_m} \right)^3 \cdot 10^6$$

$$C_a = P_i \cdot 4.45 \cdot \sqrt[3]{\frac{25.4}{P}} \; [N]$$

P = Lead [mm]
F_m = Dynamic equivalent axial load [N]
F_{m1} = Dynamic equivalent axial load [LBS]
C_a = Dynamic axial load capacity [N]
P_i = Dynamic axial load capacity [lbf]; ANSI 5.48
L_{10} = Nominal service life [10^6 rev.]

Example of Load Capacity Selection

The following duty cycle is given for a machine:

	q_i	n_i	F_i	
1:	20%	250 rpm	2500 N	>>>
2:	50%	1200 rpm	1600 N	>>>
3:	15%	2000 rpm	800 N	>>>
4:	15%	2000 rpm	800 N	<<<

For stiffness reasons a ballscrew with double nut shall be selected, and therefore the direction of the external load is to be considered.

The preload is set to 1000 N to keep all axial loads within the preload range. As a rule of thumb, the following Equation can be used:

Equation 5

$$F_{pr} \geq 0.4 \cdot F_{imax}$$

Both nuts must be calculated separately:

1: $F_{A1}^* = 1000\text{ N} + 2500\text{ N}/2 = 2250\text{ N}$
2: $F_{A2}^* = 1000\text{ N} + 1600\text{ N}/2 = 1800\text{ N}$ **„NUT A“**
3: $F_{A3}^* = 1000\text{ N} + 800\text{ N}/2 = 1400\text{ N}$
4: $F_{A4}^* = 1000\text{ N} - 800\text{ N}/2 = 600\text{ N}$

The same applies to the second nut, but with inverted external loads:

1: $F_{B1}^* = 1000\text{ N} - 2500\text{ N}/2 = (-250\text{ N})$ ==> 0

Although Equation 3 leads to a negative result, this will simply lead to unloading of the second nut. Exact calculation or crosscheck with Equation 5 can ensure that this will not happen.

2: $F_{B2}^* = 1000\text{ N} - 1600\text{ N}/2 = 200\text{ N}$
3: $F_{B3}^* = 1000\text{ N} - 800\text{ N}/2 = 600\text{ N}$ **„NUT B“**
4: $F_{B4}^* = 1000\text{ N} + 800\text{ N}/2 = 1400\text{ N}$

As the **resulting loads** in nut „A“ are reasonably higher and the nut shall be symmetrical (both nuts same load capacity), the service life of the ballscrew will be determined by nut „A“.

By means of Equation 1.1 the equivalent dynamic axial load in nut „A“ is:

$\mathbf{F_m^* = 1583\text{ N}}$

The average speed is:

$\mathbf{n_m = 1250\text{ rpm}}$

The desired service life shall be 20000 hours (L_h) with a working percentage of 50 %. With the average speed, the number of revolutions for the desired service life can be evaluated:

$\mathbf{L_{10} = 20\,000\text{ h} \cdot 0.5 \cdot 60\text{ min/h} \cdot 1\,250 \cdot \text{rpm} = 750 \cdot 10^6\text{ rev.}}$

By means of Equation 4.2 the required dynamic axial load capacity is:

$\mathbf{C_{areq.} = F_m^* \cdot (L_{10} / 10^6)^{1/3}\text{ [N]} = 14380\text{ N}}$

A ballscrew with a dynamic axial load capacity of 14600 N (4/25 mm) is selected, resulting in a service life of:

$\mathbf{L_{10actual} = (14600 / 1583)^3 \cdot 10^6\text{ rev.} = 784 \cdot 10^6\text{ rev.}}$

The resulting actual service life expectancy should be in the range of:

$$10^6 \leq L_{10} \leq 10^9$$

It is not recommended to rely on service life expectancies outside the above range.

Radial Loads

Ballscrews are designed to take axial loads. The load capacities given in this catalog apply only to pure axial loading.
As there are always tolerances in the alignment of bearings and linear guideways, there may be a small amount of radial force, which should be minimized. Under normal conditions, a radial load less than 5% of the minimum axial load will not cause any problems.
When considering a ballscrew for use under radial load, please consult ***Steinmeyer*** engineers.

Stiffness

Besides the pure geometric accuracy the precision in position is mainly influenced by the stiffness (rigidity) of a ballscrew drive.
Steinmeyer describes the stiffness in the manner of the DIN / ISO standard and uses the same designations: This catalog uses therefore the following designations:

$R_{b/t}$ Stiffness of ball contact zone: Includes all deformations incorporated in balls and ballrace

R_{nu} Stiffness of nut: Deformations described under $R_{b/t}$ plus the deformation of the nut

$R_{nu,ar}$ For single nuts without preload the catalog gives different values for $R_{nu,ar}$ than for the preloaded version. Generally stiffnesses for preloaded nuts are higher than for non-preloaded ones.

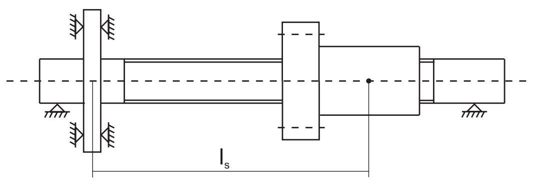
As an approximate estimation, twice the stiffness of a non-preloaded nut can be obtained by preloading the nut.
The values listed in the catalog apply only to deflections of the nut. For total stiffness of the drive the stiffnesses of the shaft under load and the stiffness of the thrust bearing must be taken into account. The total stiffness (R_t) is calculated as follows:

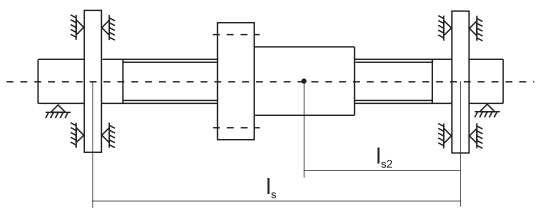
Equation 6

$$R_t = \frac{1}{\left(\frac{1}{R_{nu,ar}} + \frac{1}{R_s} + \frac{1}{R_b}\right)}$$

$R_{nu,ar}$: Reduced stiffness of nut
R_s: Stiffness of screw
R_b: Axial stiffness of thrust bearings
The stiffness of the shaft is determined by the Young's modulus of the material, the screw cross section and the length.

Fig. 13





When using the **fixed-free** mounting method, the stiffness of the shaft is:

Equation 7

$$R_{s1} = A \cdot \frac{E}{l_s} \cdot 10^{-3}$$

In case of **fixed-fixed** mounting method it is:

Equation 8

$$R_{s2} = 2 \cdot A \cdot \frac{E}{l_{s2}} \cdot 10^{-3}$$

with $l_{s2} = 0.5 \cdot l_s$
E = 210000 N/mm^2
$R_{s2min} = 2 \cdot A \cdot E / l_{s2} \cdot 10^{-3}$

Table 5

A = Screw cross-section [mm^2]

P \ d_N	16	20	25	32	40	50	60	63	80	100
2	175	282	450	–	–	–	–	–	–	–
4	151	251	411	701	–	–	–	–	–	–
5	144	241	398	685	1106	1774	–	2877	–	–
10	144	241	398	605	946	1569	–	2615	4382	7043
15	–	–	398	605	946	1569	–	2519	–	–
20	–	241	398	605	1004	1495	–	2395	4097	–
25	–	–	–	605	1008	1569	2260	–	–	–
30	–	–	–	605	–	1569	2260	2395	4097	6680
35	–	–	–	–	–	1569	–	–	–	–
40	–	–	–	–	1004	1569	2260	–	–	–

Example

Ballscrew 10 x 32 mm, double nut with 2 x 3 circuits
Preloaded to 10% of the dynamic load capacity
ISO-standard grade 3,
System: fixed-free
$R_{nu,ar}$ = 490 N/µm,
Bearing INA ZARN 2062 LTN,
Stiffness R_b = 2300 N/µm (see page 29)

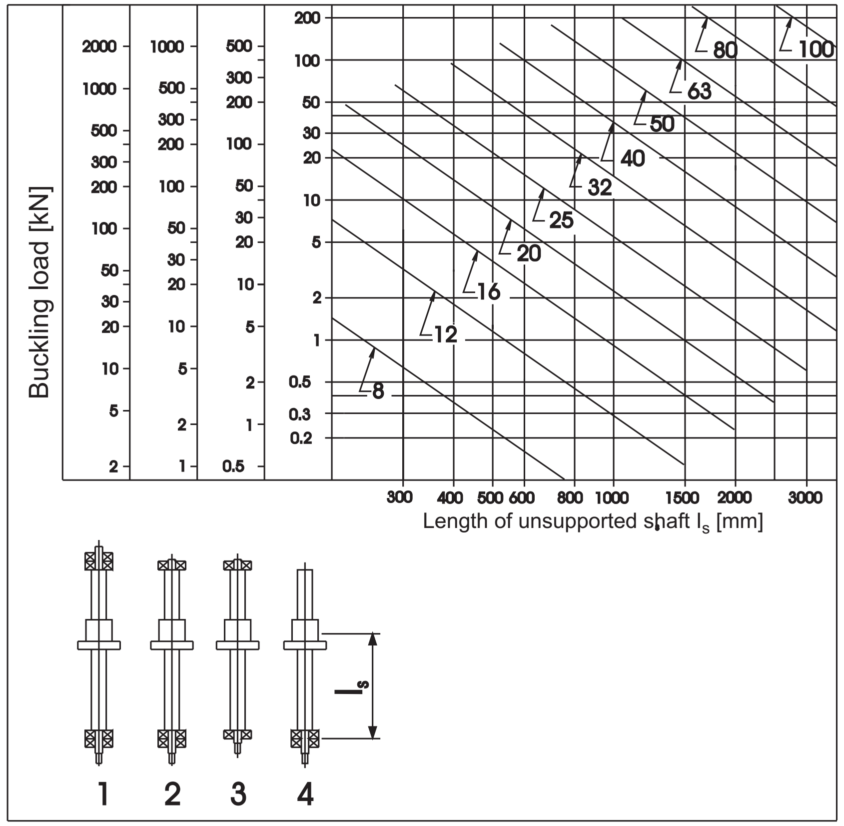
A = 605 mm^2
l_s = 1000 mm
$R_{s1} = (A \cdot E) / (l_s \cdot 10^3)$
R_{s1} = 127 N/µm
$R_t = 1 / (1/R_{nu,ar} + 1/R_s + 1/R_b)$
R_t = 1 / (1/490+1/127+1/2300)
R_t = 97 N/µm

For improved stiffness of the axis, a fixed-fixed bearing configuration can be used:

R_{s2} = 508 N/µm
R_t = 1 / (1/490+1/508+1/2300)
R_t = 225 N/µm

Critical Column Load

Table 6



For quickly determining the buckling load, same result can be obtained by calculating it by means of the following Equation:

Equation 9

$$P_B = \frac{m \cdot d_N^4}{l_s^2} \cdot 10^4 [N]$$

P_B = Buckling load [N]
d_N = Nominal diameter of ballscrew [mm]
l_s = Length of unsupported shaft [mm]
m = Coefficient of bearing configuration (see table 6)

fixed - fixed:	22.4	(1)
fixed - supported:	11.2	(2)
supported - supported:	5.6	(3)
fixed - free:	1.4	(4)

For safety reasons, a factor of 0.5 must be applied:

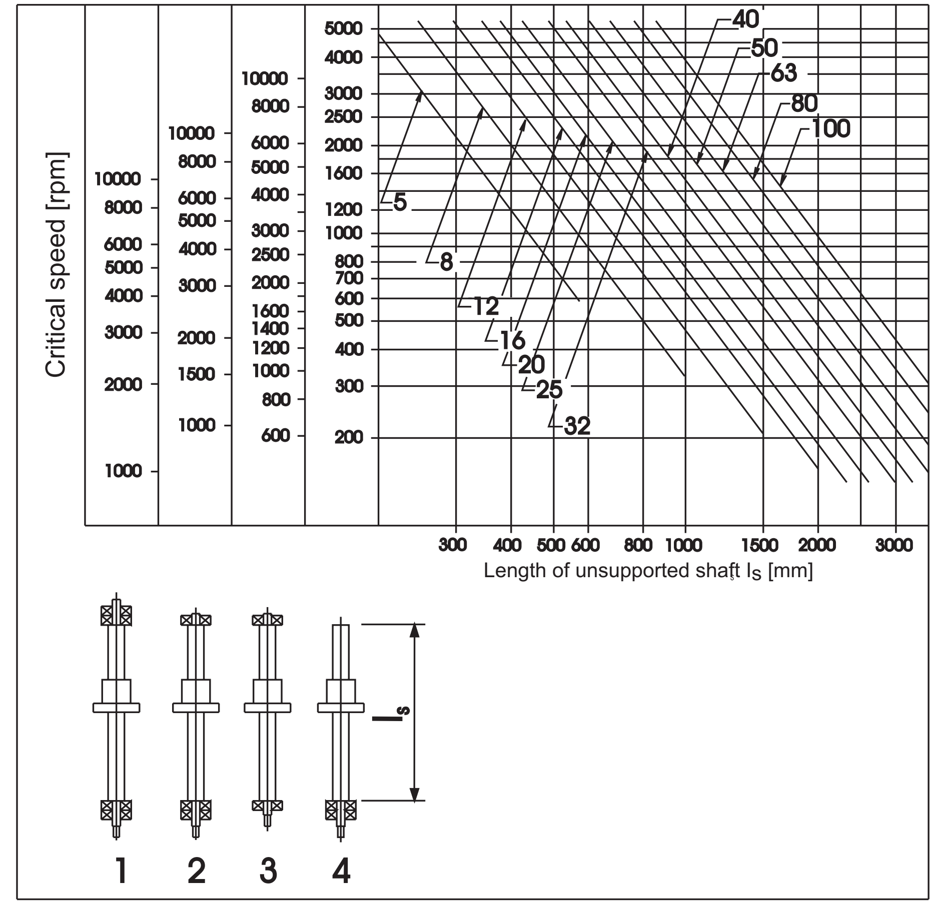
Equation 10

$$F_{max} = 0.5 \cdot P_B$$

Critical Speeds

The critical speed is the speed, where the screw starts vibrating because of resonance.
For rotating screws the maximum speed (rpm) is determined by the critical speed according to the graph below. This speed depends on the screw's nominal diameter, length and bearing method.

Table 7



For quickly determining the critical speed, the same result can be obtained by calculating it by means of the following equation:

Equation 11

$$n_k = k \cdot d_N \cdot \frac{1}{l_s^2} \cdot 10^7 [1/min]$$

n_k = Critical speed [rpm]
d_N = Nominal diameter of ballscrew [mm]
l_s = Length of unsupported shaft [mm]
k = Coefficient of bearing configuration (see table 7)

fixed - fixed:	25.5	(1)
fixed - supported:	17.7	(2)
supported - supported:	11.5	(3)
fixed - free:	3.9	(4)

Whether the critical speed has been found by means of the table or by calculation a **safety factor** must be applied:

Equation 12

$$n_{max} = 0.8 \cdot n_k$$

d_n - value

A second limitation is given by the maximum speed of the nut.

As the balls are not running with constant speed through the nut like in a ball bearing, but have to follow the ball deflector grooves and thus receive an axial acceleration, the maximum speed is not simply determined by the temperature limits of the lubricant.
So, the mass of the balls and the resulting accelerations and forces put a limitation to the speed.

Equation 13

$$d_N = n_{max} \cdot d_N$$

For maximum speeds refer to following table:

n_{max} = Maximum speed [rpm]

Series	d_N-value
1416, 1213	120.000
1516, 1313	120.000
3426, 3526	160.000

For higher speeds, please inquire
Table 9

P \ d_N	16	20	25	32	40	50	60	63	80	100
2	2800	2200	1800	–	–	–		–	–	–
4	4300	4100	3600	2800	–	–		–	–	–
5	4300	4100	3800	3300	2600	2100		1700	–	–
10	4300	4100	3800	3400	3000	2500		2000	1500	1200
15	–	–	3800	3400	3000	2500		2000	–	–
20	–	4100	4000	4000	3000	2500		2000	1500	–
25	–	–	4000	–	4000	3000	2500	–	–	–
30	–	–	–	4000	3500	3000	2500	2000	2000	1600
35	–	–	–	–	–	3000	–	–	–	–
40	–	–	–	–	3500	3000	2500	–	–	–

In order to avoid vibration problems due to exceeding the critical speed, the screw can be used stationary, while the nut is rotating.
Since ***Steinmeyer's*** ball return system is suitable for rotating nuts as well, same speeds can be obtained for rotating nuts. The maximum speeds listed in this catalog apply only to use of the ballscrew under normal conditions. Extreme accelerations, vibrations or permanent use at high speeds, which may lead to extensive heating and possible failure of the lubricant, may reduce service life. Please make use of the experience of our application engineers in such cases.

Lubrication

Ball screws can be lubricated with grease or oil. The selection of lubricants and re-lubrication intervals and lubricant quantities depends on the operating conditions. As a general rule, ball screws are best lubricated with an automated oil supply, except when speeds are very low and surface loading high, or when minimal lubricant loss or even for-life lubrication is desired.
Lubrication is a complex subject. Always follow our lubrication guidelines. Failure to do so may void the warranty. If uncertain, please contact our application engineering service.

Oil Lubrication

When lubricating with oil, the ball nut should have an oil port and wipers at both ends. The oil used must withstand very high pressure. As speeds during start-up and reversing are insufficient to build a hydrodynamic lubrication film, the oil should have additives that prevent excessive wear during conditions of boundary friction. Such oil is generally rated as CLP or HLP, or high-pressure gear oil. Guidelines for proper quantities and oil viscosity can be found at our website ***www.steinmeyer.com***.

Ball screws to be used with oil lubrication will be treated with Kluber Isoflex® Dispersion at the factory. This special grease guarantees proper lubrication and protection from corrosion during storage, inspection and installation of the ball screw. It is not necessary to remove it before installation. Once the oil supply is operational, the grease will be washed out.

Grease Lubrication

As an all-purpose grease we recommend Kluber Staburags® NBU 8 EP. Normally, the ball screw will have to be re-lubricated, either manually using a grease gun, or with an automated grease supply. If necessary, the factory grease can be substituted with a lighter grease that can be fed through piping more easily. Only grease with high-pressure rating should be used. Nuts should be fitted with wipers. Consult our website at ***www.steinmeyer.com*** for recommended lubrication intervals, quantities and a list of approved greases.

Lubrication Under Extreme Conditions

Extreme operating conditions, such as high accelerations, vibration, or prolonged operation at or near the maximum recommended speed may cause problems due to excessive heat generation. This in turn may have an adverse impact on the performance of the lubricant and possibly cause premature failure. In such cases, or when planning to use ball screws under unusual environmental conditions (below -20° C or above +100° C, under vacuum, radiation, clean room conditions, in aerospace applications, etc.), or with short, repetitive strokes, please contact our engineers.

Re-Lubrication

Lubrication intervals depend mainly on the operating conditions. Generally, lubricant loss in ball screws is higher than in ball bearings. Covers or bellows that protect the ball screw from chips, dirt, coolant or aggressive vapors, as well as the proper selection of wiper seals (see page 25) play an important role in reliability and life. Accelerations and speeds may also have an impact. The following rules therefore can only provide general guidelines.

For applications requiring for-life or long-term lubrication, Steinmeyer supplies ball screws fitted with grease packaged nuts and felt wipers. These felt wipers act as a lubricant reservoir and minimize lubricant loss.

Manual Re-Lubrication

Lubrication intervals depend on the type of wipers used. The following recommendations assume that the ball screw is sufficiently protected from contamination with telescopic way covers, bellows or similar. Any direct exposure to chips, dirt and coolant should be avoided. Excessive contact with contaminants, solid or liquid, may cause reduced wiper life or make it necessary to clean and re-lubricate ball screws more frequently.

Table 10

Wipers	Lubrication Interval
None	2 months or 300 hours
Labyrinth seals	3 months or 500 hours
Contact wiper	4 months or 650 hours
Felt or combination wipers	6 months or 1000 hours

Apply grease through the lube port into the nut. When a grease gun is used be careful not to overfill the nut. This may result in excessive heat generation. Combination or felt wipers may become damaged or dislocated if the nut is pressurized.

If no lube port is available, apply grease as an even layer along the screw thread.

If possible, any visible used grease or dirt should be wiped off prior to relubrication. Please refer to our website at ***www.steinmeyer.com*** for recommended grease quantities.

Automatic Lubrication

For automatic grease lubrication, use grease with lower viscosity or even liquid grease. Refer to your grease pump manufacturer for viscosity information. Only use grease with EP-additives to reduce wear.

The recommended lubrication interval for automatic grease lubrication is approx. 8 hours. Generally, shorter intervals and smaller quantities are better than long intervals with high quantity.

Long-Term or For-Life Lubrication

It is possible to extend re-lubrication intervals to over 1000 hours, or even to the rated life of the ball screw. This is accomplished with our combination wipers, or, in a perfectly clean environment, with our felt wipers only. The nut will be pre-greased at the factory with a long-life grease, and the felt reservoir is saturated with lubricant.

This system offers significant advantages over other, oil-impregnated plastic wipers: The felt holds lubricant up to 70% of its own volume, and it will absorb any contaminant from outside the nut as well as wear particles from inside. Thus, the lubricant is kept clean, extending the lubricant life significantly. And, because in heavy-duty applications such as high speed machine tools it is still advisable to re-lubricate whenever possible, the felt reservoir offers the advantage of being able to re-absorb lubricant. There is no need to replace wipers, since they can be re-filled by pumping some lubricant into the nut. However, should they become saturated with debris, it is advisable to replace them. This can be done without dismantling the ball screw – another advantage of our combination wipers.

Wipers and Seals

Wipers protect the ball nut from contamination. They also distribute lubricant and prevent lubricant loss in some cases. Manufactured from durable plastic material, they are compatible with all commonly used lubricants and resistant to most coolants. For certain applications in extreme environments, such as very high or very low temperatures or radiation, custom wipers made from PTFE or PEEK are available upon request.

Steinmeyer supplies four basic wiper designs:

Type	Application	Lubrication	Friction
Labyrinth seal	Standard	Oil or grease	Low
Contact wiper	Dirty environment	Oil or grease	Medium
Felt wiper	Long-term lubrication and clean environment	Oil or grease	High
Combination wiper	Maximum protection against fine or abrasive dirt, longterm lubrication	Oil or grease	High

Labyrinth seals

These are the most frequently used wipers. Since they leave a gap about 0.2 mm above the screw thread , they should not be used in dirty environments. When used with automatic oil lubrication of the ball nut, they allow flushing of the nut with fresh lubricant. Oil consumption is relatively high, but friction is very low. Operating temperature range is from –20° C to +100° C.

Felt wipers

These are made of durable, dense felt and efficiently seal the nut. Lubricant loss is very low, and since felt absorbs and stores lubricant, felt wipers are suitable for long-term lubrication. They are able to protect the ball nut from very fine particles and even absorb wear particles generated inside the nut, thus keeping the lubricant clean. Felt wipers however have a limited life in dirty environments, and they should not be exposed to coolant or other water-based fluids. Maximum temperatures should not exceed +70° C. Friction is relatively high.

Segmented contact wipers

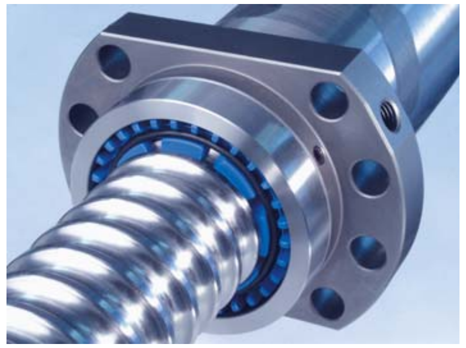
These wipers are made from durable plastic material, and several elastic segments maintain contact with and slide on the screw surface. A spring keeps this contact constant. The segments provide multiple wiper lips which makes these wipers very efficient in a dirty environment. An additional, uninterrupted wiper lip keeps the lubricant inside the ball nut. Segmented contact wipers have a somewhat elevated friction compared to labyrinth seals. Temperature range is from –20° C to +100° C.

Segmented wiper with
protruding fingers

Segmented wiper,
flush mounted

Combination wipers

These combine advantages of the segmented contact wiper, plus those of the felt wiper. They provide optimum protection against large amounts of contaminants, including fine, abrasive dirt such as grinding sludge, paper or wood fibers , and dust. Since the felt wiper is inside the ball nut and behind the plastic wiper, it is well protected against fluids from outside. Because of the perfect sealing against contamination and the lubricant retention and storage capability of the felt, they are suitable for long-term lubrication, or even for-life lubrication. Steinmeyer combination wipers can be used with any liquid lubricant, grease or oil, and allow selection of the lubricant that best suits the application – an important advantage over oil-impregnated plastic wipers. They can be re-filled with lubricant in intervals of several hundred hours, if necessary. Used in conjunction with automatic oil or grease lubrication, they allow the lubricant flow to be significantly reduced.



Operation of ball screws without wipers

If the ball nut is not fitted with any wiper, it must be protected efficiently against any outside contamination. Frequent re-lubrication or automatic oil supply is necessary. Steinmeyer recommends reviewing such applications carefully.

Materials

Steinmeyer ballscrews are made of high quality steel to ensure best performance and durability. Purity, hardness, absence of stresses and micro-cracks are most important. ***Steinmeyer*** uses steel suppliers, who have to conform to very restricted conditions.

Depending on the nominal diameter the screw is made of AISI 1050/1055 or AISI 52100. Nuts and balls are made of AISI 52100. Steel materials are vacuum-melted to reduce impurities, which inherently increases resistance to fatigue.

Ballraces are induction hardened, balls and nut are through hardened.
Upon request, bearings journals will be hardened, too.
Hardnesses are:

ballrace zone of screw:	**HRC 60 ± 2 (700 HV 10)**
nut:	**HRC 62 ± 2 (740 HV 10)**
balls:	**HRC 62 ± 2 (740 HV 10)**

Special materials/ vacuum use

For special applications, ***Steinmeyer*** ballscrews are also available in corrosion resistant steel.
For use in vacuum chambers, normal materials used may lead to outgassing. Special executions for such applications are available, please use our engineering service.

Ballscrew Journal Design

Steinmeyer recommends using INA support bearings. Upon request, our engineers will make recommendations concerning which bearing to use and how to design the journals accordingly.

In machine tool applications, basically, only bearings providing a similar axial stiffness to the ballnut should be used. The size of the bearing is to be determined – for better cost effectiveness – according to the major (nominal) diameter of the screw, as this is generally used as a shoulder to preload the bearings pack (see fig. 14.1).

If the bearing's recommended minimum shoulder diameter comes close to the major diameter of the screw, the ballthread should not penetrate the shoulder in order to allow for a full 360° surface. This will prevent problems such as cocking or skewing (see fig. 14.2).

In cases of the bearing's recommended minimum support (shoulder) diameter being larger than the screw's nominal or outside diameter, we will provide a solid shoulder using a bushing shrunk on the journal, so that it can be ground to optimum perpendicularity. Please **avoid** – if possible – **to design wrench flats on this diameter**, as the ballscrew must be machined from larger diameter raw material, which may **increase costs** (see fig. 14.3).

Fig. 14.1

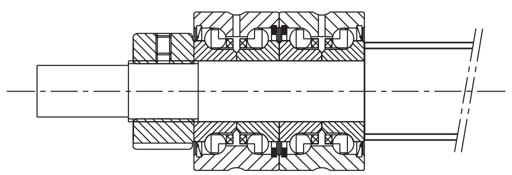


Fig. 14.2

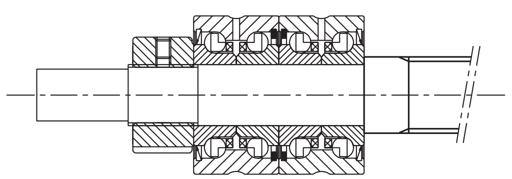
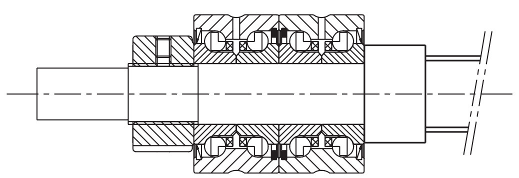


Fig. 14.3



Bearings

As the axial stiffness, as well as the critical speed, can be improved by supporting the screw at both ends by thrust bearings, this method is often used. However, keep in mind, that at least on one end the maximum journal diameter must be smaller than the root diameter of the ballthread. Otherwise, it will be impossible to mount the nut. Using shrunk bushings at both ends will make it impossible to remove the nut and may cause extra cost upon repair.

The following table gives examples of typical ballscrew / bearing assemblies. However, it is not possible to cover all combinations in this catalog. Please refer to our engineering service for further information.

Table 13

Ballscrew nominal diameter [mm]	INA-bearing w/journal configuration acc. to fig.		
	14.1	14.2	14.3
16	ZKLN1034	–	ZKLN1242
20	ZKLN1242	–	ZKLN1545
25	ZKLN1747	–	ZKLN2052
32 (P ≤ 5)	ZKLN2557	–	–
32 (P ≤ 10)	ZKLN2052	ZKLN2557	–
40 (P ≤ 5)	ZKLN3062	–	–
40 (P ≤ 10)	–	ZARN3062LTN	–
50 (P ≤ 5)	ZKLN4075	–	–
50 (P ≤ 10)	–	ZARN4075LTN	–
63 (P ≤ 5)	ZKLN5090	–	–
63 (P ≤ 10)	ZARN4090LTN	ZARN45105LTN	–
80	–	ZARN50110LTN	–
100	–	ZARN60120LTN	–

This brief overview cannot give a final selection aid to determine an optimum bearing solution. Radial loads due to drive belt tension or increased axial loads due to pre-tensioning a ballscrew need to be considered, too.
Steinmeyer has CAD software available, which is used by our engineers to select the optimum solution for your individual application.

Steinmeyer

Tensioning a Ballscrew

For eliminating loss of accuracy due to thermal expansion, the ballscrew can be held under tension. In this case the lead error can be specified to be negative[1]. Bearings must be selected accordingly. ***Steinmeyer*** will provide you with calculations regarding proper selection of bearings and resulting axial stiffness upon request.

The elongation due to pretensioning must be greater than or equal to the thermal expansion that would occur under the maximum temperature increase expected.

Equation 15

$$\Delta l_p \geq \Delta l_T$$

The pretensioning force must be considered carefully, as it will affect load capacity evaluations for the support bearings.

Equation 16

$$F_T = E \cdot A \cdot \varepsilon$$

$$\varepsilon = \frac{\Delta l_p}{l_s}$$

F_T = Screw pretension force [N]
E = Young´s modulus [N/mm^2]
ε = Extension
Δl_p = Elongation [mm]
l_s = Length of unsupported shaft [mm]
A = Screw cross section[2] [mm^2]

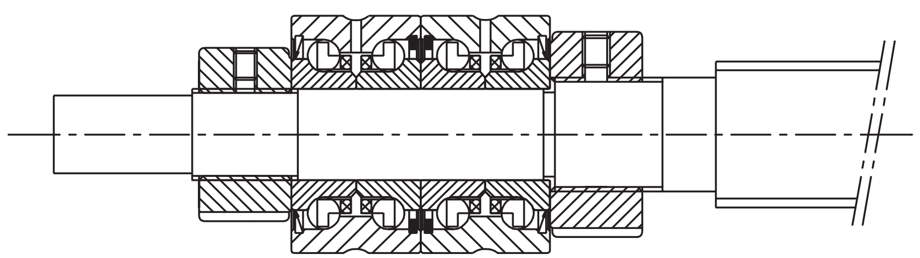
The thermal expansion (Δl_T) can be defined as follows:

Equation 17

$$\Delta l_T = l_s \cdot \Delta t \cdot \alpha$$

α = Coefficient of thermal expansion [11.5 • 10^{-6} / °C]
Δt = Temperature gradient [°C]

Fig. 15



[1] see also specified lead deviation (page 10)
[2] see also cross section (table 5, page 19)

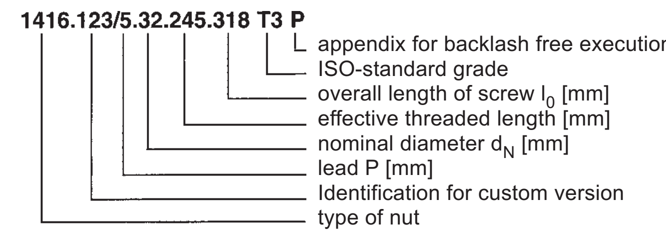
Numbering systems

The ***Steinmeyer*** numbering system is divided in two parts:

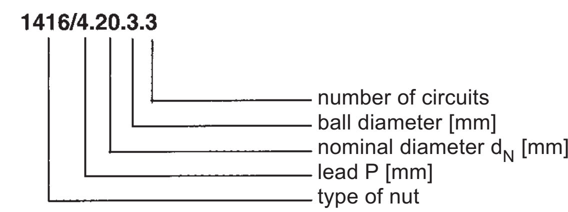
1. The order number describing the entire assembly
2. The item (or catalog) number describing the nut only

For enquiries please use the **type number** listed in part II. Please make sure to provide us also with drawings of the screws journals and with additional information regarding accuracy grade, preload etc. Once a customized design has been created, it will be assigned an individual **item number**.

Item Number



Type Number



Pls note:
Dimensions in item numbers, such as nominal dia., lead or length, will be separated by periods.
Decimals will be shown using a comma instead of decimal point.
Example: 1414/5,08.16.013
Meaning: d_N:16 mm
P: 5.08 mm

Extra ballcircles for increased load carrying capacity

If you cannot find a nut to meet your load capacity requirement, please enquire also. Standard nuts as per this catalog, as well as customized nuts, are available with additional load carrying ballcircles to provide higher load carrying capabilities.

Nominal Diameter 16 - 20 mm

Single Nut with Ball Oversize Preload
Precision Ground Execution Grade T0 - T5

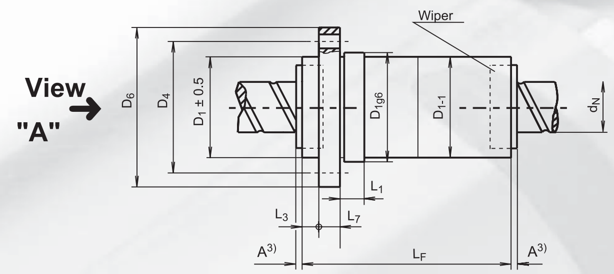
Steinmeyer

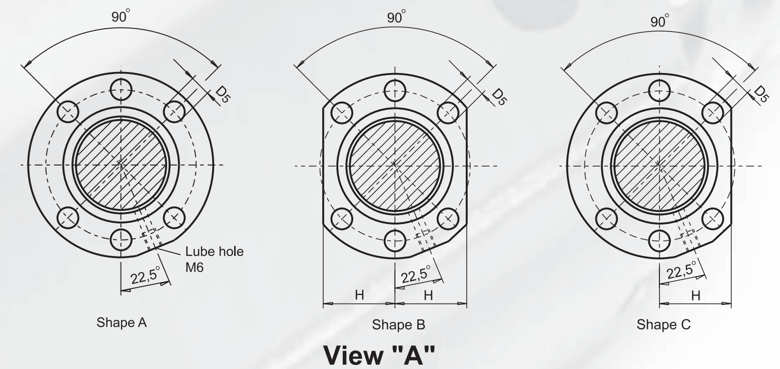
Series 3426:
UltraSpeed nut with flange,
dual start, ball oversize preload

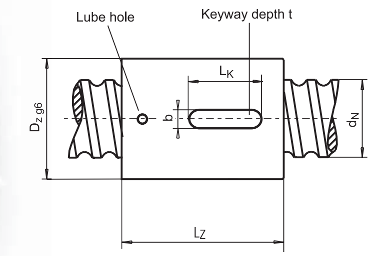
Series 2426:
End cap nut with flange,
dual start, ball oversize preload

Series 1416:
DIN Standard Flanged Nut

Series 1213:
Cylindrical Nut with Fitting Keyway







3) *If lead > 20 mm then A = 5 mm*

Technical Data									Dimensions															
	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]	Flanged nut with wipers both ends ■	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Cylindrical nut without wipers with fitting keyway	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1416 → 1213 →	2.16.1,5.3	2	16	3	1.5	2.9	4.8	200	1416	39	28	10	38	5.5	48	10	6	20	1213	21	28	5	1.9	12
	2.16.1,5.4	2	16	4	1.5	3.8	6.4	260		43	28	10	38	5.5	48	10	6	20		25	28	5	1.9	16
	4.16.3.3	4	16	3	3	8.9	11.3	210		49	28	10	38	5.5	48	10	6	20		23	28	5	1.9	12
	4.16.3.4	4	16	4	3	11.3	15.1	280		53	28	10	38	5.5	48	10	6	20		27	28	5	1.9	12
	5.16.3,5.3	5	16	3	3.5	10.1	11.9	180		54	28	10	38	5.5	48	10	6	20		29	28	5	1.9	16
	5.16.3,5.4	5	16	4	3.5	12.9	15.9	250		59	28	10	38	5.5	48	10	6	20		34	28	5	1.9	12
2426	10.16.3,5.6	10	16	6	3.5	19.6	27.4	270	2426	44	32	12	42	5.5	52	10	11	20						
	10.16.3,5.10	10	16	10	3.5	31.4	47.3	450		64	32	16	42	5.5	52	10	11	20						
1416 → 1213 →	2.20.1,5.3	2	20	3	1.5	3.2	6.1	240	1416	48	36	10	47	6.6	58	10	6	22	1213	23	33	6	2.5	14
	2.20.1,5.4	2	20	4	1.5	4.1	8.1	310		52	36	10	47	6.6	58	10	6	22		27	33	6	2.5	16
	2.20.1,5.5	2	20	5	1.5	5	10.1	390		56	36	10	47	6.6	58	10	6	22		31	33	6	2.5	16
	4.20.3.3	4	20	3	3	10.1	14.8	270		49	36	10	47	6.6	58	10	6	22		23	33	6	2.5	14
	4.20.3.4	4	20	4	3	13	19.7	360		53	36	10	47	6.6	58	10	6	22		27	33	6	2.5	10
	5.20.3,5.3	5	20	3	3.5	12.1	16.6	260		55	36	10	47	6.6	58	10	6	22		29	33	6	2.5	16
	5.20.3,5.4	5	20	4	3.5	15.5	22.1	340		60	36	10	47	6.6	58	10	6	22		34	33	6	2.5	14
	10.20.3,5.2	10	20	2	3.5	8.5	10.9	130		62	36	16	47	6.6	58	10	7	22		36	33	6	2.5	20
	10.20.3,5.3	10	20	3	3.5	12	16.4	200		76	36	16	47	6.6	58	10	7	22		48	33	6	2.5	25
3426	20.20.3,5.4	20	20	4	3.5	14.7	25.3	140	3526	75 ◆	36	16	47	6.6	58	10	7	22						
	20.20.3,5.6	20	20	6	3.5	21.7	38	220		95 ◆	36	16	47	6.6	58	10	7	22						

● Actual stiffness at preload equal to 0.08 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

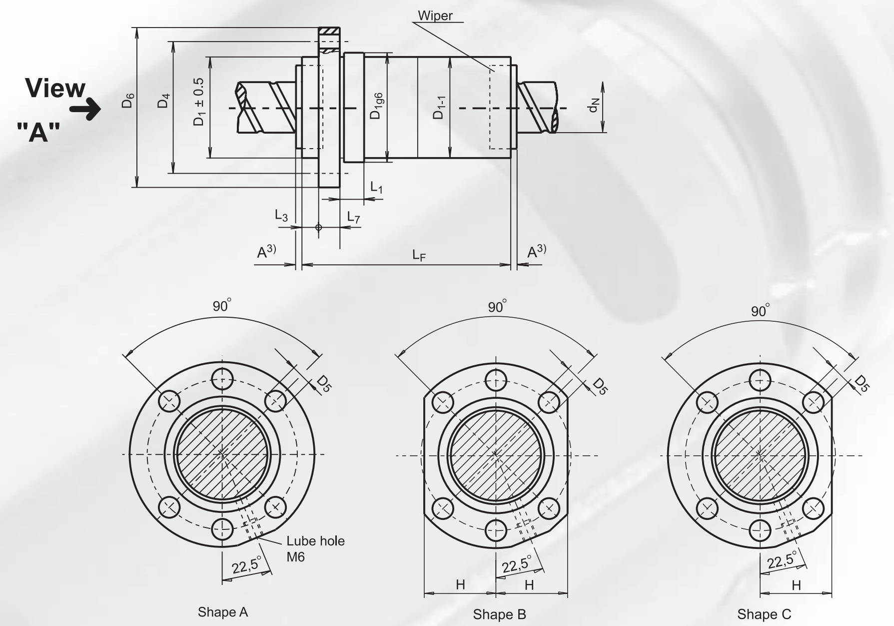
Nominal Diameter 25 mm

Single Nut with Ball Oversize Preload
Precision Ground Execution Grade T0 - T5

Series 3426:
UltraSpeed nut with flange,
dual start, ball oversize preload

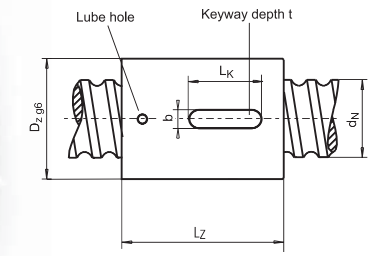
Series 1416:
DIN Standard Flanged Nut

Series 1213:
Cylindrical Nut with Fitting Keyway



View "A"

[3] *If lead > 20 mm then A = 5 mm*



	Technical Data								Dimensions	Flanged nut with wipers both ends ■										Cylindrical nut without wipers with fitting keyway				
	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]		L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]		L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1416 → 1213	2.25.1,5.3	2	25	3	1.5	3.5	7.7	280	1416	43	40	10	51	6.6	62	10	6	24	1213	23	38	6	2.5	14
	2.25.1,5.4	2	25	4	1.5	4.5	10.3	370		51	40	10	51	6.6	62	10	6	24		27	38	6	2.5	16
	2.25.1,5.5	2	25	5	1.5	5.5	12.8	460		56	40	10	51	6.6	62	10	6	24		31	38	6	2.5	16
	4.25.3.3	4	25	3	3.0	11.4	19.1	340		49	40	10	51	6.6	62	10	6	24		23	38	6	2.5	14
	4.25.3.4	4	25	4	3.0	14.6	25.5	450		53	40	10	51	6.6	62	10	6	24		27	38	6	2.5	10
	5.25.3,5.3	5	25	3	3.5	13.7	21.3	330		55	40	10	51	6.6	62	10	6	24		29	38	6	2.5	16
	5.25.3,5.4	5	25	4	3.5	17.5	28.4	430		60	40	10	51	6.6	62	10	6	24		34	38	6	2.5	14
	5.25.3,5.5	5	25	5	3.5	21.2	35.5	530		66	40	10	51	6.6	62	10	6	24		40	38	6	2.5	14
	10.25.3,5.2	10	25	2	3.5	9.6	14.1	180		64	40	16	51	6.6	62	10	7	24		37	38	6	2.5	20
	10.25.3,5.3	10	25	3	3.5	13.6	21.2	270		78	40	16	51	6.6	62	10	7	24		49	38	6	2.5	25
	15.25.3,5.2	15	25	2	3.5	9.4	14.0	140		71	40	16	51	6.6	62	10	7	24		43	38	6	2.5	25
	15.25.3,5.3	15	25	3	3.5	13.4	21.0	200		92	40	16	51	6.6	62	10	7	24		68	38	6	2.5	32
3426	20.25.3,5.4	20	25	4	3.5	17.1	33.4	230	3426	75 ◆	40	16	51	6.6	62	10	7	24						
	20.25.3,5.6	20	25	6	3.5	25.2	50.1	340		95 ◆	40	16	51	6.6	62	10	7	24						
	25.25.3,5.4	25	25	4	3.5	16.7	32.8	180		81 ◆	40	16	51	6.6	62	10	7	24						

● Actual stiffness at preload equal to 0.08 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

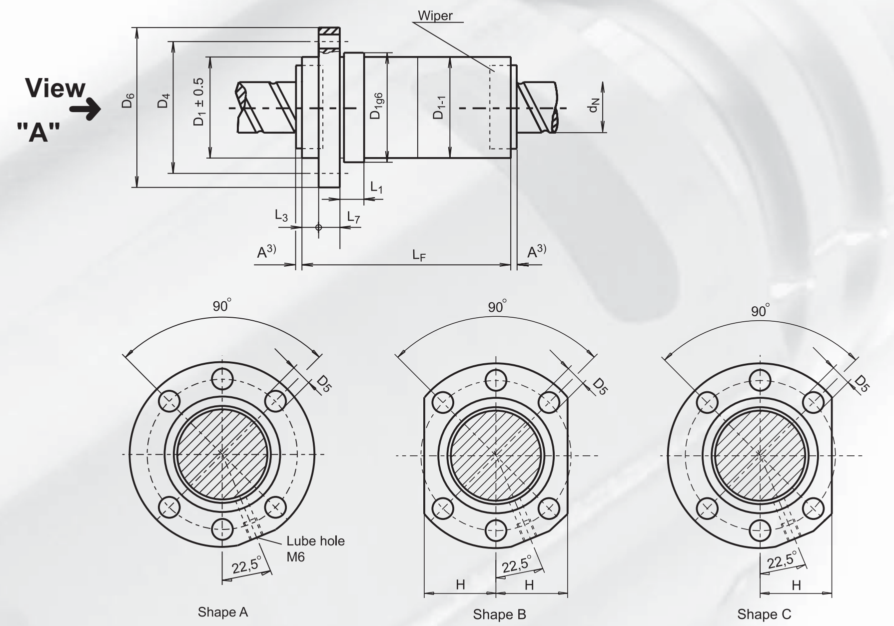
Nominal Diameter 32 mm

Single Nut with Ball Oversize Preload
Precision Ground Execution Grade T0 - T5

Series 3426:
UltraSpeed nut with flange,
dual start, ball oversize preload

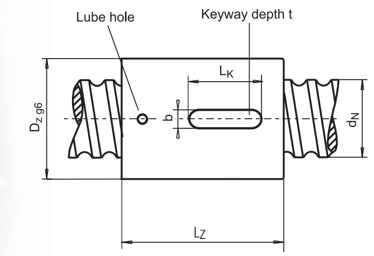
Series 1416:
DIN Standard Flanged Nut

Series 1213:
Cylindrical Nut with Fitting Keyway



View "A"

3) *If lead > 20 mm then A = 5 mm*



Technical Data	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]	Dimensions: Flanged nut with wipers both ends ■	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Cylindrical nut without wipers with fitting keyway	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1416 →	4.32.3.3	4	32	3	3	13.1	26.0	440	1416	51	50	10	65	9	80	12	6	31.0	1213	23	48	6	2.5	14
1213 →	4.32.3.4	4	32	4	3	16.8	34.7	580		55	50	10	65	9	80	12	6	31.0		27	48	6	2.5	16
	5.32.3,5.3	5	32	3	3.5	16.0	29.5	440		57	50	10	65	9	80	12	6	31.0		29	48	6	2.5	16
	5.32.3,5.4	5	32	4	3.5	20.4	39.4	570		62	50	10	65	9	80	12	6	31.0		34	48	6	2.5	20
	5.32.3,5.5	5	32	5	3.5	24.8	49.2	710		67	50	10	65	9	80	12	6	31.0		40	48	6	2.5	25
	5.32.3,5.6	5	32	6	3.5	29.0	59.0	850		73	50	10	65	9	80	12	6	31.0		48	48	6	2.5	32
	10.32.6.3	10	32	3	6	30.8	45.1	380		84	50	16	65	9	80	12	7	31.0		56	50	8	3.1	36
	10.32.6.4	10	32	4	6	39.4	60.2	500		95	50	16	65	9	80	12	7	31.0		66	50	8	3.1	32
	10.32.6.5	10	32	5	6	47.8	75.2	620		107	50	16	65	9	80	12	7	31.0		77	50	8	3.1	32
	15.32.6.3	15	32	3	6	30.5	44.8	310		101	50	16	65	9	80	12	7	31.0		72	50	8	3.1	45
	20.32.6.3	20	32	3	6	30.2	44.5	250		122	50	16	65	9	80	12	7	31.0		95	50	8	3.1	45
3426	20.32.6.6	20	32	6	6	57.9	108.0	530	3526	103 ◆	56	16	71	9	86	12	7	32.5						
	20.32.6.8	20	32	8	6	75.6	144.0	710		123 ◆	56	16	71	9	86	12	7	32.5						
	30.32.6.4	30	32	4	6	38.1	70.3	250		95 ◆	56	16	71	9	86	12	7	32.5						

● Actual stiffness at preload equal to 0.08 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

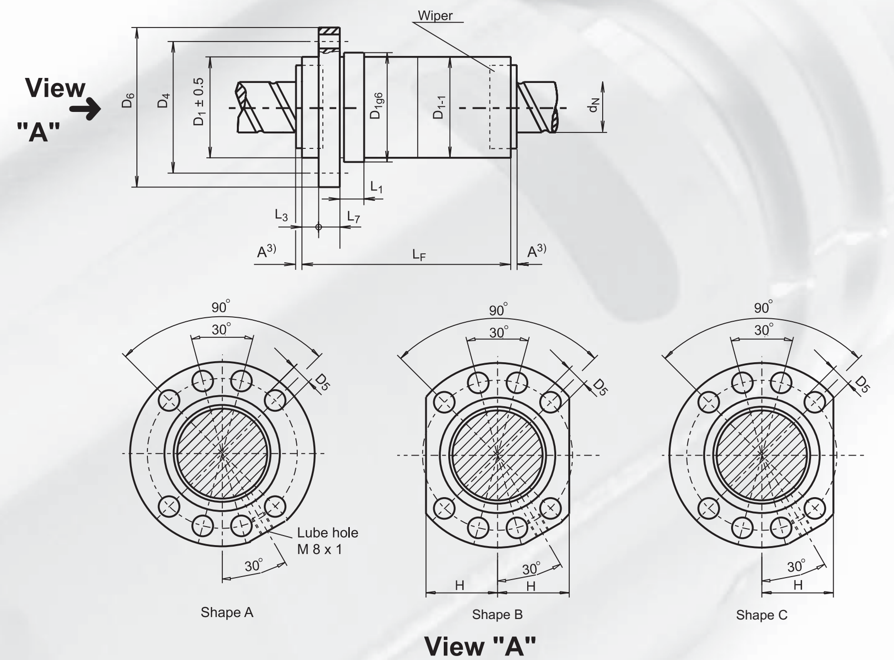
◆ Flange shape B only.
Flange shape A or C not available.

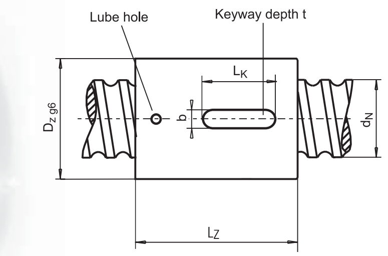
Steinmeyer

Series 3426:
UltraSpeed nut with flange,
dual start, ball oversize preload

Series 1416:
DIN Standard Flanged Nut

Series 1213:
Cylindrical Nut with Fitting Keyway





3) *If lead > 20 mm then A = 5 mm*

Technical Data									Dimensions															
	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]	Flanged nut with wipers both ends ■	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Cylindrical nut without wipers with fitting keyway	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1416 →	5.40.3,5.3	5	40	3	3.5	17.7	37.8	540	1416	59	63	10	78	9	93	14	6	35	1213	29	56	8	3.1	16
1213 →	5.40.3,5.4	5	40	4	3.5	22.7	50.4	710		64	63	10	78	9	93	14	6	35		34	56	8	3.1	20
	5.40.3,5.5	5	40	5	3.5	27.5	63.0	870		69	63	10	78	9	93	14	6	35		40	56	8	3.1	25
	5.40.3,5.6	5	40	6	3.5	32.1	75.6	1040		75	63	10	78	9	93	14	6	35		48	56	8	3.1	32
	10.40.7,5.3	10	40	3	7.5	46.1	70.6	490		86	63	16	78	9	93	14	7	35		56	63	8	3.1	36
	10.40.7,5.4	10	40	4	7.5	59.0	94.2	650		97	63	16	78	9	93	14	7	35		66	63	8	3.1	45
	10.40.7,5.5	10	40	5	7.5	71.5	117.7	800		110	63	16	78	9	93	14	7	35		77	63	8	3.1	50
	15.40.7,5.3	15	40	3	7.5	45.9	70.4	440		104	63	16	78	9	93	14	7	35		72	63	8	3.1	50
	15.40.7,5.4	15	40	4	7.5	58.7	93.8	570		121	63	16	78	9	93	14	7	35		88	63	8	3.1	50
	20.40.7,5.2	20	40	2	7.5	32.1	46.6	250		92	63	16	78	9	93	14	7	35		59	63	8	3.1	36
	20.40.7,5.3	20	40	3	7.5	45.5	70.0	370		121	63	16	78	9	93	14	7	35		93	63	8	3.1	63
3426	20.40.6.6	20	40	6	6.0	64.9	136.4	720	3426	105 ◆	63	16	78	9	93	14	7	35						
	20.40.6.8	20	40	8	6.0	84.7	181.8	960		125 ◆	63	16	78	9	93	14	7	35						
	25.40.6.6	25	40	6	6.0	64.3	135.4	630		115 ◆	63	16	78	9	93	14	7	35						
	25.40.6.8	25	40	8	6.0	84.0	180.6	840		135 ◆	63	16	78	9	93	14	7	35						
	30.40.6.6	30	40	6	6.0	63.6	134.3	550		123 ◆	63	16	78	9	93	14	7	35						
	30.40.6.8	30	40	8	6.0	83.1	179.1	730		153 ◆	63	16	78	9	93	14	7	35						
	40.40.6.6	40	40	6	6.0	61.9	131.6	410		155 ◆	63	16	78	9	93	14	7	35						

● Actual stiffness at preload equal to 0.08 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

Nominal Diameter 50 mm

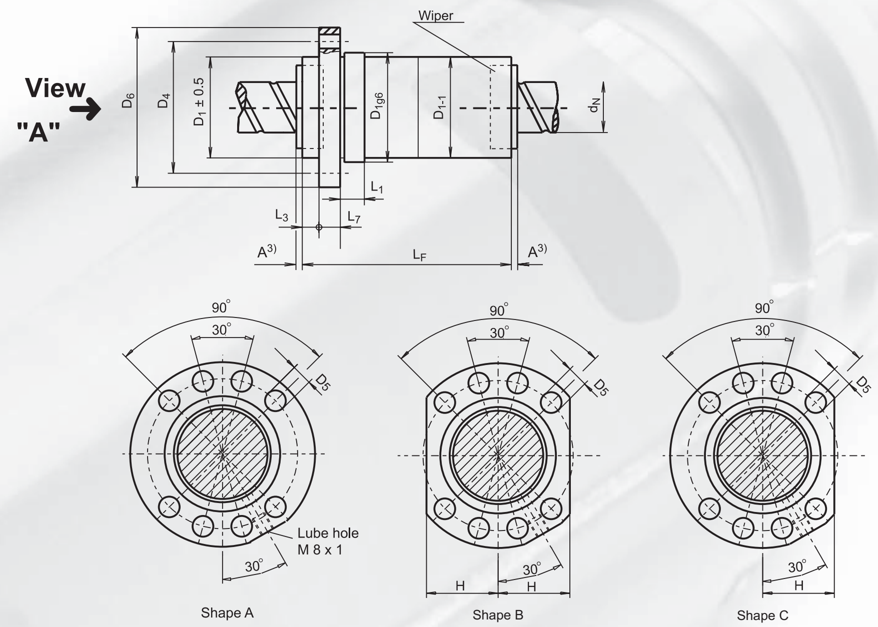
Single Nut with Ball Oversize Preload
Precision Ground Execution Grade T0 - T5

Steinmeyer

Series 3426:
UltraSpeed nut with flange,
dual start, ball oversize preload

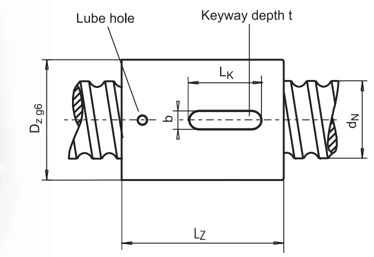
Series 1416:
DIN Standard Flanged Nut

Series 1213:
Cylindrical Nut with Fitting Keyway



3) *If lead > 20 mm then A = 5 mm*

View "A"



	Technical Data								Dimensions															
	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]	Flanged nut with wipers both ends ■	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Cylindrical nut without wipers with fitting keyway	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1416 → 1213 →	5.50.3,5.3	5	50	3	3.5	19.6	48.4	650	1416	61	75	10	93	11	110	16	6	42.5	1213	29	68	8	3.1	16
	5.50.3,5.4	5	50	4	3.5	25.1	64.6	850		66	75	10	93	11	110	16	6	42.5		34	68	8	3.1	20
	5.50.3,5.5	5	50	5	3.5	30.4	80.7	1060		71	75	10	93	11	110	16	6	42.5		39	68	8	3.1	25
	5.50.3,5.6	5	50	6	3.5	35.6	96.9	1260		76	75	10	93	11	110	16	6	42.5		45	68	8	3.1	32
	10.50.7,5.3	10	50	3	7.5	52.7	92.3	630		88	75	16	93	11	110	16	7	42.5		56	72	8	3.1	36
	10.50.7,5.4	10	50	4	7.5	67.4	123.0	830		99	75	16	93	11	110	16	7	42.5		66	72	8	3.1	25
	10.50.7,5.5	10	50	5	7.5	81.7	153.8	1030		111	75	16	93	11	110	16	7	42.5		77	72	8	3.1	45
	15.50.7,5.3	15	50	3	7.5	52.5	92.1	580		107	75	16	93	11	110	16	7	42.5		73	72	8	3.1	50
	15.50.7,5.4	15	50	4	7.5	67.2	122.7	760		124	75	16	93	11	110	16	7	42.5		89	72	8	3.1	63
	15.50.7,5.5	15	50	5	7.5	81.4	153.4	950		142	75	16	93	11	110	16	7	42.5		105	72	8	3.1	63
	20.50.9.3	20	50	3	9.0	76.8	128.7	590		129	75	16	93	11	110	16	7	42.5		98	75	8	3.1	63
	20.50.9.4	20	50	4	9.0	98.4	171.5	770		150	75	16	93	11	110	16	7	42.5		119	75	8	3.1	63
3426	25.50.7,5.8	25	50	8	7.5	126.6	284.1	1190	3426	140 ◆	82	16	108	11	125	18	7	47.5						
	30.50.6.8	30	50	8	6.0	92.6	226.6	1030		160 ◆	75	16	93	11	110	16	7	42.5						
	30.50.7,5.8	30	50	8	7.5	125.7	282.6	1070		165 ◆	82	16	108	11	125	18	7	47.5						
	35.50.7,5.8	35	50	8	7.5	124.7	280.8	950		180 ◆	82	16	108	11	125	18	7	47.5						
	40.50.7,5.6	40	50	6	7.5	94.6	209.1	640		160 ◆	82	16	108	11	125	18	7	47.5						

● Actual stiffness at preload equal to 0.08 * C_a.

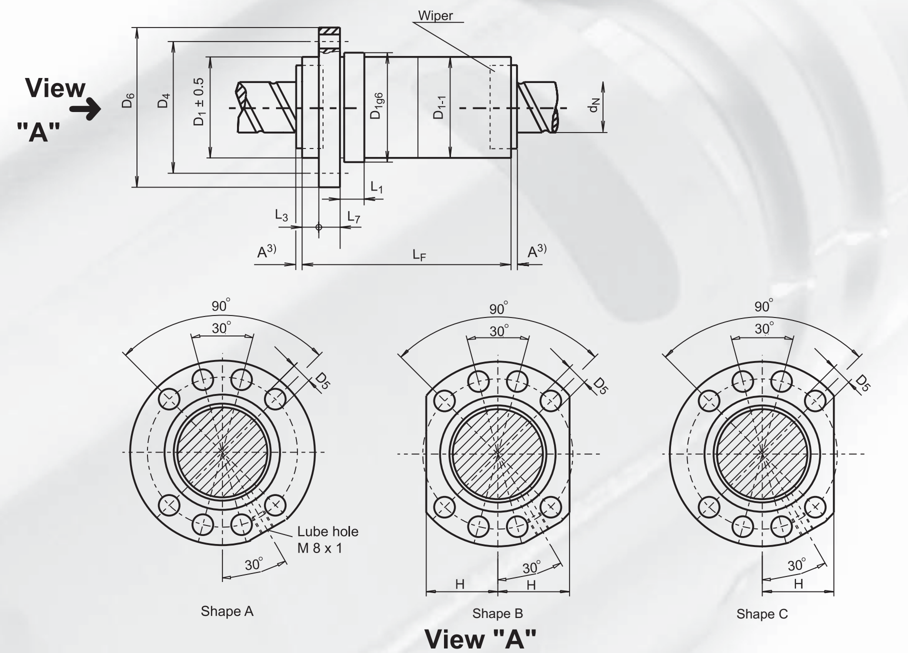
■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

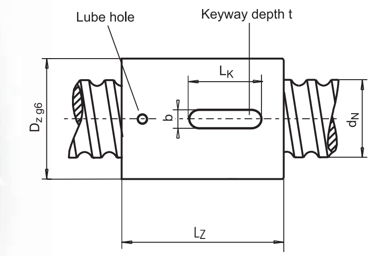
Series 3426:
UltraSpeed nut with flange,
dual start, ball oversize preload

Series 1416:
DIN Standard Flanged Nut

Series 1213:
Cylindrical Nut with Fitting Keyway



3) *If lead > 20 mm then A = 5 mm*



Technical Data

	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]
3426	25.60.9.6	25	60	6	9.0	164.3	390.4	1350
	30.60.9.6	30	60	6	9.0	163.5	388.9	1250
	30.60.9.8	30	60	8	9.0	213.5	518.5	1650
	40.60.9.4	40	60	4	9.0	109.5	256.8	700
	40.60.9.6	40	60	6	9.0	161.5	385.2	1040
1416 →	5.63.3,5.4	5	63	4	3.5	27.8	83.5	1020
1213 →	5.63.3,5.5	5	63	5	3.5	33.7	104.4	1260
	5.63.3,5.6	5	63	6	3.5	39.5	125.2	1500
	10.63.7,5.3	10	63	3	7.5	59.2	119.4	790
	10.63.7,5.4	10	63	4	7.5	75.8	159.3	1040
	10.63.7,5.5	10	63	5	7.5	91.8	199.1	1280
	10.63.7,5.6	10	63	6	7.5	107.4	238.9	1530
	15.63.9.4	15	63	4	9.0	116.7	237.5	1160
	20.63.11.3	20	63	3	11.0	115.3	207.0	820
	20.63.11.4	20	63	4	11.0	147.7	276.0	1080
	20.63.11.5	20	63	5	11.0	179.0	345.0	1340
	30.63.11.3	30	63	3	11.0	114.4	205.7	680
	5.80.3,5.6	5	80	6	3.5	43.4	160.7	1700
	10.80.7,5.3	10	80	3	7.5	68.2	162.6	980
	10.80.7,5.4	10	80	4	7.5	87.3	216.8	1280
	10.80.7,5.5	10	80	5	7.5	105.8	271.1	1600
	10.80.7,5.6	10	80	6	7.5	123.8	325.3	1900
	15.80.11.5	15	80	5	11.0	208.6	468.3	1920
	20.80.11.4	20	80	4	11.0	171.9	374.1	1480
	20.80.11.6	20	80	6	11.0	243.6	561.2	2180
	10.100.7,5.5	10	100	5	7.5	116.3	343.5	1840
3426	30.80.11.10	30	80	10	11.0	394.9	1071.4	3000
	30.100.11.12	30	100	12	11.0	506.7	1586.0	4460

Dimensions

	Nut type	Flanged nut with wipers both ends ■ L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]		Cylindrical nut without wipers with fitting keyway L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
3426	25.60.9.6	119 ◆	95	25	115	13.5	135	20	7	50.0						
	30.60.9.6	130 ◆	95	25	115	13.5	135	20	7	50.0						
	30.60.9.8	160 ◆	95	25	115	13.5	135	20	7	50.0						
	40.60.9.4	118 ◆	95	25	115	13.5	135	20	7	50.0						
	40.60.9.6	158 ◆	95	25	115	13.5	135	20	7	50.0						
1416	5.63.3,5.4	68	90	10	108	11.0	125	18	6	47.5	1213	34	82	8	3.1	20
	5.63.3,5.5	73	90	10	108	11.0	125	18	6	47.5		34	82	8	3.1	20
	5.63.3,5.6	78	90	10	108	11.0	125	18	6	47.5		45	82	8	3.1	32
	10.63.7,5.3	91	90	16	108	11.0	125	18	7	47.5		56	85	8	3.1	36
	10.63.7,5.4	102	90	16	108	11.0	125	18	7	47.5		67	85	8	3.1	45
	10.63.7,5.5	112	90	16	108	11.0	125	18	7	47.5		78	85	8	3.1	50
	10.63.7,5.6	124	90	16	108	11.0	125	18	7	47.5		89	85	8	3.1	50
	15.63.9.4	133	90	16	108	11.0	125	18	7	47.5		100	88	8	3.1	50
	20.63.11.3	136	95	25	115	13.5	135	20	7	50.0		98	92	8	3.1	50
	20.63.11.4	157	95	25	115	13.5	135	20	7	50.0		118	92	8	3.1	50
	20.63.11.5	182	95	25	115	13.5	135	20	7	50.0		151	92	8	3.1	63
	30.63.11.3	173	95	25	115	13.5	135	20	7	50.0		139	92	8	3.1	50
	5.80.3,5.6	79	105	16	125	13.5	145	20	7	55.0		44	102	8	3.1	36
	10.80.7,5.3	93	105	16	125	13.5	145	20	7	55.0		56	102	8	3.1	36
	10.80.7,5.4	104	105	16	125	13.5	145	20	7	55.0		67	102	8	3.1	36
	10.80.7,5.5	114	105	16	125	13.5	145	20	7	55.0		77	102	8	3.1	45
	10.80.7,5.6	125	105	16	125	13.5	145	20	7	55.0		89	102	8	3.1	45
	15.80.11.5	153	125	25	145	13.5	165	25	7	65.0		114	102	8	3.1	45
	20.80.11.4	164	125	25	145	13.5	165	25	7	65.0		119	110	8	3.1	50
	20.80.11.6	206	125	25	145	13.5	165	25	7	65.0		170	110	8	3.1	50
	10.100.7,5.5	115	125	16	145	13.5	165	25	7	65.0		76	122	8	3.1	50
3426	30.80.11.10	196 ◆	125	25	145	13.5	165	25	7	65.0						
	30.100.11.12	230 ◆	150	25	176	17.5	202	30	7	77.5						

● Actual stiffness at preload equal to 0.08 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

Nominal Diameter 16-20 mm

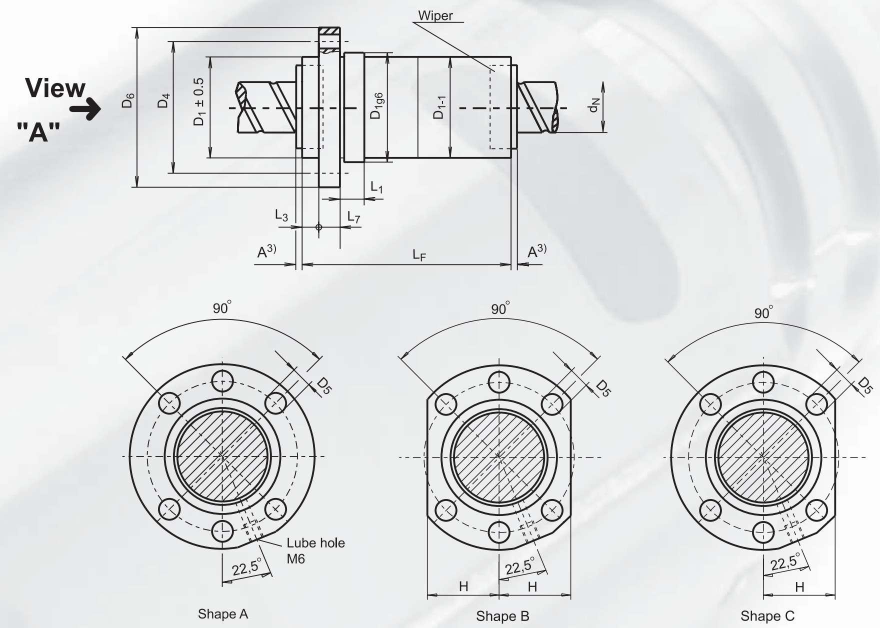
Double Nut
Precision Ground Execution Grade T0 - T5

Series 3526:
UltraSpeed nut with flange,
dual start, pitch offset preload

Series 2526:
End cap nut with flange,
dual start, pitch offset preload

Series 1516:
DIN Standard Flanged Nut
with UNILOCK preload

Series 1313:
Cylindrical Nut with Fitting Keyway
with UNILOCK preload



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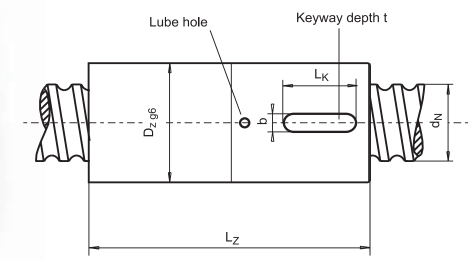


3) *If lead > 20 mm then A = 5 mm*

Technical Data / Dimensions

	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i [2x]	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]	Flanged nut with wipers both ends ■	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Cylindrical nut without wipers with fitting keyway	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1516	2.16.1,5.3	2	16	3	1.5	2.9	4.8	240	1516	62	28	10	38	5,5	48	10	6	20	1313	42	28	5	1,9	12
1313	2.16.1,5.4	2	16	4	1.5	3.8	6.4	330		70	28	10	38	5,5	48	10	6	20		50	28	5	1,9	16
	4.16.3.3	4	16	3	3.0	8.9	11.3	270		73	28	10	38	5,5	48	10	6	20		46	28	5	1,9	12
	4.16.3.4	4	16	4	3.0	11.3	15.1	360		81	28	10	38	5,5	48	10	6	20		54	28	5	1,9	12
	5.16.3,5.3	5	16	3	3.5	10.1	11.9	240		84	28	10	38	5,5	48	10	6	20		58	28	5	1,9	16
2526	5.16.3,5.4	5	16	4	3.5	12.9	15.9	320		95	28	10	38	5,5	48	10	6	20		68	28	5	1,9	12
	10.16.3,5.3	10	16	3	3.5	9.9	12.4	240	2426	44	32	12	42	5,5	52	10	6	20						
	10.16.3,5.5	10	16	5	3.5	16.5	22.4	390		64	32	16	42	5,5	52	10	6	20						
1516	2.20.1,5.3	2	20	3	1.5	3.2	6.1	300	1516	72	36	10	47	6,6	58	10	6	22	1313	46	33	6	2,5	14
1313	2.20.1,5.4	2	20	4	1.5	4.1	8.1	390		80	36	10	47	6,6	58	10	6	22		54	33	6	2,5	16
	2.20.1,5.5	2	20	5	1.5	5.0	10.1	480		89	36	10	47	6,6	58	10	6	22		62	33	6	2,5	16
	4.20.3.3	4	20	3	3.0	10.1	14.8	350		73	36	10	47	6,6	58	10	6	22		46	33	6	2,5	14
	4.20.3.4	4	20	4	3.0	13.0	19.7	460		82	36	10	47	6,6	58	10	6	22		54	33	6	2,5	10
	5.20.3,5.3	5	20	3	3.5	12.1	16.6	330		85	36	10	47	6,6	58	10	6	22		58	33	6	2,5	16
	5.20.3,5.4	5	20	4	3.5	15.5	22.1	440		95	36	10	47	6,6	58	10	6	22		68	33	6	2,5	14
	10.20.3,5.2	10	20	2	3.5	8.5	10.9	180		102	36	16	47	6,6	58	10	7	22		72	33	6	2,5	20
	10.20.3,5.3	10	20	3	3.5	12.0	16.4	270		126	36	16	47	6,6	58	10	7	22		96	33	6	2,5	25
3526	20.20.3,5.2	20	20	2	3.5	7.1	12.7	130	3526	75 ◆	36	16	47	6,6	58	10	7	22						
	20.20.3,5.3	20	20	3	3.5	11.0	19.0	200		95 ◆	36	16	47	6,6	58	10	7	22						

● Actual stiffness at preload equal to 0.01 * C_a.

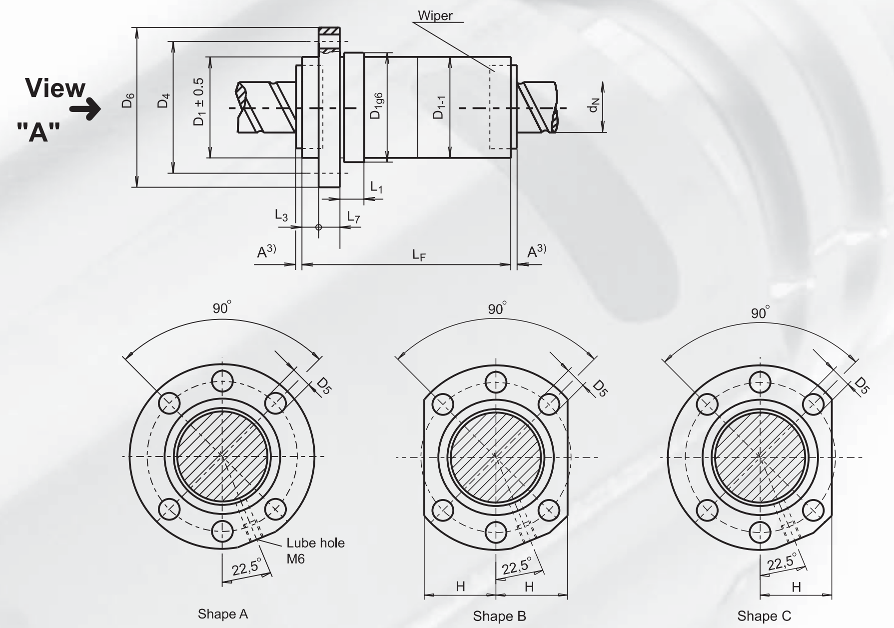
■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

Series 3526:
UltraSpeed nut with flange,
dual start, pitch offset preload

Series 1516:
DIN Standard Flanged Nut
with UNILOCK preload

Series 1313:
Cylindrical Nut with Fitting Keyway
with UNILOCK preload



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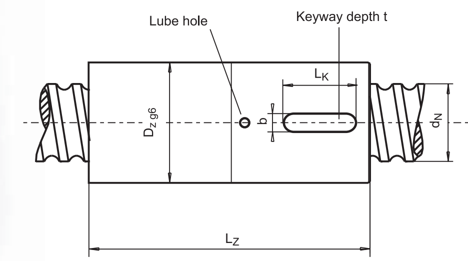


3) *If lead > 20 mm then A = 5 mm*

Technical Data

Series	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i 2x	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]
1516 / 1313	2.25.1,5.3	2	25	3	1.5	3.5	7.7	350
	2.25.1,5.4	2	25	4	1.5	4.5	10.3	460
	2.25.1,5.5	2	25	5	1.5	5.5	12.8	570
	4.25.3.3	4	25	3	3.0	11.4	19.1	430
	4.25.3.4	4	25	4	3.0	14.6	25.5	570
	5.25.3,5.3	5	25	3	3.5	13.7	21.3	410
	5.25.3,5.4	5	25	4	3.5	17.5	28.4	550
	5.25.3,5.5	5	25	5	3.5	21.2	35.5	680
	10.25.3,5.2	10	25	2	3.5	9.6	14.1	240
	10.25.3,5.3	10	25	3	3.5	13.6	21.2	350
	15.25.3,5.2	15	25	2	3.5	9.4	14.0	190
	15.25.3,5.3	15	25	3	3.5	13.4	21.0	290
3526	20.25.3,5.2	20	25	2	3.5	8.2	16.7	200
	20.25.3,5.3	20	25	3	3.5	12.8	25.0	300
	25.25.3,5.2	25	25	2	3.5	8.1	16.4	160

Dimensions

Flanged nut with wipers both ends ■

Series	Nut type	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]
1516	2.25.1,5.3	72	40	10	51	6.6	62	10	6	24
	2.25.1,5.4	77	40	10	51	6.6	62	10	6	24
	2.25.1,5.5	81	40	10	51	6.6	62	10	6	24
	4.25.3.3	73	40	10	51	6.6	62	10	6	24
	4.25.3.4	82	40	10	51	6.6	62	10	6	24
	5.25.3,5.3	85	40	10	51	6.6	62	10	6	24
	5.25.3,5.4	95	40	10	51	6.6	62	10	6	24
	5.25.3,5.5	107	40	10	51	6.6	62	10	6	24
	10.25.3,5.2	104	40	16	51	6.6	62	10	7	24
	10.25.3,5.3	128	40	16	51	6.6	62	10	7	24
	15.25.3,5.2	117	40	16	51	6.6	62	10	7	24
	15.25.3,5.3	167	40	16	51	6.6	62	10	7	24
3526	20.25.3,5.2	75 ◆	40	16	51	6.6	62	10	7	24
	20.25.3,5.3	95 ◆	40	16	51	6.6	62	10	7	24
	25.25.3,5.2	81 ◆	40	16	51	6.6	62	10	7	24

Cylindrical nut without wipers with fitting keyway

Series	Nut type	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1313	2.25.1,5.3	46	38	6	2.5	14
	2.25.1,5.4	54	38	6	2.5	16
	2.25.1,5.5	62	38	6	2.5	16
	4.25.3.3	46	38	6	2.5	14
	4.25.3.4	54	38	6	2.5	10
	5.25.3,5.3	58	38	6	2.5	16
	5.25.3,5.4	68	38	6	2.5	14
	5.25.3,5.5	80	38	6	2.5	14
	10.25.3,5.2	74	38	6	2.5	20
	10.25.3,5.3	98	38	6	2.5	25
	15.25.3,5.2	86	38	6	2.5	25
	15.25.3,5.3	136	38	6	2.5	32

● Actual stiffness at preload equal to 0.01 * C_a.

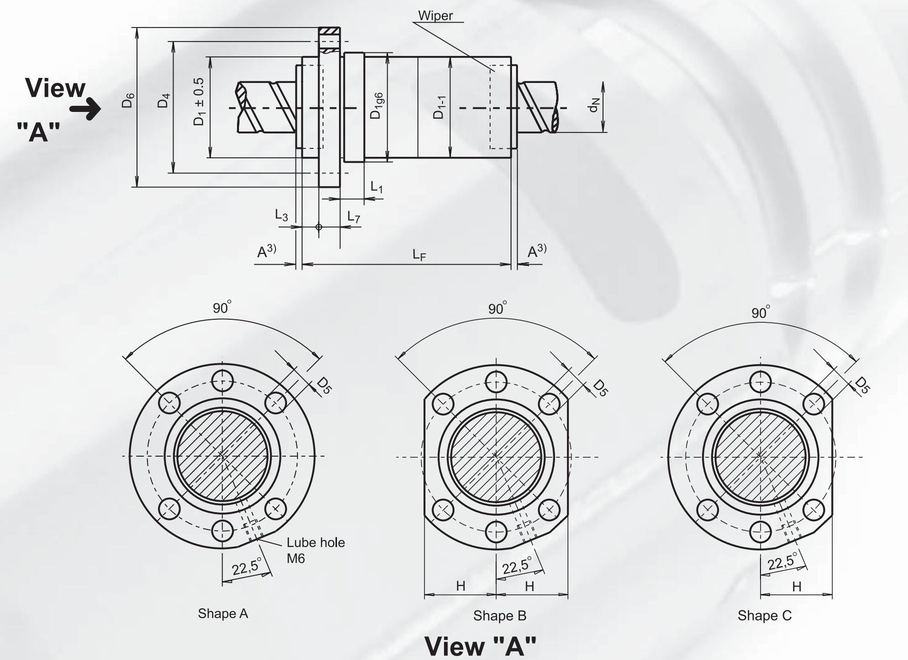
■ With standard wipers.
Special execution wipers available. See page 25.

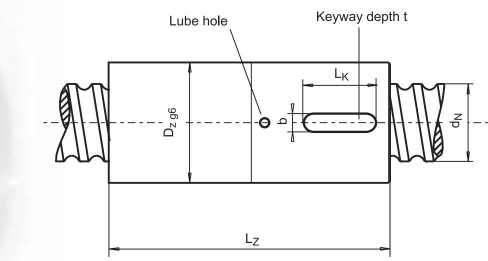
◆ Flange shape B only.
Flange shape A or C not available.

Series 3526:
UltraSpeed nut with flange,
dual start, pitch offset preload

Series 1516:
DIN Standard Flanged Nut
with UNILOCK preload

Series 1313:
Cylindrical Nut with Fitting Keyway
with UNILOCK preload





3) *If lead > 20 mm then A = 5 mm*

Technical Data

Series	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i 2x	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]
1516 →	4.32.3.3	4	32	3	3.0	13.1	26.0	550
1313 →	4.32.3.4	4	32	4	3.0	16.8	34.7	730
	5.32.3,5.3	5	32	3	3.5	16.0	29.5	550
	5.32.3,5.4	5	32	4	3.5	20.4	39.4	720
	5.32.3,5.5	5	32	5	3.5	24.8	49.2	890
	5.32.3,5.6	5	32	6	3.5	29.0	59.0	1060
	10.32.6.3	10	32	3	6.0	30.8	45.1	490
	10.32.6.4	10	32	4	6.0	39.4	60.2	640
	10.32.6.5	10	32	5	6.0	47.8	75.2	750
	15.32.6.3	15	32	3	6.0	30.5	44.8	420
	20.32.6.3	20	32	3	6.0	30.2	44.5	350
3526	20.32.6.3	20	32	3	6.0	29.4	54.0	460
	20.32.6.4	20	32	4	6.0	39.3	72.0	610
	30.32.6.2	30	32	2	6.0	18.4	35.2	220

Dimensions

Nut type	Series	Flanged nut with wipers both ends ■ L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Series	Cylindrical nut without wipers with fitting keyway L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
4.32.3.3	1516	75	50	10	65	9	80	12	6	31.0	1313	46	48	6	2.5	14
4.32.3.4		84	50	10	65	9	80	12	6	31.0		54	48	6	2.5	16
5.32.3,5.3		87	50	10	65	9	80	12	6	31.0		58	48	6	2.5	16
5.32.3,5.4		97	50	10	65	9	80	12	6	31.0		68	48	6	2.5	20
5.32.3,5.5		107	50	10	65	9	80	12	6	31.0		80	48	6	2.5	25
5.32.3,5.6		114	50	10	65	9	80	12	6	31.0		96	48	6	2.5	32
10.32.6.3		144	50	16	65	9	80	12	7	31.0		112	50	8	3.1	36
10.32.6.4		165	50	16	65	9	80	12	7	31.0		132	50	8	3.1	32
10.32.6.5		187	50	16	65	9	80	12	7	31.0		154	50	8	3.1	32
15.32.6.3		177	50	16	65	9	80	12	7	31.0		144	50	8	3.1	45
20.32.6.3		200	50	16	65	9	80	12	7	31.0		190	50	8	3.1	45
20.32.6.3	3526	103 ◆	56	16	71	9	86	12	7	32.5						
20.32.6.4		123 ◆	56	16	71	9	86	12	7	32.5						
30.32.6.2		95 ◆	56	16	71	9	86	12	7	32.5						

● Actual stiffness at preload equal to 0.01 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

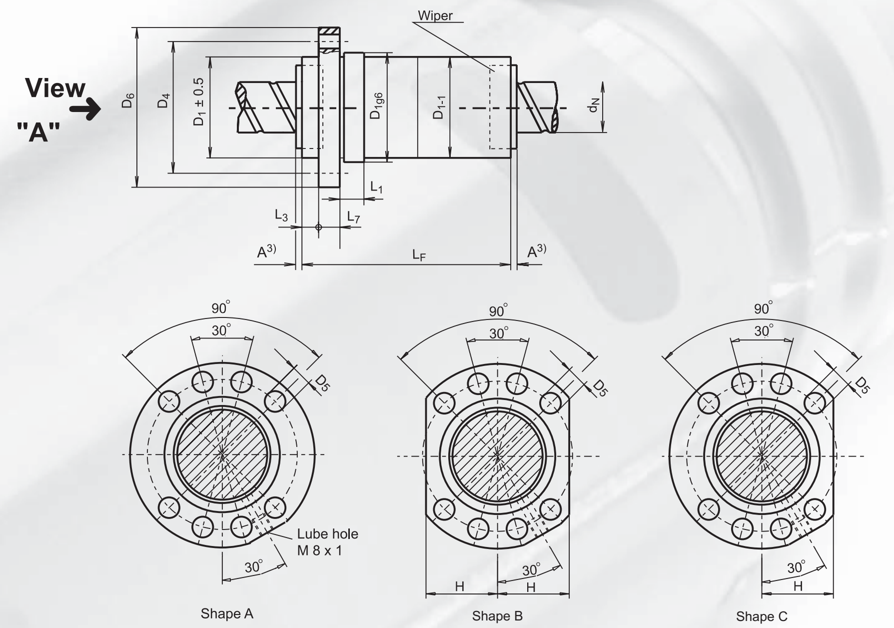
Nominal Diameter 40 mm

Double Nut
Precision Ground Execution Grade T0 - T5

Series 3526:
UltraSpeed nut with flange,
dual start, pitch offset preload

Series 1516:
DIN Standard Flanged Nut
with UNILOCK preload

Series 1313:
Cylindrical Nut with Fitting Keyway
with UNILOCK preload



3) *If lead > 20 mm then A = 5 mm*

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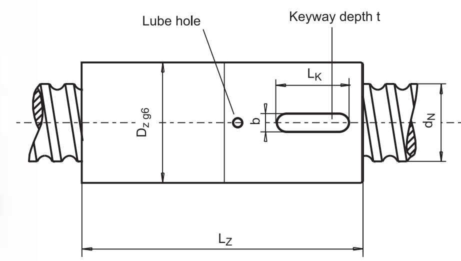


Technical Data

Series	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i 2x	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]
1516 → 1313 →	5.40.3,5.3	5	40	3	3.5	17.7	37.8	670
	5.40.3,5.4	5	40	4	3.5	22.7	50.4	880
	5.40.3,5.5	5	40	5	3.5	27.5	63.0	1100
	5.40.3,5.6	5	40	6	3.5	32.1	75.6	1300
	10.40.7,5.3	10	40	3	7.5	46.1	70.6	630
	10.40.7,5.4	10	40	4	7.5	59.0	94.2	830
	10.40.7,5.5	10	40	5	7.5	71.5	117.7	1030
	15.40.7,5.3	15	40	3	7.5	45.9	70.4	570
	15.40.7,5.4	15	40	4	7.5	58.7	93.8	750
	20.40.7,5.2	20	40	2	7.5	32.1	46.6	340
	20.40.7,5.3	20	40	3	7.5	45.5	70.0	500
3526	20.40.6.3	20	40	3	6.0	32.9	68.2	610
	20.40.6.4	20	40	4	6.0	44.0	90.9	800
	20.40.6.5	20	40	5	6.0	54.6	113.6	1000
	25.40.6.3	25	40	3	6.0	32.6	67.7	540
	25.40.6.4	25	40	4	6.0	43.6	90.3	720
	30.40.6.3	30	40	3	6.0	32.3	67.2	490
	30.40.6.4	30	40	4	6.0	43.1	89.5	650
	40.40.6.3	40	40	3	6.0	31.4	65.8	390

Dimensions

Flanged nut with wipers both ends ■

Nut type	Series	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]
5.40.3,5.3	1516	89	63	10	78	9	93	14	6	35.0
5.40.3,5.4		99	63	10	78	9	93	14	6	35.0
5.40.3,5.5		109	63	10	78	9	93	14	6	35.0
5.40.3,5.6		121	63	10	78	9	93	14	6	35.0
10.40.7,5.3		147	63	16	78	9	93	14	7	35.0
10.40.7,5.4		168	63	16	78	9	93	14	7	35.0
10.40.7,5.5		189	63	16	78	9	93	14	7	35.0
15.40.7,5.3		180	63	16	78	9	93	14	7	35.0
15.40.7,5.4		211	63	16	78	9	93	14	7	35.0
20.40.7,5.2		153	63	16	78	9	93	14	7	35.0
20.40.7,5.3		221	63	16	78	9	93	14	7	35.0
20.40.6.3	3526	105 ◆	63	16	78	9	93	14	7	35.0
20.40.6.4		125 ◆	63	16	78	9	93	14	7	35.0
20.40.6.5		145 ◆	63	16	78	9	93	14	7	35.0
25.40.6.3		115 ◆	63	16	78	9	93	14	7	35.0
25.40.6.4		135 ◆	63	16	78	9	93	14	7	35.0
30.40.6.3		123 ◆	63	16	78	9	93	14	7	35.0
30.40.6.4		153 ◆	63	16	78	9	93	14	7	35.0
40.40.6.3		155 ◆	63	16	78	9	93	14	7	35.0

Cylindrical nut without wipers with fitting keyway

Nut type	Series	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
5.40.3,5.3	1313	58	56	8	3.1	16
5.40.3,5.4		68	56	8	3.1	20
5.40.3,5.5		80	56	8	3.1	25
5.40.3,5.6		96	56	8	3.1	32
10.40.7,5.3		112	63	8	3.1	36
10.40.7,5.4		132	63	8	3.1	45
10.40.7,5.5		154	63	8	3.1	50
15.40.7,5.3		144	63	8	3.1	50
15.40.7,5.4		176	63	8	3.1	50
20.40.7,5.2		118	63	8	3.1	36
20.40.7,5.3		186	63	8	3.1	63

● Actual stiffness at preload equal to 0.01 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

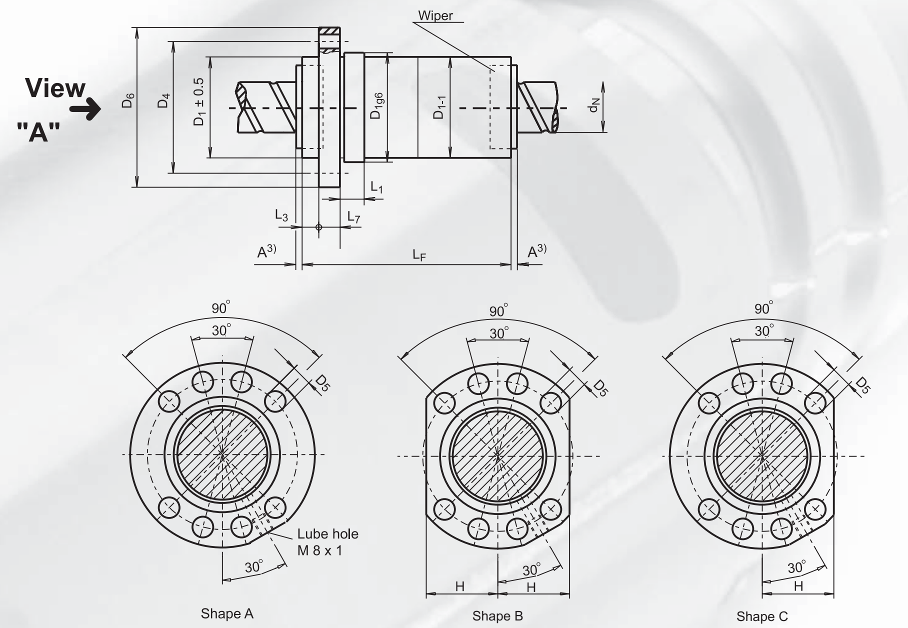
Nominal Diameter 50 mm

Double Nut
Precision Ground Execution Grade T0 - T5

Series 3526:
UltraSpeed nut with flange,
dual start, pitch offset preload

Series 1516:
DIN Standard Flanged Nut
with UNILOCK preload

Series 1313:
Cylindrical Nut with Fitting Keyway
with UNILOCK preload



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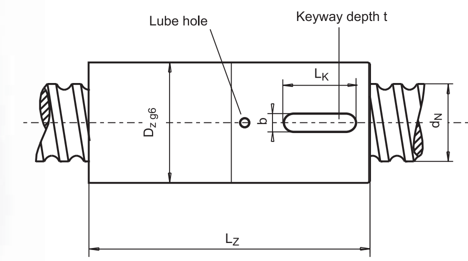
3) *If lead > 20 mm then A = 5 mm*



Technical Data									Dimensions															
										Flanged nut with wipers both ends ■										Cylindrical nut without wipers with fitting keyway				
	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i 2x	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]		L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]		L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1516 → 1313 →	5.50.3,5.3	5	50	3	3.5	19.6	48.4	800	1516	91	75	10	93	11	110	16	6	42.5	1313	58	68	8	3.1	1
	5.50.3,5.4	5	50	4	3.5	25.1	64.6	1060		101	75	10	93	11	110	16	6	42.5		68	68	8	3.1	20
	5.50.3,5.5	5	50	5	3.5	30.4	80.7	1320		111	75	10	93	11	110	16	6	42.5		78	68	8	3.1	25
	5.50.3,5.6	5	50	6	3.5	35.6	96.9	1570		122	75	10	93	11	110	16	6	42.5		90	68	8	3.1	32
	10.50.7,5.3	10	50	3	7.5	52.7	92.3	800		148	75	16	93	11	110	16	7	42.5		112	72	8	3.1	36
	10.50.7,5.4	10	50	4	7.5	67.4	123.0	1060		169	75	16	93	11	110	16	7	42.5		132	72	8	3.1	25
	10.50.7,5.5	10	50	5	7.5	81.7	153.8	1310		191	75	16	93	11	110	16	7	42.5		154	72	8	3.1	45
	15.50.7,5.3	15	50	3	7.5	52.5	92.1	760		182	75	16	93	11	110	16	7	42.5		146	72	8	3.1	50
	15.50.7,5.4	15	50	4	7.5	67.2	122.7	990		213	75	16	93	11	110	16	7	42.5		178	72	8	3.1	63
	15.50.7,5.5	15	50	5	7.5	81.4	153.4	1230		262	75	16	93	11	110	16	7	42.5		210	72	8	3.1	63
	20.50.9.3	20	50	3	9.0	76.8	128.7	780		229	75	16	93	11	110	16	7	42.5		196	75	8	3.1	63
	20.50.9.4	20	50	4	9.0	98.4	171.5	1020		271	75	16	93	11	110	16	7	42.5		238	75	8	3.1	63
3526	25.50.7,5.4	25	50	4	7.5	65.7	142.1	1000	3526	140 ◆	82	16	108	11	125	18	7	47.5						
	30.50.6.4	30	50	4	6.0	48.1	113.3	880		160 ◆	75	16	93	11	110	16	7	42.5						
	30.50.7,5.4	30	50	4	7.5	65.3	141.3	920		165 ◆	82	16	108	11	125	18	7	47.5						
	35.50.7,5.4	35	50	4	7.5	64.7	140.4	840		180 ◆	82	16	108	11	125	18	7	47.5						
	40.50.7,5.3	40	50	3	7.5	48.0	104.6	570		160 ◆	82	16	108	11	125	18	7	47.5						

● Actual stiffness at preload equal to 0.01 * C_a.

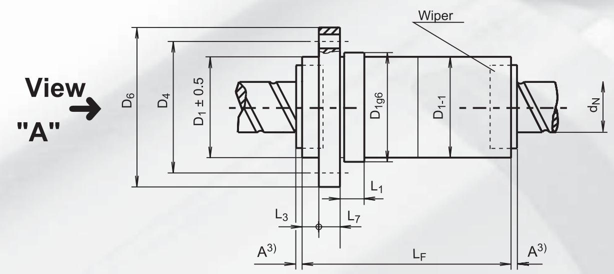
■ With standard wipers.
Special execution wipers available. See page 25.

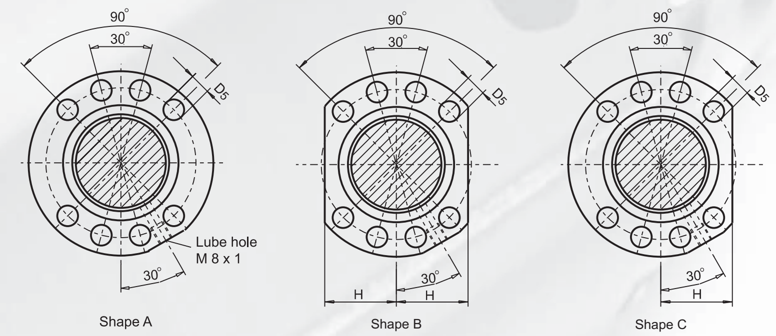
◆ Flange shape B only.
Flange shape A or C not available.

Series 3526:
UltraSpeed nut with flange,
dual start, pitch offset preload

Series 1516:
DIN Standard Flanged Nut
with UNILOCK preload

Series 1313:
Cylindrical Nut with Fitting Keyway
with UNILOCK preload





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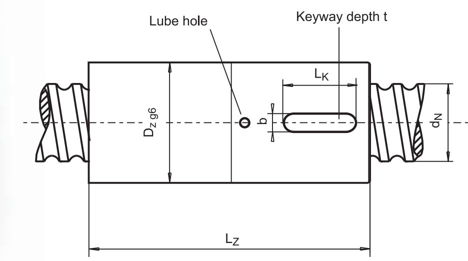


3) *If lead > 20 mm then A = 5 mm*

Technical Data	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i 2x	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Stiffness ● $R_{nu,ar}$ [N/µm]	Dimensions: Flanged nut with wipers both ends ■	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Cylindrical nut without wipers with fitting keyway	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
3526	25.60.9.3	25	60	3	9.0	83.4	195.2	1110	3526	119 ◆	95	25	115	13.5	135	20	7	50.0						
	30.60.9.3	30	60	3	9.0	83.0	194.4	1040		130 ◆	95	25	115	13.5	135	20	7	50.0						
	30.60.9.4	30	60	4	9.0	110.8	259.2	1390		160 ◆	95	25	115	13.5	135	20	7	50.0						
	40.60.9.2	40	60	2	9.0	52.8	128.4	590		118 ◆	95	25	115	13.5	135	20	7	50.0						
	40.60.9.3	40	60	3	9.0	82.0	192.6	900		158 ◆	95	25	115	13.5	135	20	7	50.0						
1516 →	5.63.3,5.4	5	63	4	3.5	27.8	83.5	1250	1516	103	90	10	108	11.0	125	18	6	47.5	1313	68	82	8	3.1	20
1313 →	5.63.3,5.5	5	63	5	3.5	33.7	104.4	1560		113	90	10	108	11.0	125	18	6	47.5		78	82	8	3.1	20
	5.63.3,5.6	5	63	6	3.5	39.5	125.2	1860		124	90	10	108	11.0	125	18	6	47.5		90	82	8	3.1	32
	10.63.7,5.3	10	63	3	7.5	59.2	119.4	990		151	90	16	108	11.0	125	18	7	47.5		112	85	8	3.1	36
	10.63.7,5.4	10	63	4	7.5	75.8	159.3	1310		172	90	16	108	11.0	125	18	7	47.5		134	85	8	3.1	45
	10.63.7,5.5	10	63	5	7.5	91.8	199.1	1620		192	90	16	108	11.0	125	18	7	47.5		156	85	8	3.1	50
	10.63.7,5.6	10	63	6	7.5	107.4	238.9	1930		214	90	16	108	11.0	125	18	7	47.5		178	85	8	3.1	50
	15.63.9.4	15	63	4	9.0	116.7	237.5	1510		239	90	16	108	11.0	125	18	7	47.5		200	88	8	3.1	50
	20.63.11.3	20	63	3	11.0	115.3	207.0	1070		237	95	25	115	13.5	135	20	7	50.0		196	92	8	3.1	50
	20.63.11.4	20	63	4	11.0	147.7	276.0	1410		277	95	25	115	13.5	135	20	7	50.0		236	92	8	3.1	50
	20.63.11.5	20	63	5	11.0	179.0	345.0	1740		342	95	25	115	13.5	135	20	7	50.0		302	92	8	3.1	63
	30.63.11.3	30	63	3	11.0	114.4	205.7	920		324	95	25	115	13.5	135	20	7	50.0		278	92	8	3.1	50
	5.80.3,5.6	5	80	6	3.5	43.4	160.7	2090		127	105	16	125	13.5	145	20	6	55.0		88	102	8	3.1	36
	10.80.7,5.3	10	80	3	7.5	68.2	162.6	1210		153	105	16	125	13.5	145	20	7	55.0		112	102	8	3.1	36
	10.80.7,5.4	10	80	4	7.5	87.3	216.8	1600		174	105	16	125	13.5	145	20	7	55.0		134	102	8	3.1	45
	10.80.7,5.5	10	80	5	7.5	105.8	271.1	1990		194	105	16	125	13.5	145	20	7	55.0		154	102	8	3.1	45
	10.80.7,5.6	10	80	6	7.5	123.8	325.3	2370		215	105	16	125	13.5	145	20	7	55.0		174	102	8	3.1	63
	15.80.11.5	15	80	5	11.0	208.6	468.3	2430		274	125	25	145	13.5	165	25	7	65.0		228	102	8	3.1	45
	20.80.11.4	20	80	4	11.0	171.9	374.1	1900		284	125	25	145	13.5	165	25	7	65.0		238	110	8	3.1	50
	20.80.11.6	20	80	6	11.0	243.6	561.2	2800		386	125	25	145	13.5	165	25	7	65.0		340	110	8	3.1	50
	10.100.7,5.5	10	100	5	7.5	116.3	343.5	2280		195	125	16	145	13.5	165	22	7	65.0		152	122	8	3.1	50
3526	30.80.11.5	30	80	5	11.0	207.7	535.7	2470	3526	196 ◆	125	25	145	13.5	165	25	7	65.0						
	30.100.11.6	30	100	6	11.0	268.7	793.0	3640		230 ◆	150	25	176	17.5	202	30	7	77.5						

● Actual stiffness at preload equal to 0.01 * C_a.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

Nominal Diameter 16-20 mm

Single Nut with Backlash
Ball Oversize Preload Optional
Precision Rolled Execution Grade T7 - T10

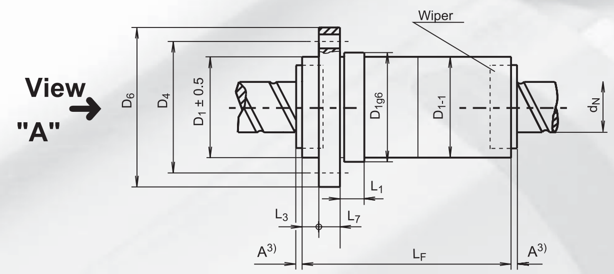
Steinmeyer

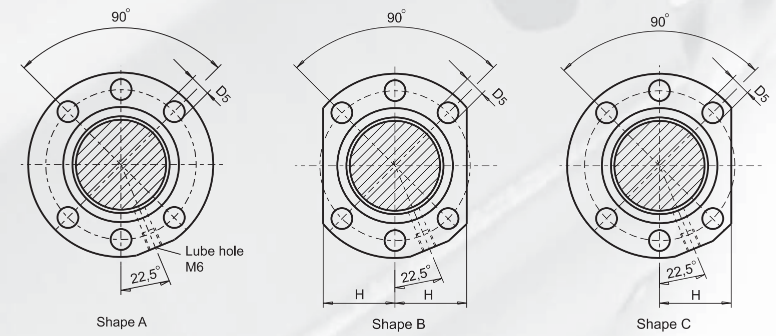
Series 3446:
UltraSpeed nut with flange, dual start

Series 2446:
End cap nut with flange, dual start

Series 1436:
DIN Standard Flanged Nut

Series 1233:
Cylindrical Nut with Fitting Keyway





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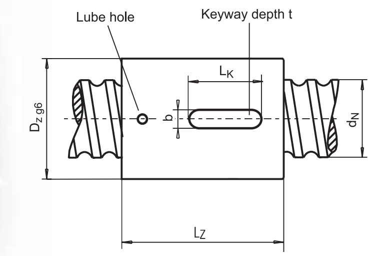


3) *If lead > 20 mm then A = 5 mm*

Technical Data / Dimensions

Series	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Backlash ● max. [mm]	Series	Flanged nut with wipers both ends ■ L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Series	Cylindrical nut without wipers with fitting keyway L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
1436 →	2.16.1,5.3	2	16	3	1.5	2.9	4.8	0.02	1436	45	28	10	38	5.5	48	10	6	20	1233	21	28	5	1.9	12
1233 →	2.16.1,5.4	2	16	4	1.5	3.8	6.4	0.02		49	28	10	38	5.5	48	10	6	20		25	28	5	1.9	16
	4.16.3.3	4	16	3	3.0	6.9	8.3	0.03		49	28	10	38	5.5	48	10	6	20		23	28	5	1.9	12
	4.16.3.4	4	16	4	3.0	8.8	11.1	0.03		53	28	10	38	5.5	48	10	6	20		27	28	5	1.9	12
	5.16.3,5.3	5	16	3	3.5	7.9	8.8	0.04		54	28	10	38	5.5	48	10	6	20		29	28	5	1.9	16
	5.16.3,5.4	5	16	4	3.5	10.1	11.7	0.04		59	28	10	38	5.5	48	10	6	20		34	28	5	1.9	12
2446	10.16.3,5.6	10	16	6	3.5	15.3	20.2	0.04	2446	44	32	12	42	5.5	52	10	11	20						
	10.16.3,5.10	10	16	10	3.5	24.5	34.9	0.04		64	32	16	42	5.5	52	10	11	20						
1436	2.20.1,5.3	2	20	3	1.5	3.2	6.1	0.02	1436	48	36	10	47	6.6	58	10	6	22	1233	23	33	6	2.5	14
	2.20.1,5.4	2	20	4	1.5	4.1	8.1	0.02		52	36	10	47	6.6	58	10	6	22		27	33	6	2.5	16
	2.20.1,5.5	2	20	5	1.5	5.0	10.1	0.02		56	36	10	47	6.6	58	10	6	22		31	33	6	2.5	16
	4.20.3.3	4	20	3	3.0	7.9	10.9	0.03		49	36	10	47	6.6	58	10	6	22		23	33	6	2.5	14
	4.20.3.4	4	20	4	3.0	10.1	14.5	0.03		53	36	10	47	6.6	58	10	6	22		27	33	6	2.5	10
	5.20.3,5.3	5	20	3	3.5	9.5	12.2	0.04		55	36	10	47	6.6	58	10	6	22		29	33	6	2.5	16
	5.20.3,5.4	5	20	4	3.5	12.1	16.3	0.04		60	36	10	47	6.6	58	10	6	22		34	33	6	2.5	14
	10.20.3,5.2	10	20	2	3.5	6.6	8.1	0.04		62	36	16	47	6.6	58	10	7	22		36	33	6	2.5	20
	10.20.3,5.3	10	20	3	3.5	9.3	12.1	0.04		76	36	16	47	6.6	58	10	7	22		48	33	6	2.5	25
3446	20.20.3,5.4	20	20	4	3.5	11.5	18.7	0.04	3446	75 ◆	36	16	47	6.6	58	10	7	22						
	20.20.3,5.6	20	20	6	3.5	17.0	28.1	0.04		95 ◆	36	16	47	6.6	58	10	7	22						

● Preloaded nuts upon request.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

Nominal Diameter 25 - 32 mm

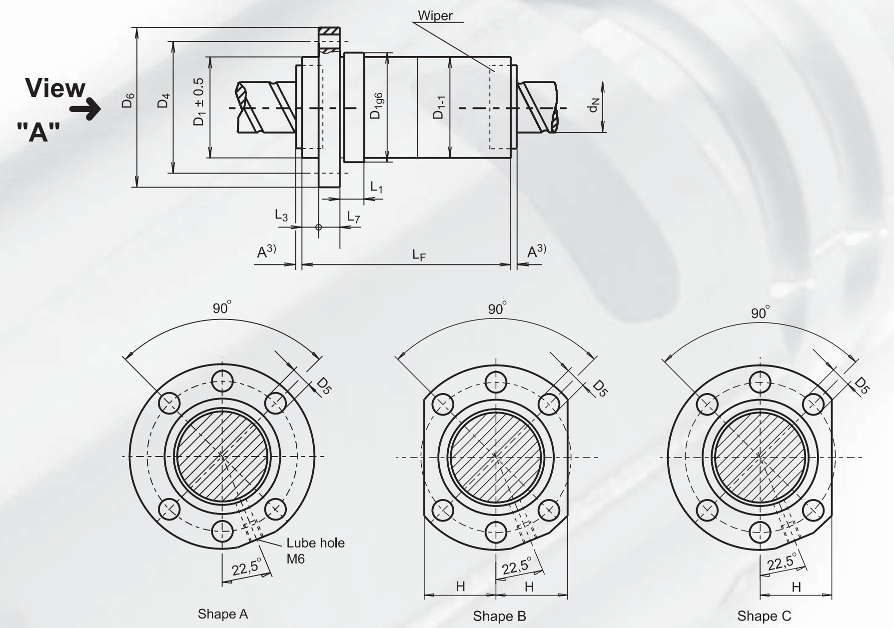
Single Nut with Backlash
Ball Oversize Preload Optional
Precision Rolled Execution Grade T7 - T10

Single Nut with Backlash T7 - T10

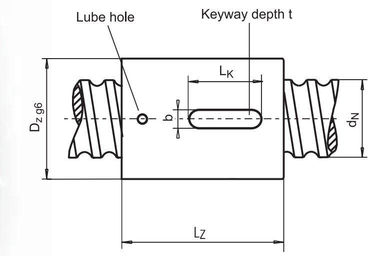
Series 3446:
UltraSpeed nut with flange, dual start

Series 1436:
DIN Standard Flanged Nut

Series 1233:
Cylindrical Nut with Fitting Keyway



View "A"



3) *If lead > 20 mm then A = 5 mm*

Technical Data

Series	Nut type	Lead P [mm]	Nominal diameter d_N [mm]	No. of circuits i	Ball diameter d_W [N]	dyn. load rating C_a [kN]	stat. load rating C_{0a} [kN]	Backlash ● max. [mm]
1436 → / 1233 →	2.25.1,5.3	2	25	3	1.5	3.5	7.7	0.02
	2.25.1,5.4	2	25	4	1.5	4.5	10.3	0.02
	2.25.1,5.5	2	25	5	1.5	5.5	12.8	0.02
	4.25.3.3	4	25	3	3.0	8.9	14.1	0.03
	4.25.3.4	4	25	4	3.0	11.4	18.8	0.03
	5.25.3,5.3	5	25	3	3.5	10.7	15.7	0.04
	5.25.3,5.4	5	25	4	3.5	13.6	21.0	0.04
	5.25.3,5.5	5	25	5	3.5	16.5	26.2	0.04
	10.25.3,5.2	10	25	2	3.5	7.5	10.4	0.04
	10.25.3,5.3	10	25	3	3.5	10.6	15.6	0.04
	15.25.3,5.2	15	25	2	3.5	7.4	10.3	0.04
	15.25.3,5.3	15	25	3	3.5	10.4	15.5	0.04
3446	20.25.3,5.4	20	25	4	3.5	13.3	24.7	0.04
	20.25.3,5.6	20	25	6	3.5	19.6	37.0	0.04
	25.25.3,5.4	25	25	4	3.5	13.0	24.2	0.04
1436 → / 1233 →	4.32.3.3	4	32	3	3.0	10.2	19.2	0.03
	4.32.3.4	4	32	4	3.0	13.1	25.6	0.03
	5.32.3,5.3	5	32	3	3.5	12.5	21.8	0.04
	5.32.3,5.4	5	32	4	3.5	15.9	29.1	0.04
	5.32.3,5.5	5	32	5	3.5	19.3	36.3	0.04
	5.32.3,5.6	5	32	6	3.5	22.6	43.6	0.04

Dimensions

Nut type	Flanged nut with wipers both ends ■	L_F [mm]	D_1 g6 [mm]	L_1 [mm]	D_4 [mm]	D_5 [mm]	D_6 [mm]	L_7 [mm]	L_3 [mm]	H [mm]	Cylindrical nut without wipers with fitting keyway	L_Z [mm]	D_Z g6 [mm]	b [mm]	t [mm]	L_K [mm]
2.25.1,5.3	1436	48	40	10	51	6.6	62	10	6	24	1233	23	38	6	2.5	14
2.25.1,5.4		51	40	10	51	6.6	62	10	6	24		27	38	6	2.5	16
2.25.1,5.5		56	40	10	51	6.6	62	10	6	24		31	38	6	2.5	16
4.25.3.3		49	40	10	51	6.6	62	10	6	24		23	38	6	2.5	14
4.25.3.4		53	40	10	51	6.6	62	10	6	24		27	38	6	2.5	10
5.25.3,5.3		55	40	10	51	6.6	62	10	6	24		29	38	6	2.5	16
5.25.3,5.4		60	40	10	51	6.6	62	10	6	24		34	38	6	2.5	14
5.25.3,5.5		66	40	10	51	6.6	62	10	6	24		40	38	6	2.5	14
10.25.3,5.2		64	40	16	51	6.6	62	10	7	24		37	38	6	2.5	20
10.25.3,5.3		78	40	16	51	6.6	62	10	7	24		49	38	6	2.5	25
15.25.3,5.2		71	40	16	51	6.6	62	10	7	24		43	38	6	2.5	25
15.25.3,5.3		92	40	16	51	6.6	62	10	7	24		68	38	6	2.5	32
20.25.3,5.4	3446	75 ◆	40	16	51	6.6	62	10	7	24						
20.25.3,5.6		95 ◆	40	16	51	6.6	62	10	7	24						
25.25.3,5.4		81 ◆	40	16	51	6.6	62	10	7	24						
4.32.3.3	1436	51	50	10	65	9.0	80	12	6	31	1233	23	48	6	2.5	14
4.32.3.4		55	50	10	65	9.0	80	12	6	31		27	48	6	2.5	16
5.32.3,5.3		57	50	10	65	9.0	80	12	6	31		29	48	6	2.5	16
5.32.3,5.4		62	50	10	65	9.0	80	12	6	31		34	48	6	2.5	20
5.32.3,5.5		67	50	10	65	9.0	80	12	6	31		40	48	6	2.5	25
5.32.3,5.6		73	50	10	65	9.0	80	12	6	31		48	48	6	2.5	32

● Preloaded nuts upon request.

■ With standard wipers.
Special execution wipers available. See page 25.

◆ Flange shape B only.
Flange shape A or C not available.

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