

The production plant in Albstadt/Germany. Together with sister companies in Suhl and Dresden, the Steinmeyer group represents one of the leading makers of ball screws 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—now the company's most important product line.

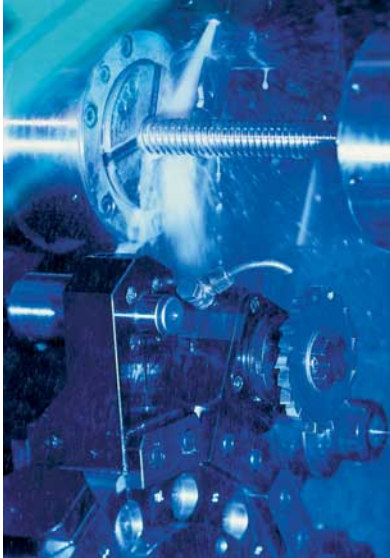
Steinmeyer is seen as one of the pioneers in this sector. In those early days ball screws were produced with nominal diameters between 5 and 16 mm for instrument engineering and for research equipment applications. With the advent of numerical

controls in the machine tools sector, the production range was successively extended to include larger sizes.

Today, **Steinmeyer** offers a wide product program ranging from 3 to 100 mm in diameter that 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.

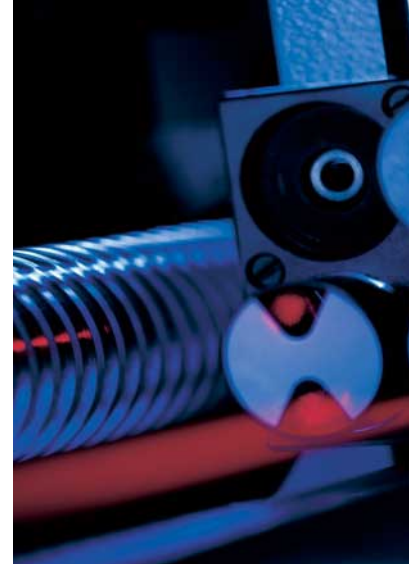
Up to Date with Steinmeyer



Ball screw technology is not a new field in the world of industry. However, the system-related properties of the ball screw 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 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 competi-



tive 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 ball screws 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. For ball screws within a range of 16 to 100 mm nominal diameter a separate catalog is available.

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.



Non-standard nuts still use our unique design features, such as our advanced ball recirculation and our preloading system. Thus our customers will benefit from the outstanding performance of our ball screws without changing the design of their machines. We understand that quality is a never ending process. This is why we seek close proximity to and communication with our customers.

To **Steinmeyer** quality means that we use our knowledge to transform the needs of our customers into an individual solution to meet even the most demanding specifications - never less, but sometimes even a bit more.



National Standards Used

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. 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 Accuracy Grades

Steinmeyer ball screws are available as a standard in five different accuracy grades, according to the ISO standard (grades 1, 3, 5 for high precision ball screws and grades 7 and 10 for normal precision ball screws). 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.

- c: Specified lead deviation, used to compensate heat effects or if the screw shall be held under tension (T).
- e_p : Represents the deviation from 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 ($e_{2\pi}$).

Fig. 1

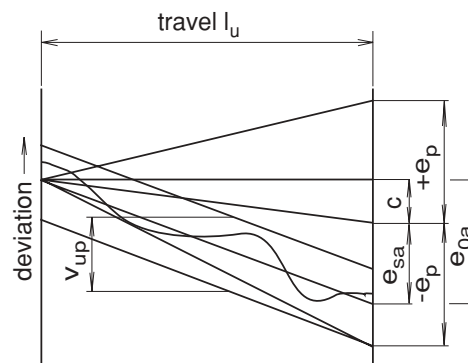


Fig. 2: The mean lead deviation e_{0a} with tolerances $\pm e_p$ at the length l_u .

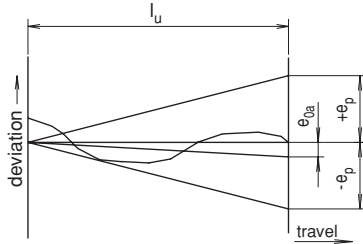


Fig. 3: The variation v_{ua} with tolerances v_{up} at the length l_u .

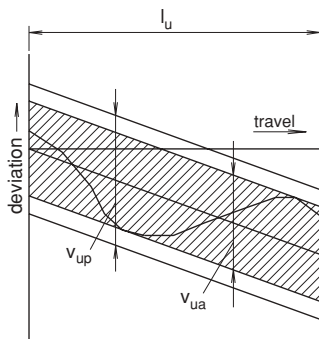


Fig. 4: The variation v_{300a} with tolerance v_{300p} at the length of 300 mm.

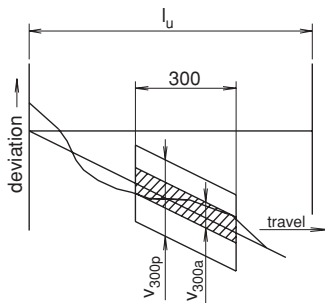


Fig. 5: The variation $v_{2\pi a}$ within 2π rad. (=1 rev.)

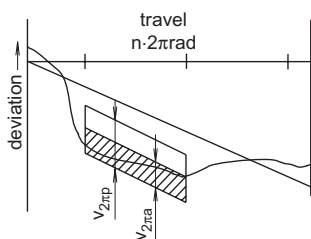


Table 1

screw length		Tolerances e_p for mean lead deviation e_{0a} [μm]						
l_u [mm]		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

Table 2

screw length		Tolerances v_{up} for variation v_{ua} [μm]						
l_u [mm]		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	–	–

Table 3

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

Table 4

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

Ball Screw Selection Guide

Load Capacity Selection

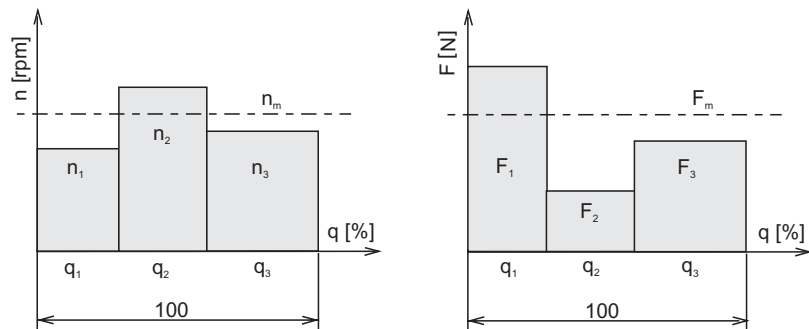
Dynamic Axial Load Capacity C_a

Ball screws 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 hardly 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. 6



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 formulas:

Equation 1.1

$$F_m = \left(\frac{q_1 \cdot n_1 \cdot F_1^3 + q_2 \cdot n_2 \cdot F_2^3 + \dots + q_z \cdot n_z \cdot F_z^3}{q_1 \cdot n_1 + q_2 \cdot n_2 + \dots + q_z \cdot n_z} \right)^{1/3} \text{ [N]}$$

Equation 1.2

$$n_m = \left(\frac{q_1 \cdot n_1 + q_2 \cdot n_2 + \dots + q_z \cdot n_z}{q_1 + q_2 + \dots + q_z} \right) \text{ [rpm]}$$

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

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 the modified actual load F_i^* can be calculated by means of the following approximations:

Equation 2

$$F_i^* = 1.25 \cdot F_{pr} + |F_i/2|$$

The resulting axial loads F_i^* now can be used for calculating the dynamic equivalent axial load F_m^* by means of formula 1.1.

The **dynamic load capacity** for a ball screw 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 ball screw 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 3.1

$$F_m = \frac{C_a}{\left(\frac{L_{10}}{10^6}\right)^{\frac{1}{3}}} \quad [\text{N}]$$

Equation 3.2

$$C_a = F_m \cdot \left(\frac{L_{10}}{10^6}\right)^{\frac{1}{3}} \quad [\text{N}]$$

Equation 3.3

$$L_{10} = \left(\frac{C_a}{F_m}\right)^3 \cdot 10^6 \quad [\text{rev.}]$$

Equation 3.4

$$C_a = P_i \cdot 4.45 \left(\frac{25.4}{P}\right)^{\frac{1}{3}} \quad [\text{N}]$$

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

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

$$10^6 \leq L_{10} \leq 10^9 \quad [\text{rev.}]$$

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

Static Axial Load Capacity C_{0a}

The axial load F_m , a ball screw can carry under static conditions is limited by the static axial load capacity. Exceeding this value will destroy the ball screw due to permanent deformation.

Radial Loads

Ball screws 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 ball screw 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 ball screw drive.

For miniature ball screws, the best values in stiffness will be reached by using preloaded nuts by ball oversize.

Ball Screw Selection Guide

Critical Column Load

Besides the service life calculations regarding the fatigue of the balls there may be further restrictions of the maximum axial loads. **First** the axial load should never exceed the static load capacity, as this will cause immediate permanent damage to the ball screw. **Secondly** for very long and slim screws, the critical column load needs to be considered.

For quickly determining the buckling load, following approximation can be used for calculation:

Equation 4

$$P_B = (m \cdot d_N^4 / l_s^2) \cdot 10^4 \text{ [N]}$$

P_B = Buckling load [N]
 d_N = Nominal diameter of ball screw [mm]
 l_s = Length of unsupported shaft [mm]
 m = Coefficient of bearing configuration
fixed - fixed: 22.4
fixed - supported: 11.2
supported - supported: 5.6
fixed - free: 1.4

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

Equation 5

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

Critical Speeds

The critical speed is the speed, where the screw starts vibrating because of resonance.

For rotating screws the maximum speed (rpm) depends on the screw's nominal diameter, length and bearing method.

For quickly determining the critical speed, following approximation can be used for calculation:

Equation 6

$$n_k = F \cdot d_N \cdot (1 / l_s^2) \cdot 10^7 \text{ [rpm]}$$

n_k = Critical speed [rpm]
 d_N = Nominal diameter of ball screw [mm]
 l_s = Length of unsupported shaft [mm]
 F = Coefficient of bearing configuration
fixed - fixed: 25.5
fixed - supported: 17.7
supported - supported: 11.5
fixed - free: 3.9

For safety reasons, a factor of 0.8 must be applied:

Equation 7

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

Maximum Speed n_{\max}

A **further 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. As **Steinmeyer** is using exclusively highly sophisticated ball recirculation systems, higher speeds are possible compared to other systems.

For maximum speeds refer to following tables:

Table 5:

Series 1412/2422
Series 1112
Series 1214

n_{\max} = Maximum speed [rpm]

d_N P	3	5	8	12	16
0.5	4500	2900	1800	–	–
1	4500	4500	3000	2000	–
1.5	–	4500	–	–	–
2	–	4500	4500	3700	2800
2.5	–	–	4500	–	–
3	–	–	–	4500	–
4	–	–	4500	4500	4300
5	–	–	4500	4500	4300
≥ 10	–	–	–	4500	4300

Table 6:

Series 1510

d_N P	3	5	8	12	16
0.5	4500	2900	1800	–	–
1	4500	4500	3000	2000	–
1.5	–	4500	–	–	–
2	–	–	3700	2500	1900
2.5	–	–	3700	–	1900
3	–	–	–	2500	–
4	–	–	–	2500	1900
5	–	–	–	2500	1900

In case of rolled executions the maximum speed values should be reduced by 30 % for all Series.

Extreme Operating Conditions

The maximum speeds listed in this catalog apply only when using the ball screw under normal conditions. Extreme accelerations, vibrations, mounting inaccuracies 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.

Ball Screw Selection Guide

Lubrication

Miniature ball screws normally will be operated with grease lubrication. In general, oil lubrication is preferred, if peripheral devices for relubrication already exist in the machine.

In case of **oil lubrication** the oil feed rate should be at least 0.3 cm³/ hour or more, depending on the operation speed of the ball screw. The oil used should be suitable for extreme pressure. In general, the same oil as for ball bearing lubrication can be used. As the operating temperature severely affects the accuracy in position, oil lubrication is preferred for high speed operation and for high precision applications.

Grease lubrication can be used if a central oil supply is not available. Re-lubrication must be considered carefully, because there is always more lubricant loss than for a ballbearing. The lubrication frequency depends highly on speed, number of revolutions made in a specific time, and environmental conditions. Also, possible contamination of the screw surface with dirt, dust, chips or aggressive gases or fluids may cause shorter re-lubrication interval to be necessary. If in doubt, please ask our application engineers.

Table 7

Application	Klüber Grease
Normal operation	Klueber Staburags NBU 8 EP
Low friction	Klueber Isoflex LDS 18 Spezial A
High temperature	Klueberalpha BHR 53-402
Low temperature	Klueber Isoflex PDL 300 A
Vacuum	Klueber Barrierta L55/2

Special Applications/ Vacuum/Clean Room

For special applications, where further attention to the ball screw is not possible, a grease package for **service life lubrication** is available on request.

Operation of a ball screw with short oscillating movement forward and backward requires further attention regarding lubrication. Please consult our engineers.

For operation under **extreme environmental conditions**, such as temperatures below -20 °C, above 100 °C, under vacuum (pressure below 10⁻⁹ bar), with exposure to radiation, under clean room conditions, or even in space environment, please consult our engineers.

If **dry lubrication** is required, special coatings are available. Please contact us for recommendations.

Maintenance

Servicing a ball screw generally means cleaning and re-lubrication. In case of **oil lubrication** there is no attention required, except verifying that the oil supply is operational and covers / boots are able to protect the ball screw against contamination by foreign matters.

In case of **grease lubrication**, the ball screw should be cleaned by carefully wiping away all used grease, dust and dirt by means of a clean, dry cloth. If possible, move the nut several times over the full travel to ensure that as much old grease as possible comes out of the nut. Do not use any detergents or other cleaning fluids, such as trichlorethylene, alcohol or acetone.

Table 8

Grease re-lubrication:

nut	re-lubrication-cycle
without wipers	6 x p.a. or every 300 operating hours
with labyrinth-/ plasticwipers	4 x p.a. or every 500 operating hours

If **washing** of the ball screw is necessary, **do not remove the nut**. Only clean benzine may be used for washing, and the ball screw must be dried with compressed air carefully afterwards. Move the nut several times and blow all remaining liquid away.

After cleaning, apply a thin layer of fresh grease over the entire surface of the screw. If available, refill the nut through the lube hole with approx. 0,2 ccm of grease. Do not overfill, as this will cause overheating of the grease.

After re-lubrication, the screw should be operated at low speeds and low loads first to ensure that all contact surfaces of nut, balls and screw are covered with a grease film.

Mounting Methods

Mounting a Ball Screw

Miniature ball screws usually will be supported using thrust bearings on one end, or by using one deep groove ballbearing on each end, which are preloaded against each other. In this case use ballbearings with increased backlash, in order to provide a better contact angle after backlash elimination.

For applications with larger axial forces, it is recommended to use angular contact ballbearings.

The following ball screw bearing examples show possible solutions for supporting our standard miniature ball screws.

According to fig. 7.1, the bushing holding the outer ring on one end of the assembly should be fixed by clamping or any other appropriate method to ensure proper alignment. Preload forces for backlash elimination should be applied manually or by incorporating spring action. Excessive preload forces must be avoided carefully, as this might compromise smoothness of the entire assembly.

Fig. 7.1

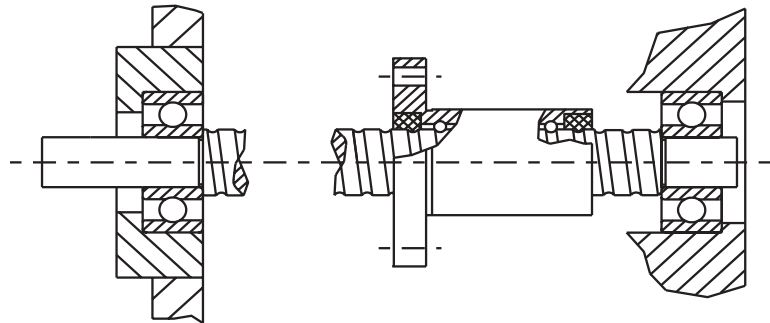
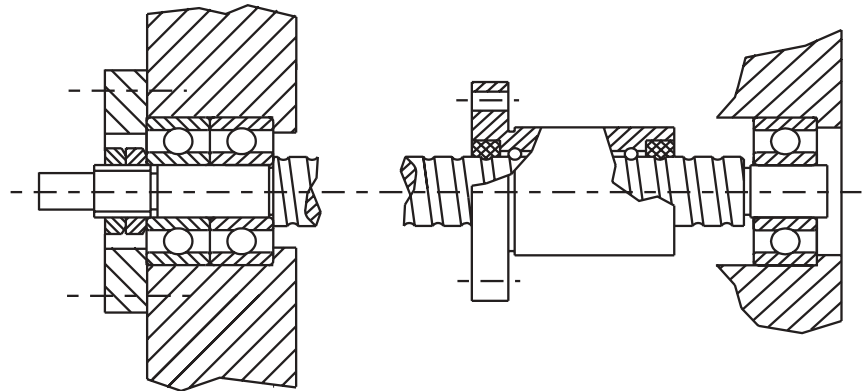


Fig. 7.2



Mounting Tolerances

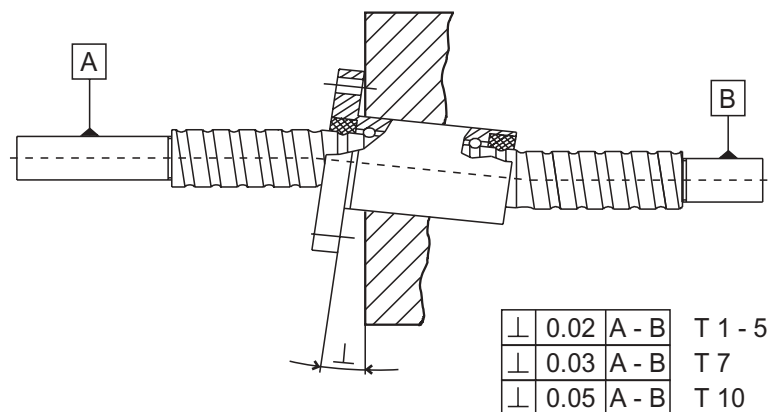
Steinmeyer recommends not to exceed out-of-center tolerances and squarenesses as specified below.

Optimum parallelism of the ball screw axis and the guideways, as well as squareness of the nut's mounting surface, is most important not to overload the ballnut.

After assembly, make sure that the ball screw rotates freely even with the nut in the closest position possible to the bearings. Any misalignment may lead to premature failure of the ball screw.

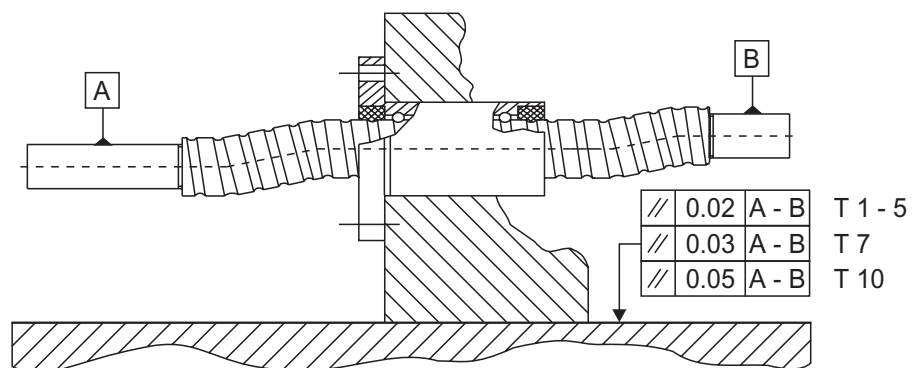
Tilt Error

Fig. 8



Out of Center Line

Fig. 9



Mounting tolerances:

T 1 - 5: preloaded ground execution

T 7: preloaded rolled execution

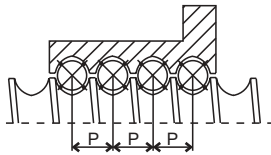
T 10: ball screws with backlash

Mounting Methods

Preloading Systems

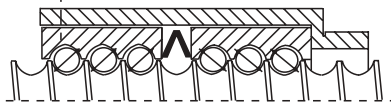
For miniature ball screws *Steinmeyer* uses two different systems for preloading to meet all requirements. Basically, preload serves to eliminate backlash and to increase stiffness. Since the preload also affects the friction torque and represents at the same time a load that has to be accounted for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

Fig. 10



Single nuts are available either with backlash or preloaded by ball oversize in three different type of nuts. As **preloaded single nuts** always use a four-point 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.

Fig. 11



Especially for miniature ball screws *Steinmeyer* has developed a **spring loaded double nut** to meet most demanding requirements of low torque along with high accuracy in position. For technical details see our 1510 / 1530 series. To determine, in which application this design will offer advantages, see Fig. 12 below.

Fig. 12

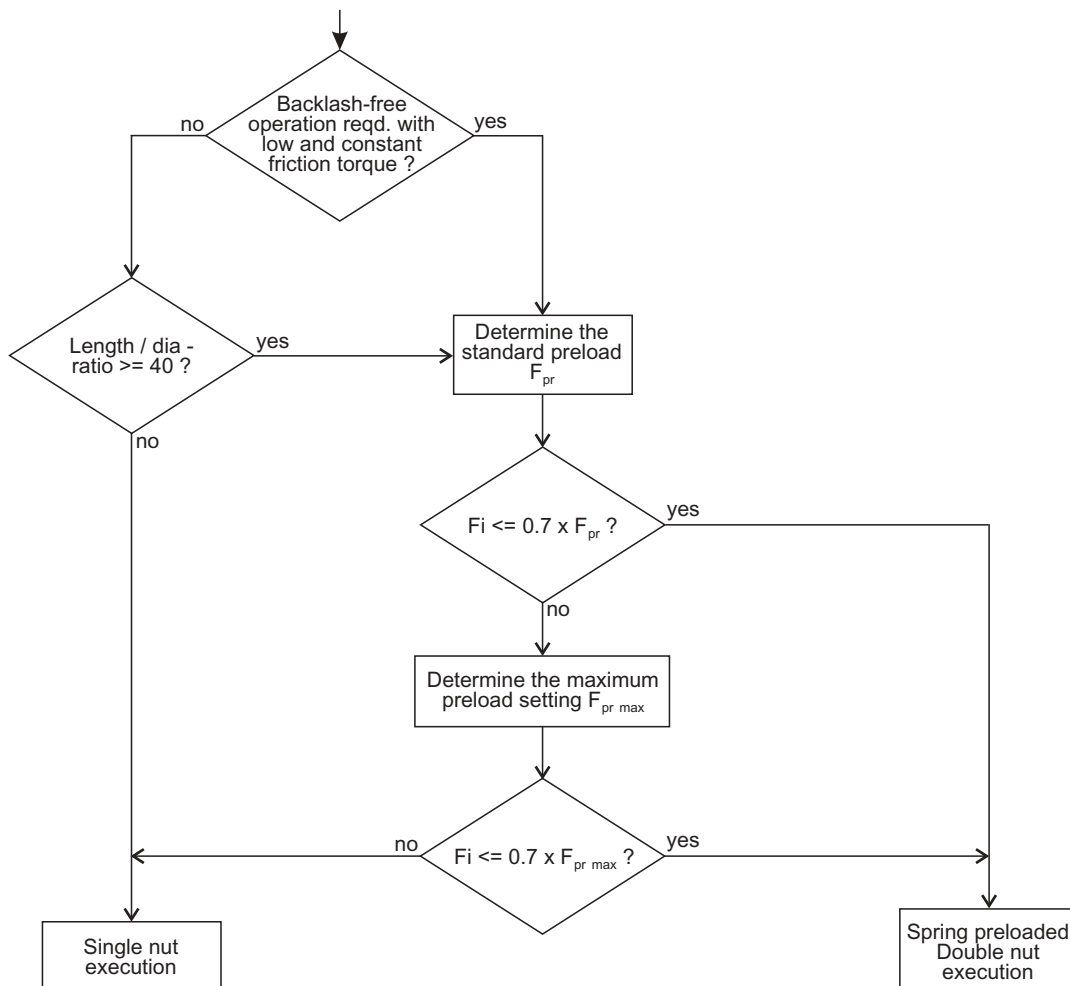


Fig. 13

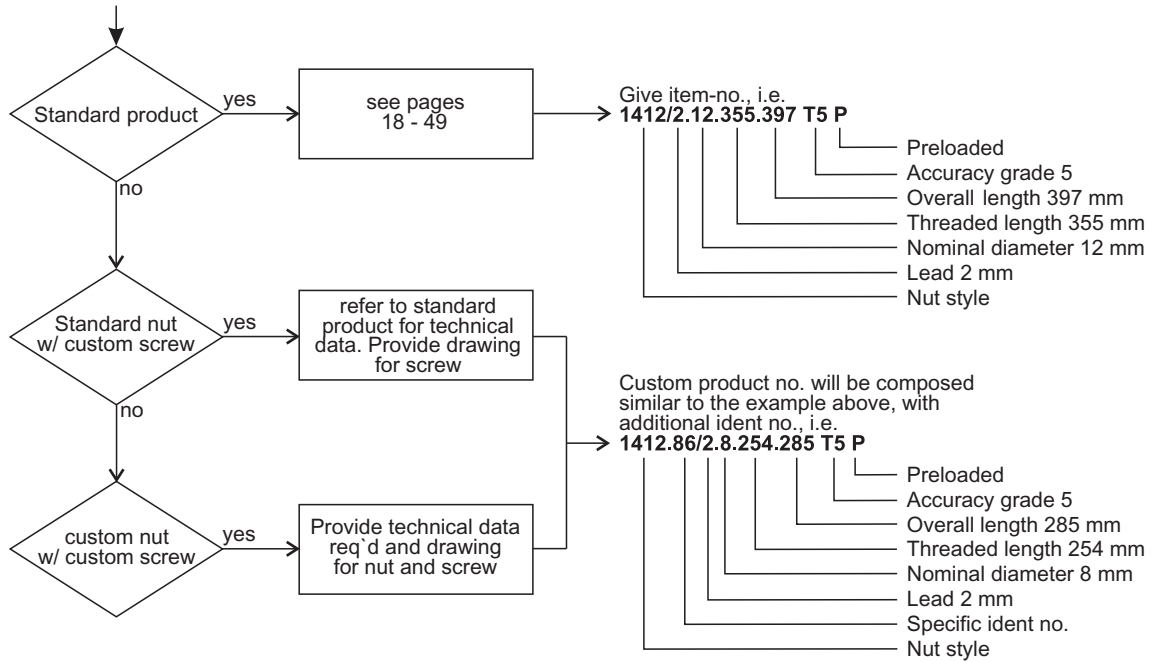


Fig. 14
Ball screw with
flange nut and
internal ball return
(3 circuits)

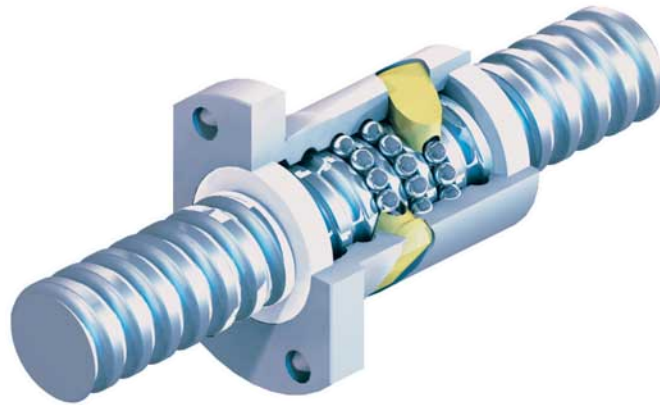
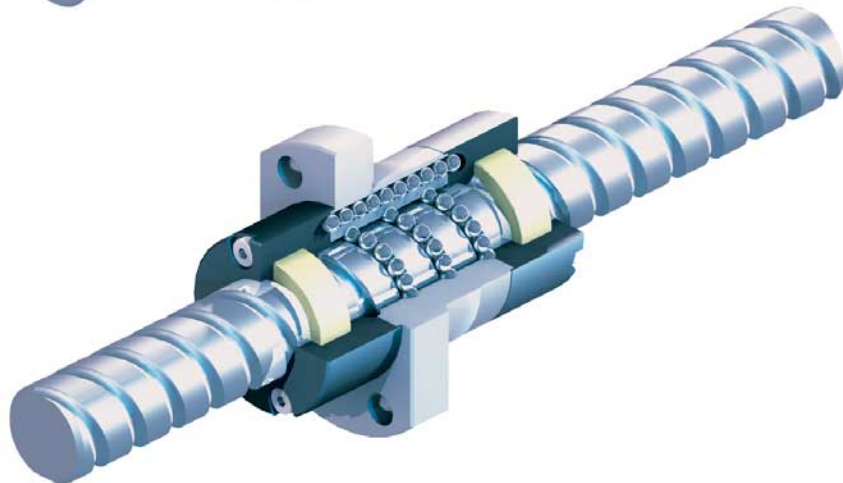


Fig. 15
Ball screw with
end cap nut
with flange
(2+2 circuits)



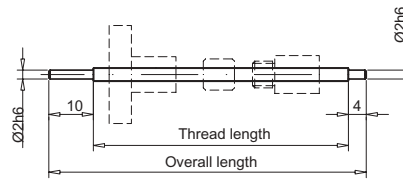
Nominal Diameter 3 mm

Ground execution with standard bearing journal
Outer Diameter 3h8
Series 1412, 1214, 1112

1. Selection of Screw:

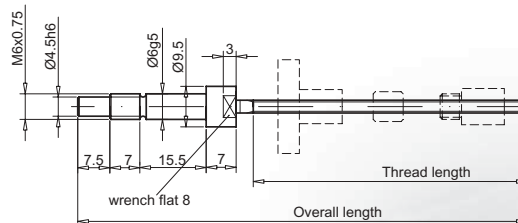
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	76	90



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
20	44	85
40	64	105
70	94	135



Nuts shown in standard orientation. Select **one** nut from table.

2. Selection of Nut:

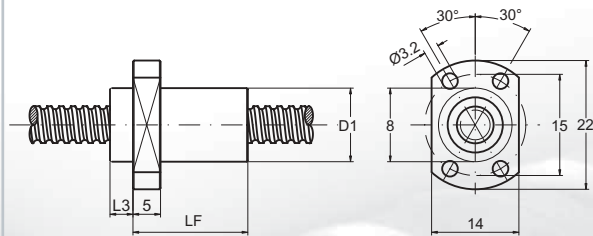
Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
0,5,3,0,6,2	0.5	3	2	0.6	90	90	0.01	0.3	0	1
1,3,0,8,2	1	3	2	0.8	240	250	0.01	0.3	0	1

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 · 10⁶ rev. service life.

Flange nut 1412



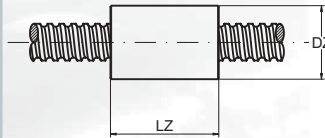
Series 1412:
Nut with flange
and standard
wipers both ends



Cylindrical nut 1214



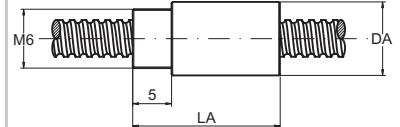
Series 1214:
Cylindrical nut
without wipers



Nut with connecting thread 1112



Series 1112:
Nut with
connecting thread
without wipers



Flange nut 1412

nut length	nut dia.	length
LF [mm]	D1g6 [mm]	L3 [mm]
15	8	0
15	8	0

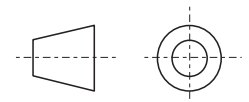
Cylindrical nut 1214

nut length	nut dia.
LZ [mm]	DZ h6 [mm]
7	7
7	7

Nut w. connect. thread 1112

nut length	nut dia.
LA [mm]	DA [mm]
15	8.5
15	8.5

All dimensions in mm.



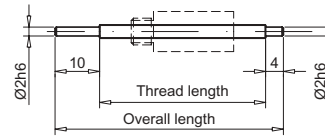
Nominal Diameter 3 mm

Ground execution with standard bearing journal
Outer Diameter 3h8
Series 1510

1. Selection of Screw:

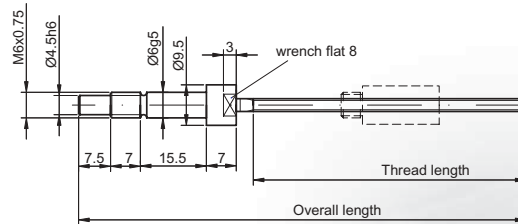
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
45	76	90



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
20	44	85
40	64	105
70	94	135



2. Selection of Nut:

Specifications

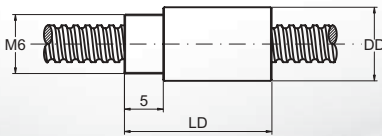
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]
0,5.3.0,6.2	0.5	3	2	0.6	90	90
1.3.0,8.2	1	3	2	0.8	240	250

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 · 10⁶ rev. service life.
- ▲ The preload is factory-set to F_{pr,max} and cannot be increased. The maximum permissible axial load of F_{max} cannot be exceeded.

Spring preloaded double nut in housing with connecting thread 1510



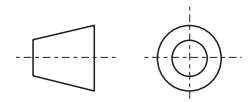
Series 1510:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1510

max. preload △ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
10	6	0.4 - 0.8	23	9
15	10	0.4 - 0.8	23	9

All dimensions in mm.



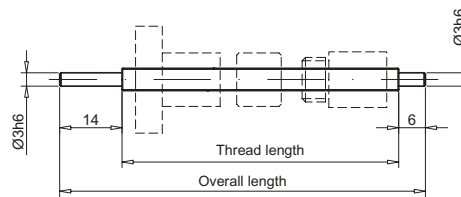
Nominal Diameter 5 mm

Ground execution with standard bearing journal
Outer Diameter 5h8
Series 1412 / 2422, 1214, 1112

1. Selection of Screw:

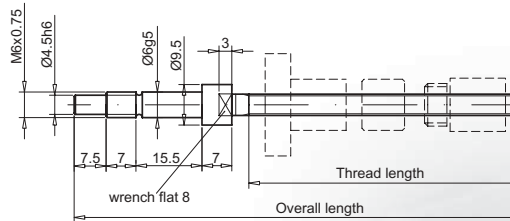
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
60	90	110



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
40	65	105
70	95	135
100	125	165



Nuts shown in standard orientation. Select **one** nut from table.

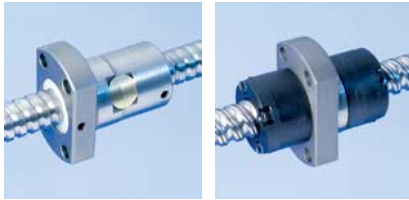
2. Selection of Nut:

Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
0,5.5.0,6.3	0.5	5	3	0.6	170	240	0.01	0.4	0	1.5
1.5.0,8.3	1	5	3	0.8	490	730	0.01	0.4	0	1.5
1,5.5.1.3	1.5	5	3	1	640	860	0.02	0.4	0	1.5
2.5.1.4	2	5	4	1	800	1150	0.02	0.4	0	1.5

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 · 10⁶ rev. service life.

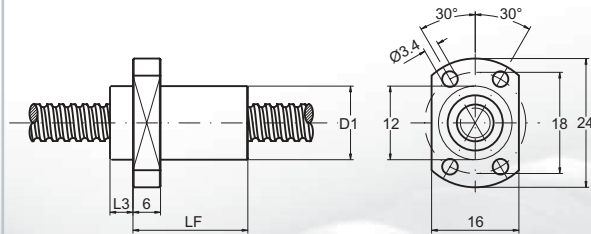
Flange nut 1412

2422



Series 1412 / 2422:
Nut with flange
and standard
wipers both ends

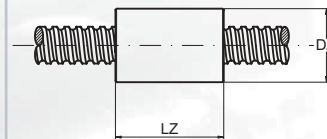
◆ Nut type 2422 only



Cylindrical nut 1214



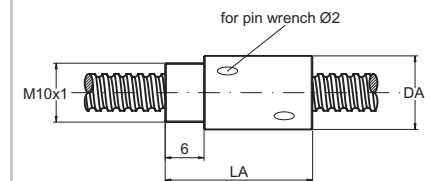
Series 1214:
Cylindrical nut
without wipers



Nut with connecting thread 1112



Series 1112:
Nut with
connecting thread
without wipers



Flange nut 1412/2422

nut length	nut dia.	length
LF [mm]	D1g6 [mm]	L3 [mm]
22	12	0
21	12	0
23	12	0
12	12	4 ◆

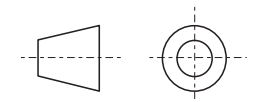
Cylindrical nut 1214

nut length	nut dia.
LZ [mm]	DZ h6 [mm]
13	12
12	12
14	12

Nut w. connect. thread 1112

nut length	nut dia.
LA [mm]	DA [mm]
19	12.5
18	12.5
20	12.5

All dimensions in mm.



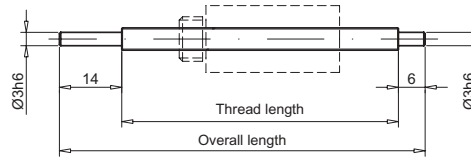
Nominal Diameter 5 mm

Ground execution with standard bearing journal
Outer Diameter 5h8
Series 1510

1. Selection of Screw:

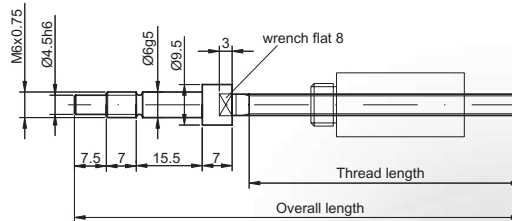
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
45	90	110



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
20	65	105
50	95	135
80	125	165



2. Selection of Nut:

Specifications

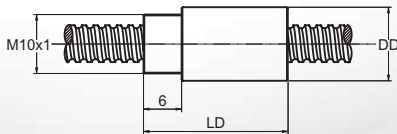
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]
0,5.5.0,6.2	0.5	5	2	0.6	120	160
1.5.0,8.2	1	5	2	0.8	350	490
1,5.5.1.2	1.5	5	2	1	450	570

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a : permissible dynamic axial load resulting in $1 \cdot 10^6$ rev. service life.
- ▲ The preload is factory-set to $F_{pr,max}$ and cannot be increased. The maximum permissible axial load of F_{max} is around 60 - 70 % of the preload.

Spring preloaded double nut in housing with connecting thread 1510



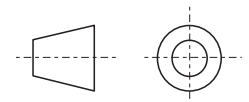
Series 1510:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1510

max. preload ^ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
10	6	0.5 - 1	36	15
20	15	0.5 - 1	36	15
20	15	0.5 - 1	36	15

All dimensions in mm.



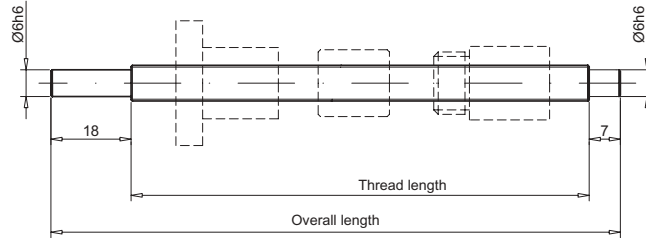
Nominal Diameter 8 mm

Ground execution with standard bearing journal
Outer Diameter 8h8
Series 1412 / 2422, 1214, 1112

1. Selection of Screw:

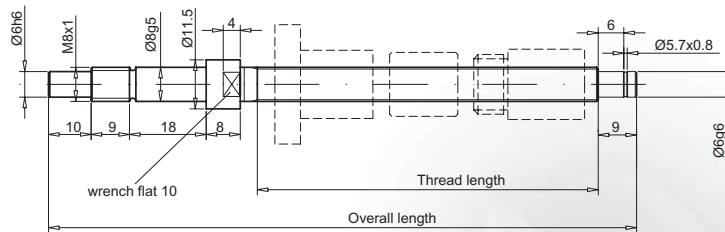
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
100	145	170
200	245	270



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
40	80	138
70	110	168
100	140	198
150	190	248



Nuts shown in standard orientation. Select **one** nut from table.

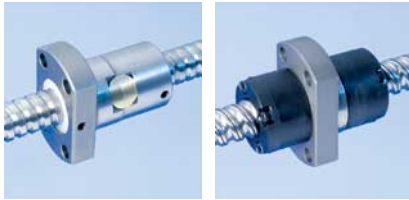
2. Selection of Nut:

Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
0,5.8.0,6.3	0.5	8	3	0.6	320	410	0.01	0.5	0	0.5 - 2
1.8.0,8.3	1	8	3	0.8	900	1230	0.01	0.5	0	0.5 - 2
2.8.1,5.3	2	8	3	1.5	2000	2100	0.02	0.5	0	0.5 - 2
2.8.1,5.4	2	8	4	1.5	2500	2800	0.02	0.5	0	0.5 - 2
2,5.8.1,5.3	2.5	8	3	1.5	2000	2100	0.02	0.5	0	0.5 - 2
4.8.1,5.3	4	8	3	1.5	2000	2100	0.02	0.5	0	0.5 - 2
4.8.1,5.5▲	4	8	5▲	1.5	3000	3500	0.02	0.5	0	0.5 - 2
5.8.1,5.3	5	8	3	1.5	1900	2100	0.02	0.5	0	0.5 - 2

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life.
- ▲ Alternate nut design. Quote number of circuits when ordering.

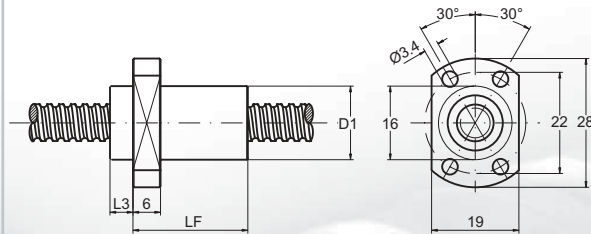
Flange nut 1412

2422



Series 1412 / 2422:
Nut with flange
and standard
wipers both ends

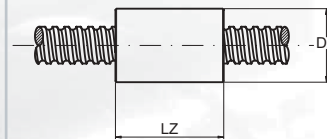
◆ Nut type 2422 only



Cylindrical nut 1214



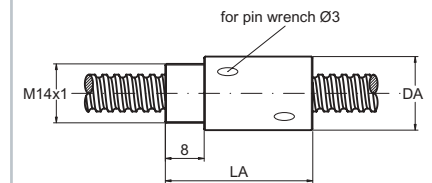
Series 1214:
Cylindrical nut
without wipers



Nut with connecting thread 1112



Series 1112:
Nut with
connecting thread
without wipers



Flange nut 1412/2422

nut length	nut dia.	length
LF [mm]	D1g6 [mm]	L3 [mm]
22	16	0
23	16	0
28	16	0
12	16	4 ◆
30	16	0
31	16	0
21	16	5 ◆
16	16	5 ◆

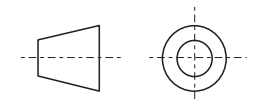
Cylindrical nut 1214

nut length	nut dia.
LZ [mm]	DZ h6 [mm]
13	15
14	15
19	15
21	15
22	15

Nut w. connect. thread 1112

nut length	nut dia.
LA [mm]	DA [mm]
21	16.5
22	16.5
27	16.5
29	16.5
30	16.5

All dimensions in mm.



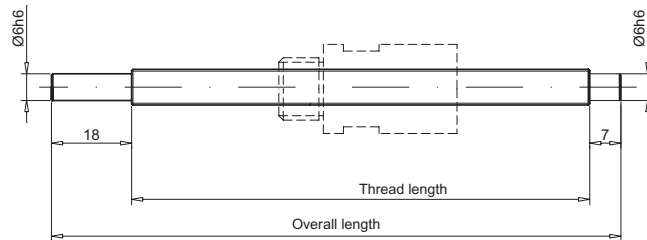
Nominal Diameter 8 mm

Ground execution with standard bearing journal
Outer Diameter 8h8
Series 1510

1. Selection of Screw:

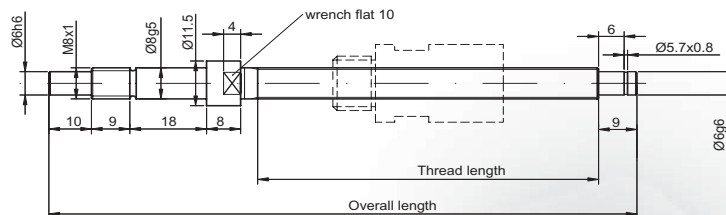
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
100	145	170
200	245	270



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
40	80	138
70	110	168
100	140	198
150	190	248



2. Selection of Nut:

Specifications

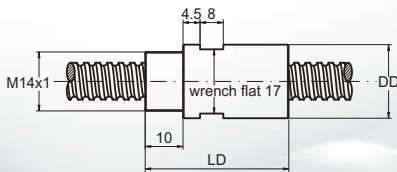
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]
0,5.8.0,6.2	0.5	8	2	0.6	220	270
1.8.0,8.2	1	8	2	0.8	630	820
2.8.1,5.2	2	8	2	1.5	1400	1400
2,5.8.1,5.2	2.5	8	2	1.5	1400	1400

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a : permissible dynamic axial load resulting in $1 \cdot 10^6$ rev. service life.
- ▲ The preload is set to $F_{pr \max}$ or at a minimum of 20 N. If F_{\max} is higher than 20 N the preload can be set at the factory up to $F_{pr \max}$. The maximum permissible axial load of F_{\max} is around 65 - 80 % of the preload.

Spring preloaded double nut in housing with connecting thread 1510



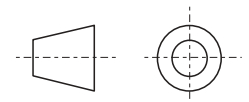
Series 1510:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1510

max. preload △ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
15	10	0.7 - 1.5	40	20
30	20	0.7 - 1.5	40	20
50	40	0.7 - 1.5	40	20
50	40	0.7 - 1.5	40	20

All dimensions in mm.



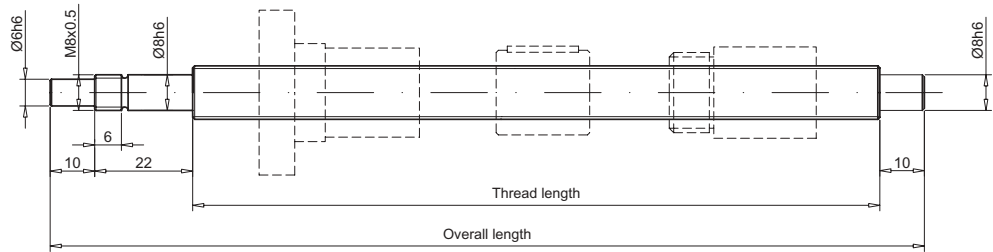
Nominal Diameter 12 mm

Ground execution with standard bearing journal
Outer Diameter 11.5h8
Series 1412 / 2422, 1214, 1112

1. Selection of Screw:

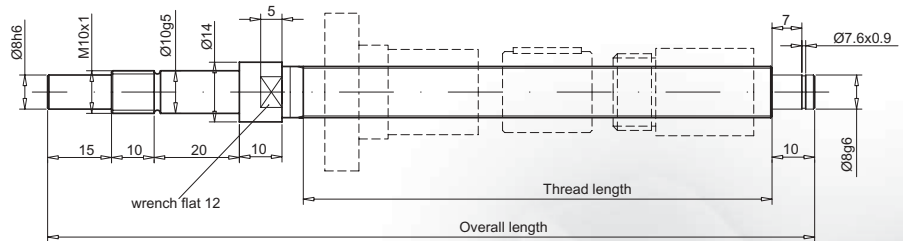
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
300	355	397



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	110	180
100	160	230
150	210	280
200	260	330
250	310	380
350	410	480
450	510	580



Nuts shown in standard orientation. Select **one** nut from table.

2. Selection of Nut:

Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
1.12.0,8.3	1	12	3	0.8	1090	1960	0.01	1	0	0.5-3
2.12.1,5.3	2	12	3	1.5	2500	3400	0.02	1	0	0.5-3
2.12.2.3	3	12	3	2	3600	4300	0.02	1	0	0.5-3
4.12.2.3	4	12	3	2	3600	4300	0.02	1	0	0.5-3
5.12.2.3	5	12	3	2	3600	4300	0.02	1	0	0.5-3
5.12.2.5▲	5	12	5▲	2	5600	7600	0.02	1	0	0.5-3
10.12.2,5.4	10	12	2+2	2.5	5800	7000	0.03	1	0	0.5-3
10.12.2,5.6▲	10	12	3+3▲	2.5	8500	10900	0.03	1	0	0.5-3

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life.
- ▲ Alternate nut design. Quote number of circuits when ordering.

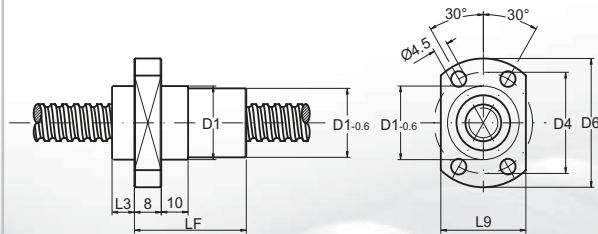
Flange nut 1412

2422



Series 1412 / 2422:
Nut with flange
and standard
wipers both ends

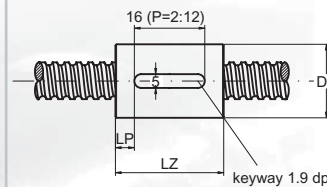
◆ Nut type 2422 only



Cylindrical nut 1214



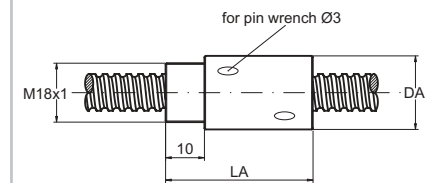
Series 1214:
Cylindrical nut
(with keyway)
without wipers



Nut with connecting thread 1112



Series 1112:
Nut with
connecting thread
without wipers



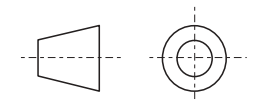
Flange nut 1412/2422

Cylindrical nut 1214

Nut w. connect. thread 1112

nut length	nut dia.	nut hole PCD	flange dia.	length	flange width	nut length	nut dia.		nut length	nut dia.
LF [mm]	D1g6 [mm]	D4 [mm]	D6 [mm]	L3 [mm]	L9 [mm]	LZ [mm]	DZ h6 [mm]	LP [mm]	LA [mm]	DA [mm]
25	20	29	37	0	24	17	19	2.5	24	20.5
30	20	29	37	0	24	19	19	1.5	29	20.5
37	22	29	37	0	24	26	19	5	36	20.5
36	22	29	37	0	24	22	19	3.5	33	22.5
39	22	29	37	0	24	26	19	5	36	22.5
26	24	32	40	7 ◆	26					
21	24	32	40	8 ◆	26					
31	24	32	40	8 ◆	26					

All dimensions in mm.



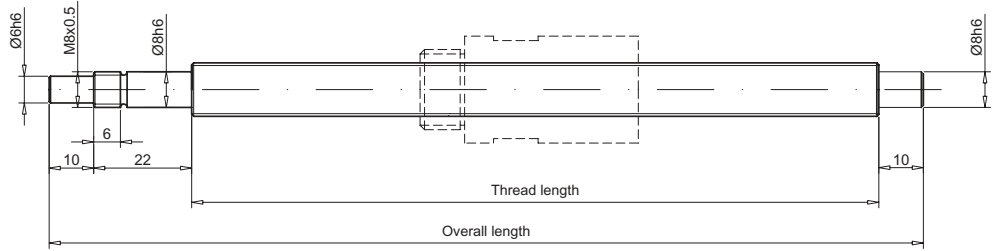
Nominal Diameter 12 mm

Ground execution with standard bearing journal
Outer Diameter 11.5h8
Series 1510

1. Selection of Screw:

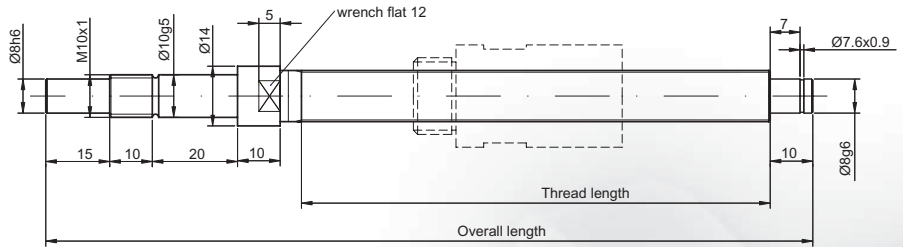
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
300	355	397



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	110	180
100	160	230
150	210	280
200	260	330
250	310	380
350	410	480
450	510	580



2. Selection of Nut:

Specifications

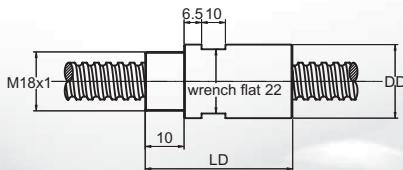
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]
1.12.0,8.2	1	12	2	0.8	770	1310
2.12.1,5.2	2	12	2	1.5	1800	2200
3.12.2.2	3	12	2	2	2500	2800
4.12.2.2	4	12	2	2	2500	2800
5.12.2.2	5	12	2	2	2500	2800

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 · 10⁶ rev. service life.
- ▲ The preload is set at a minimum of 30 N and can be set at the factory to F_{pr max}. The maximum permissible axial load of F_{max} is around 70 - 85 % of the preload.

Spring preloaded double nut in housing with connecting thread 1510



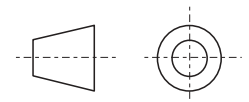
Series 1510:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1510

max. preload ▲ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
50	40	1 - 2	49	24
80	70	1 - 2	49	24
80	70	1 - 2	49	24
80	70	1 - 2	49	24
80	70	1 - 2	49	24

All dimensions in mm.



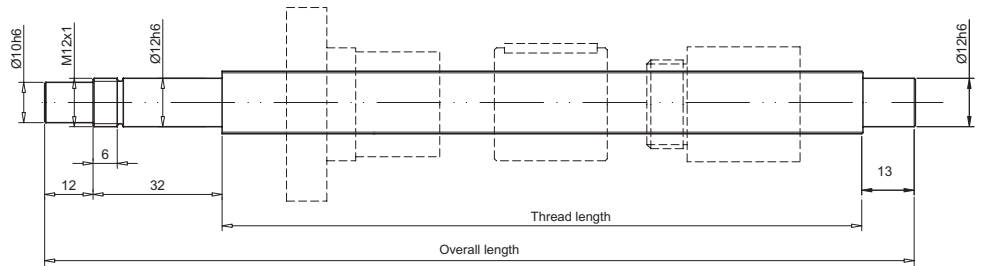
Nominal Diameter 16 mm

Ground execution with standard bearing journal
 Outer Diameter 15.5h8
 Series 1412 / 2422, 1214, 1112

1. Selection of Screw:

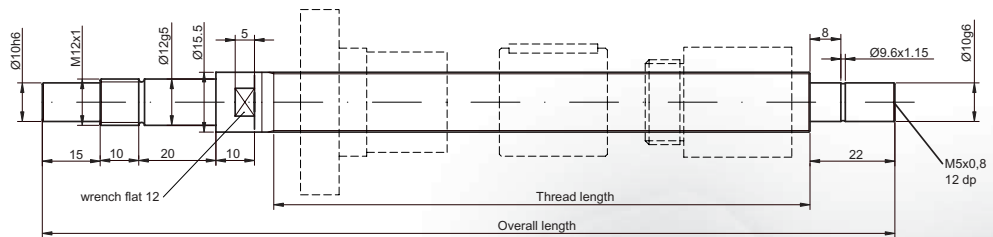
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
400	470	527



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	139	221
100	189	271
150	239	321
200	289	371
300	389	471
400	489	571
600	689	771
800	889	971



Nuts shown in standard orientation. Select **one** nut from table.

2. Selection of Nut:

Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
2.16.1,5.3	2	16	3	1.5	2900	4800	0.02	1.4	0	0.7-4
4.16.3.3	4	16	3	3	8900	11300	0.03	1.4	0	0.7-4
5.16.3,5.3	5	16	3	3.5	10100	11900	0.04	1.4	0	0.7-4
10.16.3,5.6	10	16	3+3	3.5	19600	27400	0.04	1.4	0	0.7-4
10.16.3,5.10 ▲	10	16	5+5 ▲	3.5	31400	47300	0.04	1.4	0	0.7-4
20.16.3,5.4	20	16	2+2	3.5	13000	17700	0.04	1.4	0	0.7-4
30.16.3,5.1	30	16	0.5+0.5	3.5	2300	2500	0.04	1.4	0	0.7-4

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life.
- ▲ Alternate nut design. Quote number of circuits when ordering.

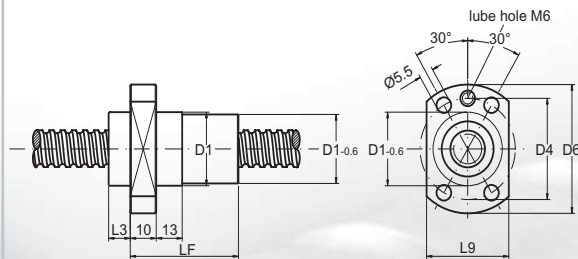
Flange nut 1412

2422



Series 1412 / 2422:
Nut with flange
and standard
wipers both ends

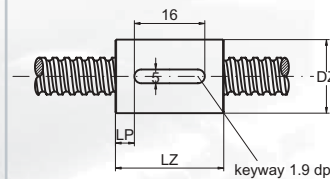
◆ Nut type 2422 only



Cylindrical nut 1214



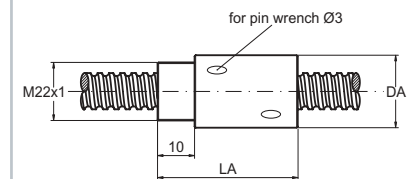
Series 1214:
Cylindrical nut
(with keyway)
without wipers



Nut with connecting thread 1112



Series 1112:
Nut with
connecting thread
without wipers



Flange nut 1412/2422

Cylindrical nut 1214

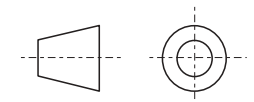
Nut w. connect. thread 1112

nut length	nut dia.	nut hole PCD	flange dia.	length	flange width
LF [mm]	D1g6 [mm]	D4 [mm]	D6 [mm]	L3 [mm]	L9 [mm]
32	25	35	44	0	29
38	28	38	48	0	31
44	28	38	48	0	31
33	32	42	52	11 ◆	40
53	32	42	52	11 ◆	40
38	32	42	52	10 ◆	40
26	32	42	52	11 ◆	40

nut length	nut dia.	
LZ [mm]	DZ h6 [mm]	LP [mm]
19	28	1.5
21	28	2.5
27	28	5.5

nut length	nut dia.
LA [mm]	DA [mm]
29	25.5
28	28.5
43	28.5

All dimensions in mm.



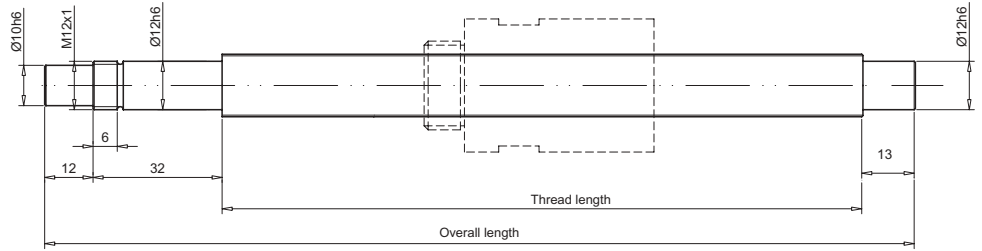
Nominal Diameter 16 mm

Ground execution with standard bearing journal
Outer Diameter 15.5h8
Series 1510

1. Selection of Screw:

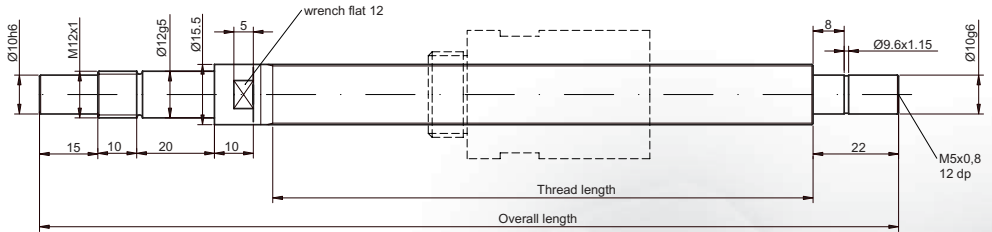
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
400	470	527



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	139	221
100	189	271
150	239	321
200	289	371
300	389	471
400	489	571
600	689	771
800	889	971



2. Selection of Nut:

Specifications

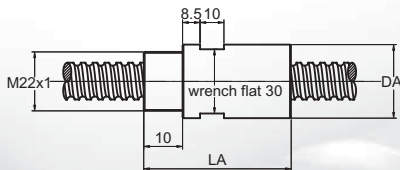
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]
2.16.1,5.2	2	16	2	1.5	2100	3200
2.5.16.1,5.2	4	16	2	1.5	2100	3200
4.16.2.2	4	16	2	2	3000	4000
5.16.2,5.2	5	16	2	2.5	3900	4700

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life.
- ▲ The preload is set at a minimum of 40 N and can be set at the factory to F_{pr max}. The maximum permissible axial load of F_{max} is around 70 - 85 % of the preload.

Spring preloaded double nut in housing with connecting thread 1510



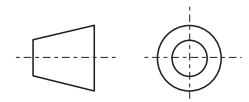
Series 1510:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1510

max. preload △ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
120	100	1.5 - 3	57	33
120	100	1.5 - 3	57	33
120	100	1.5 - 3	57	33
150	130	1.5 - 3	57	33

All dimensions in mm.



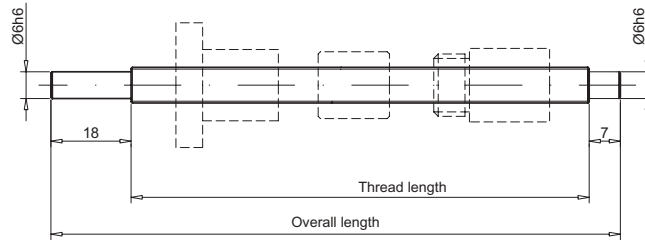
Nominal Diameter 8 mm

Rolled execution with standard bearing journal
Outer Diameter 8h8
Series 1432 / 2442, 1234, 1132

1. Selection of Screw:

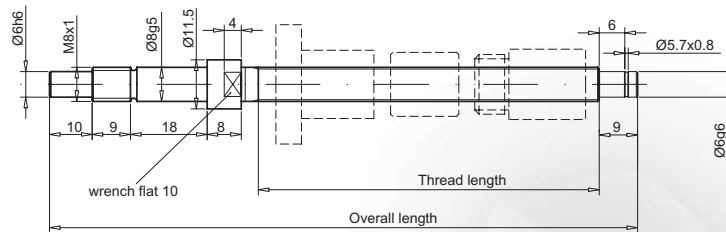
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
100	145	170
200	245	270



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
40	80	138
70	110	168
100	140	198
150	190	248



Nuts shown in standard orientation. Select **one** nut from table.

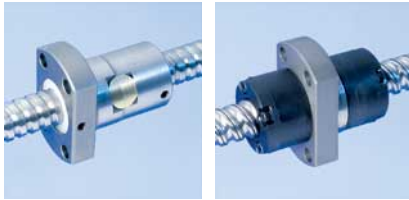
2. Selection of Nut:

Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
1.8.1.3	1	8	3	1	1210	1500	0.02	0.5	0	0.5 - 2
2.8.1,5.3	2	8	3	1.5	2000	2100	0.03	0.5	0	0.5 - 2
2.8.1,5.4	2	8	4	1.5	2500	2800	0.03	0.5	0	0.5 - 2
2,5.8.1,5.3	2,5	8	3	1.5	2000	2100	0.03	0.5	0	0.5 - 2
4.8.1,5.3	4	8	3	1.5	2000	2100	0.03	0.5	0	0.5 - 2
4.8.1,5.5▲	4	8	5▲	1.5	3000	3500	0.03	0.5	0	0.5 - 2
5.8.1,5.3	5	8	3	1.5	1900	2100	0.03	0.5	0	0.5 - 2

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life.
- ▲ Alternate nut design. Quote number of circuits when ordering.

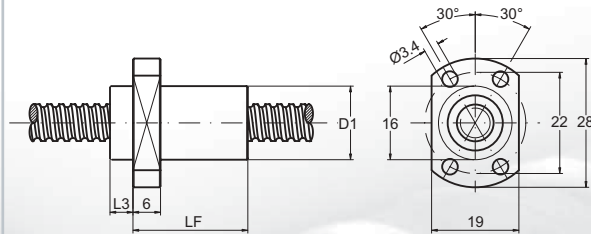
Flange nut 1432

2442



Series 1432 / 2442:
Nut with flange
and standard
wipers both ends

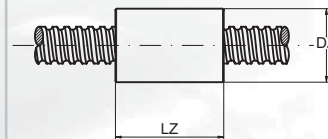
◆ Nut type 2442 only



Cylindrical nut 1234



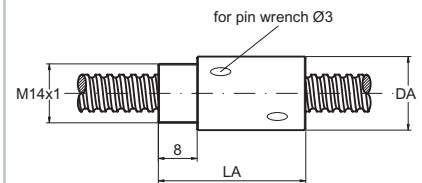
Series 1234:
Cylindrical nut
without wipers



Nut with connecting thread 1132



Series 1132:
Nut with
connecting thread
without wipers



Flange nut 1432/2442

nut length	nut dia.	length
LF [mm]	D1g6 [mm]	L3 [mm]
23	16	0
28	16	0
12	16	4 ◆
30	16	0
31	16	0
21	16	5 ◆
16	16	5 ◆

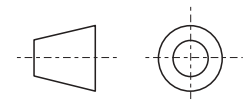
Cylindrical nut 1234

nut length	nut dia.
LZ [mm]	DZ h6 [mm]
14	15
19	15
21	15
22	15

Nut w. connect. thread 1132

nut length	nut dia.
LA [mm]	DA [mm]
22	16.5
27	16.5
29	16.5
30	16.5

All dimensions in mm.



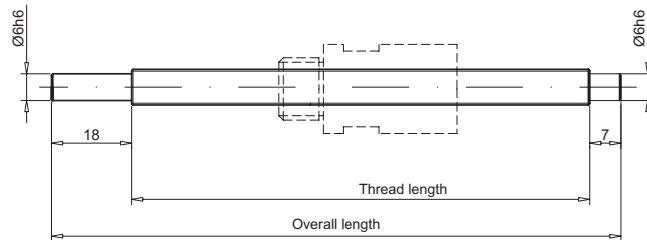
Nominal Diameter 8 mm

Rolled execution with standard bearing journal
Outer Diameter 8h8
Series 1530

1. Selection of Screw:

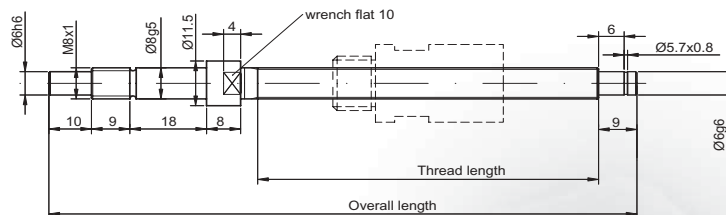
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
100	145	170
200	245	270



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
40	80	138
70	110	168
100	140	198
150	190	248



2. Selection of Nut:

Specifications

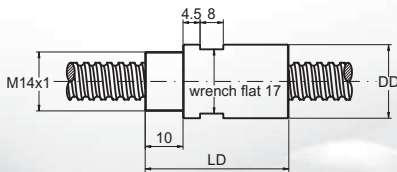
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]
1.8.1.2	1	8	2	1	850	1000
2.8.1,5.2	2	8	2	1.5	1400	1400
2,5.8.1,5.2	2.5	8	2	1.5	1400	1400

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life.
- ▲ The preload is factory-set to F_{pr max} and can be reduced to a minimum of 20 N. The maximum permissible axial load of F_{max} is around 65 - 80 % of the preload.

Spring preloaded double nut in housing with connecting thread 1530



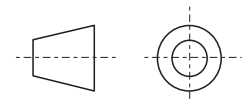
Series 1530:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1530

max. preload △ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
30	20	0.7 - 1.5	40	20
50	40	0.7 - 1.5	40	20
50	40	0.7 - 1.5	40	20

All dimensions in mm.



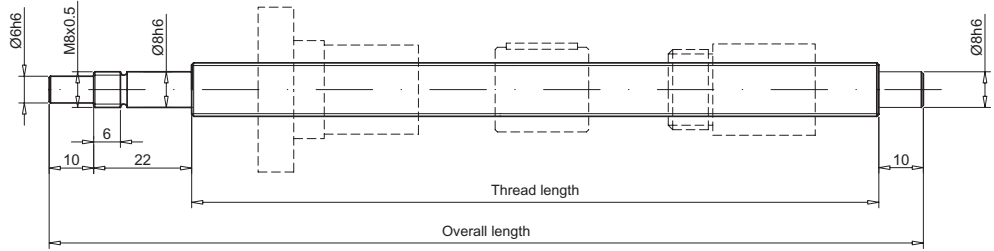
Nominal Diameter 12 mm

Rolled execution with standard bearing journal
Outer Diameter 11.5h8
Series 1432 / 2442, 1234, 1132

1. Selection of Screw:

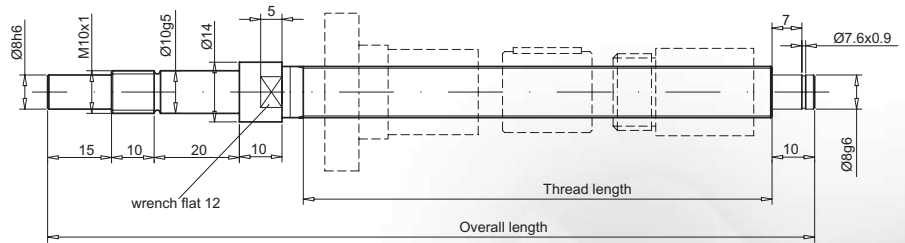
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
300	355	397



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	110	180
100	160	230
150	210	280
200	260	330
250	310	380
350	410	480
450	510	580



Nuts shown in standard orientation. Select **one** nut from table.

2. Selection of Nut:

Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
1.12.1.3	1	12	3	1	1490	2420	0.02	1	0	0.5-3
2.12.1,5.3	2	12	3	1.5	2500	3400	0.03	1	0	0.5-3
3.12.2.3	3	12	3	2	3600	4300	0.03	1	0	0.5-3
4.12.2.3	4	12	3	2	3600	4300	0.03	1	0	0.5-3
5.12.2.3	5	12	3	2	3600	4300	0.03	1	0	0.5-3
5.12.2.5▲	5	12	5▲	2	5600	7600	0.03	1	0	0.5-3
10.12.2,5.4	10	12	2+2	2.5	5800	7000	0.04	1	0	0.5-3
10.12.2,5.6▲	10	12	3+3▲	2.5	8500	10900	0.04	1	0	0.5-3

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life.
- ▲ Alternate nut design. Quote number of circuits when ordering.

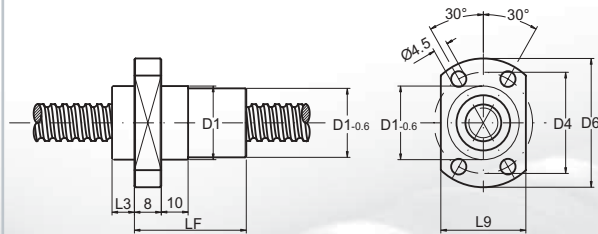
Flange nut 1432

2442



Series 1432 / 2442:
Nut with flange and standard wipers both ends

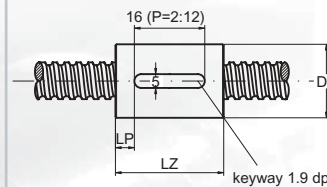
◆ Nut type 2442 only



Cylindrical nut 1234



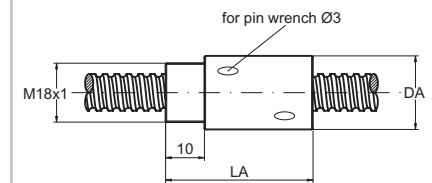
Series 1234:
Cylindrical nut (with keyway) without wipers



Nut with connecting thread 1132



Series 1132:
Nut with connecting thread without wipers



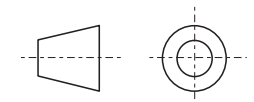
Flange nut 1432/2442

Cylindrical nut 1234

Nut w. connect. thread 1132

nut length	nut dia.	nut hole PCD	flange dia.	length	flange width	nut length	nut dia.		nut length	nut dia.
LF [mm]	D1g6 [mm]	D4 [mm]	D6 [mm]	L3 [mm]	L9 [mm]	LZ [mm]	DZ h6 [mm]	LP [mm]	LA [mm]	DA [mm]
25	20	29	37	0	24	17	19	2.5	24	20.5
30	20	29	37	0	24	19	19	1.5	29	20.5
37	22	29	37	0	24	26	19	5	36	20.5
36	22	29	37	0	24	22	19	3.5	33	22.5
39	22	29	37	0	24	26	19	5	36	22.5
26	24	32	40	7 ◆	26					
21	24	32	40	8 ◆	26					
31	24	32	40	8 ◆	26					

All dimensions in mm.



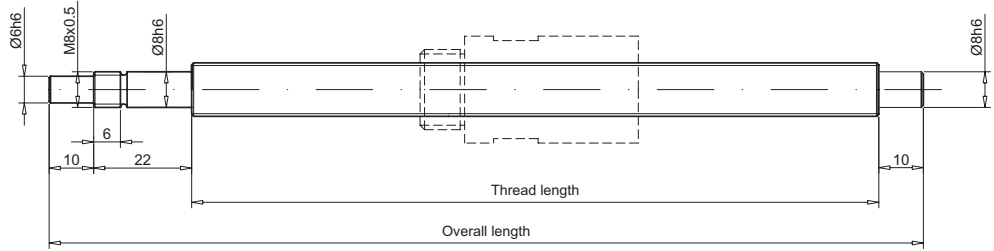
Nominal Diameter 12 mm

Rolled execution with standard bearing journal
Outer Diameter 11.5h8
Series 1530

1. Selection of Screw:

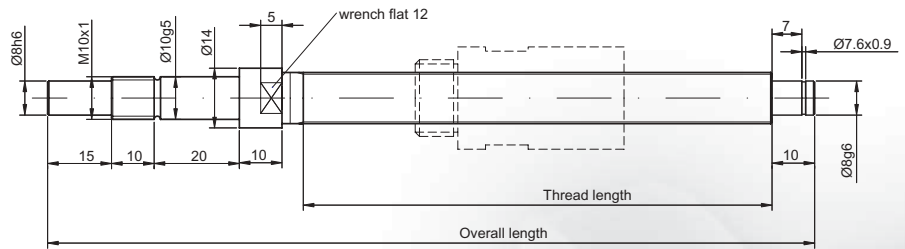
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
300	355	397



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	110	180
100	160	230
150	210	280
200	260	330
250	310	380
350	410	480
450	510	580



2. Selection of Nut:

Specifications

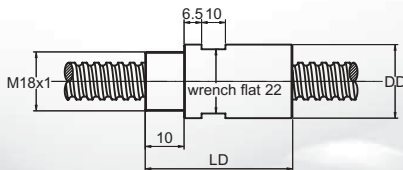
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]
1.12.1.2	1	12	2	1	1050	1610
2.12.1,5.2	2	12	2	1.5	1800	2200
3.12.2.2	3	12	2	2	2500	2800
4.12.2.2	4	12	2	2	2500	2800
5.12.2.2	5	12	2	2	2500	2800

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 · 10⁶ rev. service life.
- ▲ The preload is factory-set to F_{pr max} and can be reduced to a minimum of 30 N. The maximum permissible axial load of F_{max} is around 70 - 85 % of the preload.

Spring preloaded double nut in housing with connecting thread 1530



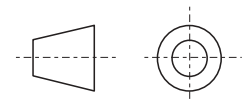
Series 1530:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1530

max. preload ^ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
50	40	1 - 2	49	24
80	70	1 - 2	49	24
80	70	1 - 2	49	24
80	70	1 - 2	49	24
80	70	1 - 2	49	24

All dimensions in mm.



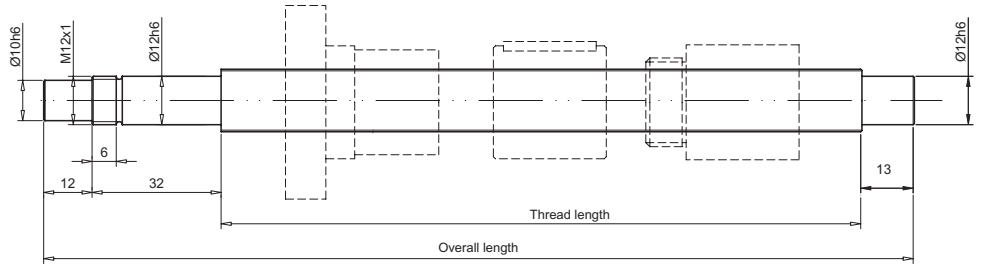
Nominal Diameter 16 mm

Rolled execution with standard bearing journal
 Outer Diameter 15.5h8
 Series 1432 / 2442, 1234, 1132

1. Selection of Screw:

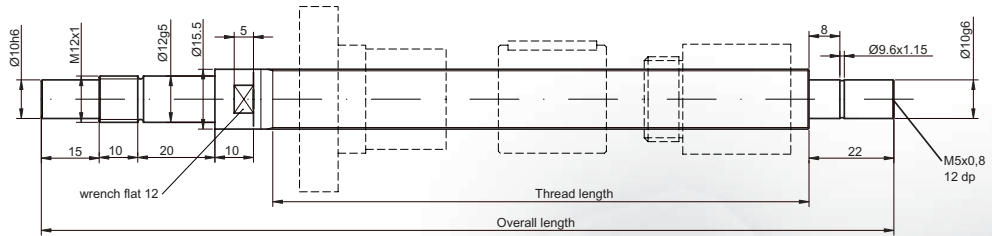
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
400	470	527



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	139	221
100	189	271
150	239	321
200	289	371
300	389	471
400	489	571
600	689	771
800	889	971



Nuts shown in standard orientation. Select **one** nut from table.

2. Selection of Nut:

Specifications							Nut with axial backlash		Nut backlash-free	
size	lead ● P [mm]	nom. dia. d _N [mm]	number of circ. ■ i	ball dia. [mm]	dyn. load capacity ◆ C _a [N]	stat. load capacity C _{0a} [N]	max. axial backl. [mm]	max. idling torque T ₀ [N cm]	axial backl. [mm]	max. idling torque T _{pr0} [N cm]
2.16.1,5,3	2	16	3	1.5	2900	4800	0.03	1.4	0	0.7-4
4.16.3,3	4	16	3	3	6900	8300	0.04	1.4	0	0.7-4
5.16.3,5,3	5	16	3	3.5	7900	8800	0.05	1.4	0	0.7-4
10.16.3,5,6	10	16	3+3	3.5	15300	20200	0.05	1.4	0	0.7-4
10.16.3,5,10 ▲	10	16	5+5 ▲	3.5	24500	34900	0.05	1.4	0	0.7-4
20.16.3,5,4	20	16	2+2	3.5	10100	13100	0.05	1.4	0	0.7-4
30.16.3,5,1	30	16	0.5+0.5	3.5	1800	1800	0.05	1.4	0	0.7-4

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a: permissible dynamic axial load resulting in 1 • 10⁶ rev. service life
- ▲ Alternate nut design. Quote number of circuits when ordering.

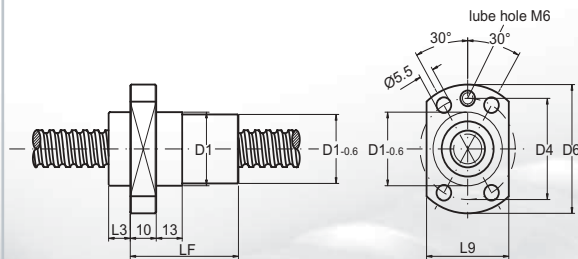
Flange nut 1432

2442



Series 1432 / 2442:
Nut with flange
and standard
wipers both ends

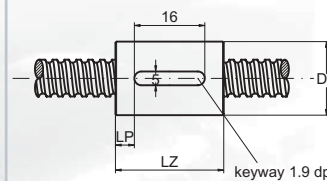
◆ Nut type 2442 only



Cylindrical nut 1234



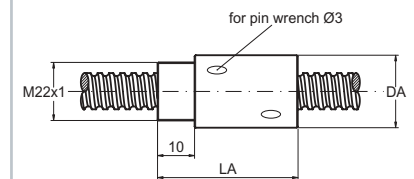
Series 1234:
Cylindrical nut
(with keyway)
without wipers



Nut with connecting thread 1132



Series 1132:
Nut with
connecting thread
without wipers



Flange nut 1432/2442

Cylindrical nut 1234

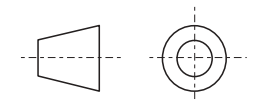
Nut w. connect. thread 1132

nut length	nut dia.	nut hole PCD	flange dia.	length	flange width
LF [mm]	D1g6 [mm]	D4 [mm]	D6 [mm]	L3 [mm]	L9 [mm]
32	25	35	44	0	29
38	28	38	48	0	31
44	28	38	48	0	31
33	32	42	52	11 ◆	40
53	32	42	52	11 ◆	40
38	32	42	52	10 ◆	40
26	32	42	52	11 ◆	40

nut length	nut dia.	
LZ [mm]	DZ h6 [mm]	LP [mm]
19	28	1.5
21	28	2.5
27	28	5.5

nut length	nut dia.
LA [mm]	DA [mm]
29	25.5
38	28.5
43	28.5

All dimensions in mm.



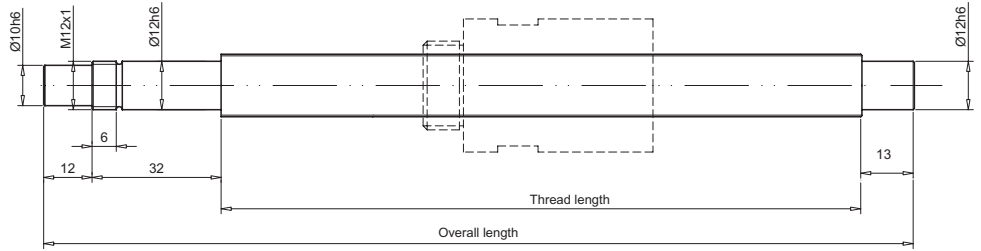
Nominal Diameter 16 mm

Roller execution with standard bearing journal
 Outer Diameter 15.5h8
 Series 1530

1. Selection of Screw:

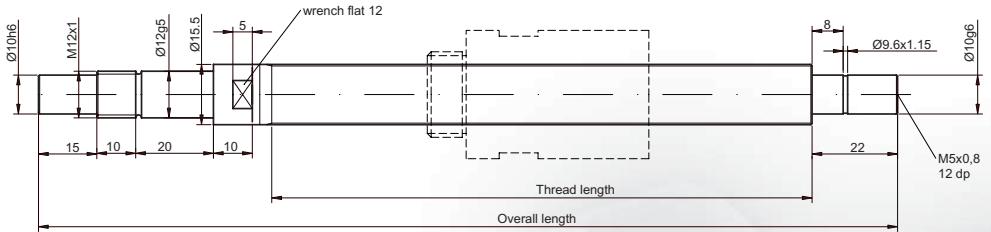
Screw Type A

Stroke [mm]	Thread length [mm]	Overall length [mm]
400	470	527



Screw Type B

Stroke [mm]	Thread length [mm]	Overall length [mm]
50	139	221
100	189	271
150	239	321
200	289	371
300	389	471
400	489	571
600	689	771
800	889	971



2. Selection of Nut:

Specifications

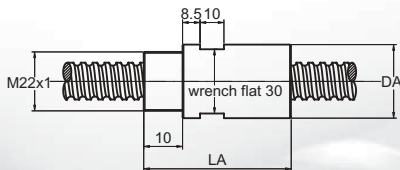
size	lead ● P [mm]	nom. dia. ■ d_N [mm]	number of circ. ◆ i	ball dia. [mm]	dyn. load capacity ◆ C_a [N]	stat. load capacity ● C_{0a} [N]
2,5.16.1,5.2	4	16	2	1.5	2100	3200
4.16.2.2	4	16	2	2	3000	4000
5.16.2,5.2	5	16	2	2.5	3900	4700

- Left hand thread and non-standard leads upon request
- Additional ball circuits for extended load capacities are also available.
- ◆ Dynamic load capacity C_a : permissible dynamic axial load resulting in $1 \cdot 10^6$ rev. service life.
- ▲ The preload is factory-set to $F_{pr max}$ and can be reduced to a minimum of 40 N. The maximum permissible axial load of F_{max} is around 70 - 85 % of the preload.

Spring preloaded double nut in housing with connecting thread 1530



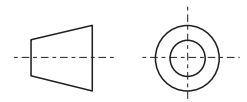
Series 1530:
Spring preloaded
double nut in
housing with
connecting
thread without
wipers



Spring preloaded double nut in housing with connecting thread 1530

max. preload ▲ $F_{pr\max}$ [N]	max. axial load F_{\max} [N]	idling torque T_{pr0} [Ncm]	nut length LD [mm]	nut dia. DD [mm]
120	100	1.5 - 3	57	33
120	100	1.5 - 3	57	33
150	130	1.5 - 3	57	33

All dimensions in mm.





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