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**Eichenberger** Gewinde



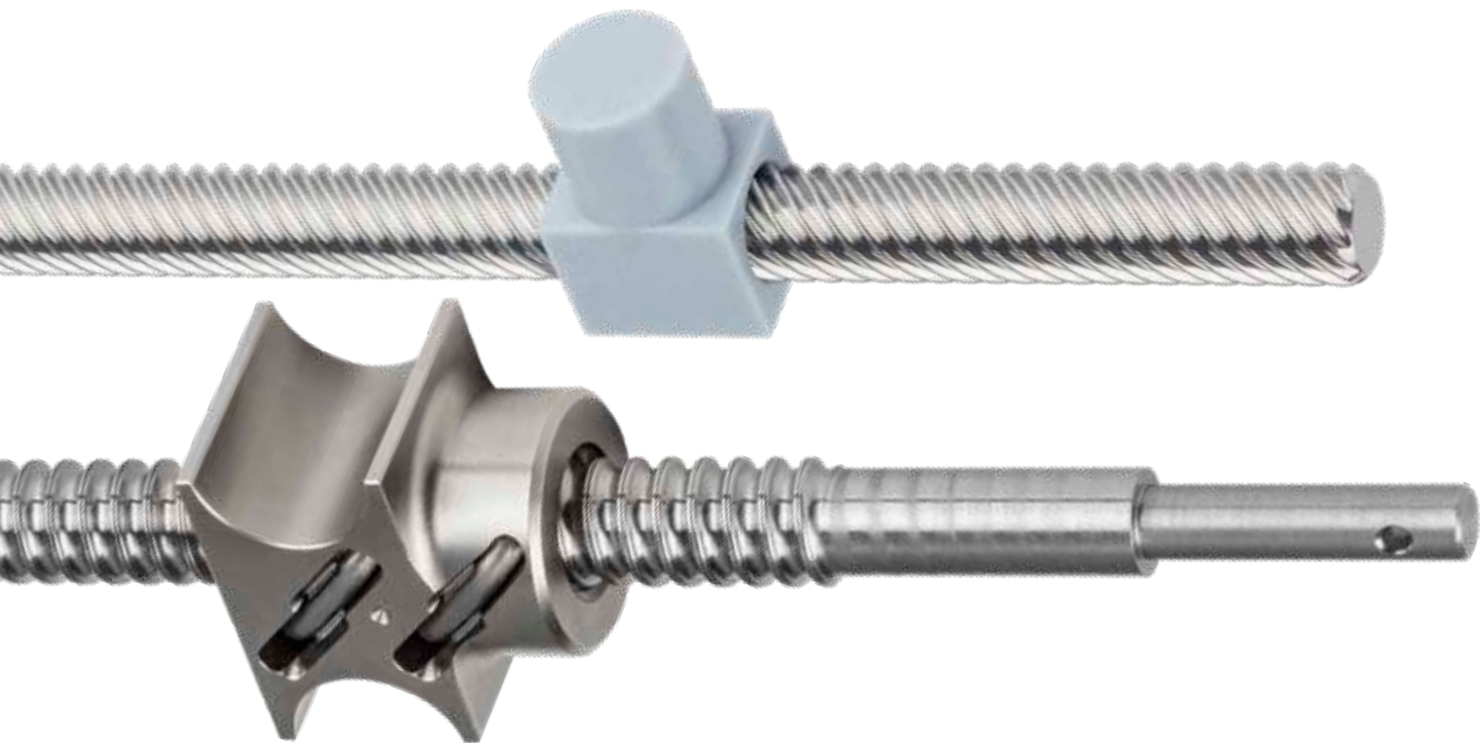
# Main Catalogue

**Ballscrews ■ Leadscrews**

100% Swiss made 



Your partner for thread drive solutions – 100% Swiss-made



Cold-rolled thread drives for every requirement

Eichenberger Gewinde AG has been supplying customers all over the world with “100% Swiss-made” thread drives for more than 30 years.

Eichenberger thread drives are high-performance nut and shaft units that have been tried and tested in their millions in all sorts of applications in linear and drive technology. Cost-effective and with maximum reliability and service life, they are manufactured using the high-quality and extremely economical cold-rolling process and offer precise conversion of rotational movement into linear movement and vice versa.

We are constantly expanding our comprehensive standard range of ballscrews and leadscrews, providing you with efficient and economical solutions “off the shelf”.

For complex projects with more advanced requirements, we can support you with expert advice at short notice during the development of individual drive solutions:

- customer-specific adjustments of Eichenberger standard thread drives
- unique, tailor-made special thread drives

Your tailor-made thread drive

Special requirements often demand tailor-made solutions. If our standard thread drives cannot fulfil your specs, we will offer a wide range of individualized options:

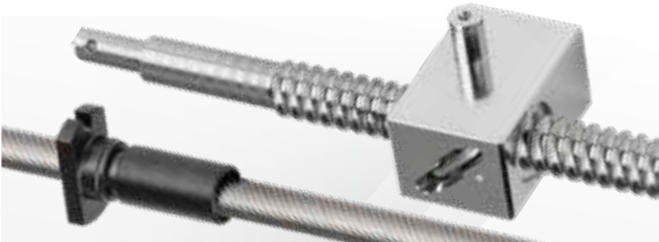
- application-specific nut shapes, including integrated additional features such as axles, mounting surfaces etc.
- individual thread profiles and customised ball sizes, e.g. for increased load ratings
- application-specific screw diameters and end machining
- special thread pitches
- customised number of ball circulations or number of carrying threads
- performance-optimised thread geometries
- special materials
- coating to improve sliding properties, to increase service life or as corrosion protection
- and much more.

Contact us with your revolutionary idea – we’ll support you during development and provide YOUR tailor-made thread drive!

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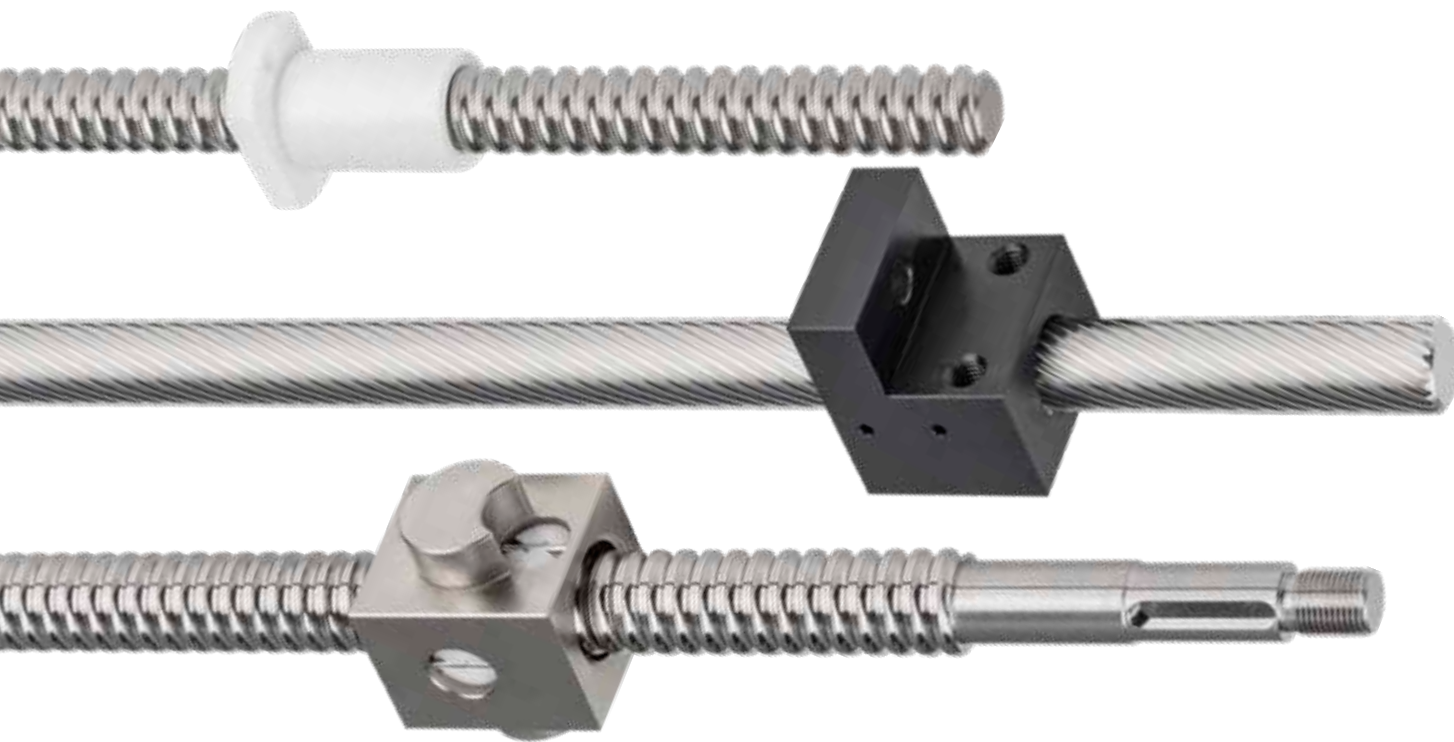
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## Individual tailor-made thread drives

100% Swiss made



### Your revolutionary idea – our tailor-made solutions

#### Any nut shape

Innovative solutions often require special, application-specific nut shapes – sometimes the nut even has to be integrated directly into a component. Or specific measurement requirements or performance parameters have to be complied with where standard thread drives simply don't suffice.

Thanks to maximum adaptability during development as well as manufacture, Eichenberger is your perfect partner for tailor-made thread drives in any shape and design.

#### Any kind of end machining

Our speciality is any kind of application-specific end machining – for your application, too.

Contact us with your revolutionary idea – we'll support you during development and provide YOUR tailor-made thread drive!



## Examples of customer-specific and application-specific solutions

#### Carry 6x1

- Medical technology
- Special nut with application-specific flange



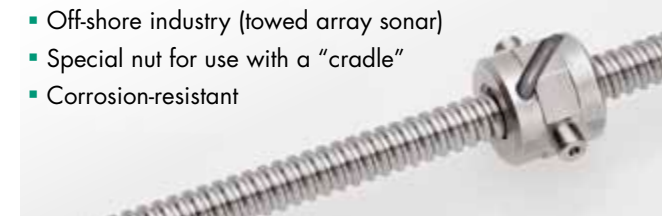
#### Carry 9.3x2

- Electronics industry (building electric motors)
- Customer-specific screw diameter, special nut, ball recirculation made of high-temperature technopolymer



#### Carry 8x2.5 made of corrosion-resistant steel

- Off-shore industry (towed array sonar)
- Special nut for use with a "cradle"
- Corrosion-resistant



#### Carry 16x5

- Off-shore industry (oil drilling)
- "Safety nut"



#### Carry 8x3

- Medical technology
- Special nut with direct linear slide connection



#### Carry 25x5

- Development and Prototype
- Hollow screw with extremely large, continuous bore hole



#### Carry 12x4

- Automation
- Special nut; screw and nut with coating to reduce sliding friction



#### Carry 10x2

- Electrically operated manual device
- Load rating increased based on customer-specific adjustment of tube type ball returns



#### Carry 10x2

- Medical technology; large-scale production
- Nut polished on the outside, featuring adhesive grooves



#### Carry 16x7

- Motor racing
- Special pitch
- Special nut



#### Speedy 4/10

- Injected two-part technopolymer nut ready for preloading by the customer



#### Speedy 26/60

- Graphics industry
- Stop adjustment





Standard range overview

100% Swiss made



Cold-rolled precision

The manufacturing core competency of Eichenberger Gewinde AG is thread rolling. That is why the thread profiles of Eichenberger screws are exclusively made using this highly precise process.

Thread rolling describes the cold-forming process of the surface of round components. A thread is created by deforming a part between two rotating rolling tools with radial dynamic force application. The rolling tool profiles penetrate the surface of the part. So when the material is cold, it is pressed into the base of the thread rolling tool and rolled to the nominal dimensions.



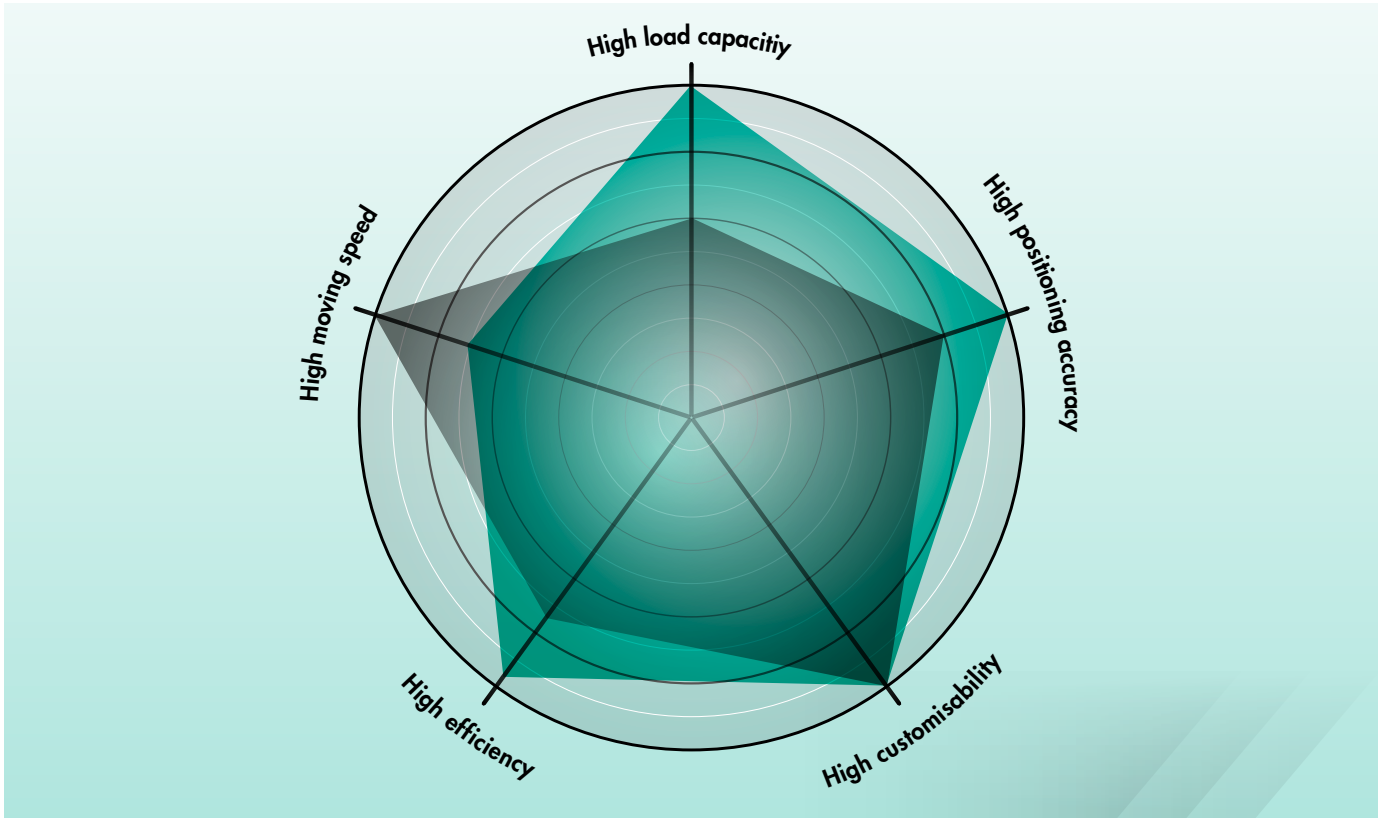
- Advantages of thread rolling:
- significant increase in strength based on cold-forming
  - very good roughness values on the edges of the thread and in the base radius
  - reduced notch-sensitivity
  - grain orientation is not interrupted as in machined threads
  - high dimensional accuracy
  - efficient and quick production
  - particularly cost-effective for large quantities

Even though all Eichenberger thread drives are made in accordance with the thread rolling process, the two construction series of the Eichenberger standard range,

- ballscrews (recirculating ballscrews in accordance with the principle of ball bearings) and
- leadscrews (thread drives with nut and screw thread edges that slide onto each other),

have very different performance characteristics, which are demonstrated in the overview.

Thread drive types and their characteristics



Ballscrews

Eichenberger ballscrews are characterised by:

- high load ratings, and are therefore suitable for high static and dynamic loads
  - medium to high travelling speeds thanks to over-square pitches ( $p > d$ )
  - excellent efficiency ( $\eta > 0.9$ ), therefore:
    - low drive power required
    - low energy consumption
    - low self-heating
  - low-friction operation
  - no stick-slip effect
  - high accuracy for positioning and repetition
  - high reliability and long service life with minimum need for maintenance
  - wipers possible
- **Carry** ballscrews

pages 8–39

Leadscrews

Eichenberger leadscrews are characterised by:

- small to medium load ratings, therefore suitable for low to medium loads
  - very high travelling speeds, thanks to over-square pitches ( $p \leq 6 \times d$ )
  - high efficiency ( $\eta \sim 0.5 \dots 0.8$ ), thanks to the finest surface quality of the steel leadscrews and nuts made of high-performance technopolymer
  - weight optimisation possible based on aluminium screws
  - performance optimisation sometimes possible based on coating
  - high reliability and long service life with marginal need for maintenance
- Eichenberger's leadscrew range includes three types:
- **Speedy** high-helix leadscrews
  - **Easy** light leadscrews
  - **Rondo** round-thread leadscrews

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### Design features

Carry screws are made using the highly economical cold-rolling process, offering – at a significant price advantage – precision that has so far only been achieved with ground screws. Carry screws are combined with individual steel nuts which are produced in a unique, highly efficient process.

Carry ballscrews offer all the advantages that are characteristic of ballscrews, such as:

- high efficiency ( $\eta > 0.9$ ), i.e.
  - low drive power
  - low self-heating
- high load ratings
- low-friction, stick-slip-free operation
- minimum wear, i.e. with consistent positioning precision, very good repeat accuracy is achieved
- high reliability and long service life

### Load ratings $C_{dyn}$ and $C_{stat}$

The dynamic and static load ratings of Eichenberger ballscrews are determined on commonly used and recognised DIN calculation bases.

According to our experience, higher values are usually achieved during practical applications.

### Materials

- standard: steel
  - 1.3505 (100Cr6)
  - 1.1213 (Cf53)
- on request:
  - corrosion-resistant steel 1.4034 (X46Cr13)
  - other materials
- on request:
  - coating for corrosion protection

 The use of corrosion-resistant steel results in lower load ratings! Details on request.

### Lead accuracy

- standard:
  - $G9 \triangleq \leq 0.1 \text{ mm/300 mm}$  (in accordance with DIN 69051)
- on request:
  - $G7 \triangleq \leq 0.052 \text{ mm/300 mm}$
  - $G5 \triangleq \leq 0.023 \text{ mm/300 mm}$

## Carry ballscrews – design features

### Nut types (shapes)



- Nut with mounting thread  
**Type FG...**
- cost-effective standard nut
  - outer diameter turned
  - with pin wrench hole



- Cylindrical nut  
**Type ZY...**
- outer diameter ground
  - with keyway



- Flange nut  
**Type FB... / FA...**
- mounting section and flange ground (Type FB...)
  - drilling pattern 1/2/3 following DIN 69051
  - flange type C on request

If required, any application-specific nut shapes can be manufactured.

Contact us with your revolutionary idea – we'll provide YOUR tailor-made ballscrew!

### Reduced backlash

Reduced backlash up to  $\leq 0.01 \text{ mm}$  is possible, if required (only for paired screw and nut units or those that have been mounted).

### Efficiency

Efficiency  $\eta$  for Carry ballscrews is more than 0.9  
➤ also see calculations and diagram, page 14

### Ball return systems



- End cap ball returns  
**Type ...E / ...F** 
- also for over-square pitches ( $p \geq d_o$ )
  - wipers firmly integrated into end caps
  - made of high-performance technopolymer
  - cost-effective



- Tube ball return, fully integrated into nut body  
**Type ...R** 
- for heavy loads
  - can also be used in high temperatures
  - space-saving in length



- Single-thread ball return  
**Type ...I** 
- space-saving in diameter
  - made of high-performance technopolymer
  - other materials (e.g. brass) on request

### Operational temperatures

During normal use:  $-20$  to  $+80 \text{ }^\circ\text{C}$ .

Different operational temperatures after consultation.

### Wipers

Depending on the type, technopolymer wipers (K) or brush wipers (B) can be mounted. Felt rings (F) on request (for lifetime lubrication).



## Production / Handling / Lubrication

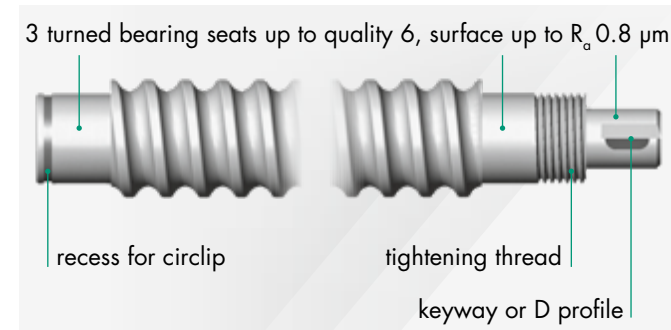
### Production lengths

In general, Eichenberger screws are produced as threaded rods with a length of 3 m.

### Any kind of end machining

Ballscrew ends are without any machining cut by grinding (standard).

Upon request, a so-called standard screw end journal with three turned bearing seats is available. Dimensions are as per customer specifications. Note also the links to the CAD data at [www.gewinde.ch](http://www.gewinde.ch)



Screws may also be ordered with softened ends for subsequent finishing by the customer.

Our speciality is any application-specific end machining: Tell us your requirements, and we'll provide YOUR tailor-made screw!

In each instance, a detailed drawing would be necessary.

### Radial loads and torque

Radial loads or torque brought to bear upon the nut result in overload of individual contact surfaces, thus seriously affecting the service life of the ballscrew assembly. Therefore it is important to properly mount the screw and to comply with all relevant form and positional tolerances.

### Handling

Ballscrews are precision parts and must be protected from shock, dirt or moisture when transported or stored. Please do not unpack until ready for use.

Please check for cleanness when mounting the ballscrew. Dirt or foreign matter on the ball race – especially inside the nut – may cause increased wear and premature failure.

### Lubrication

The usual specifications for lubricating ball bearings also apply to ballscrews. However, lubrication applied only once but intended to last a lifetime is not sufficient in most cases. Regular lubrication is required to extend the service life of the ballscrew.

⚠ When shipped, screws simply have a protective film. Before mounting or operating the ballscrew, units must be lubricated with the proper lubricant (through the lube hole for nuts with wipers; directly onto the screw for nuts without wipers).

Recommended all-purpose lubricant:

- Klüber Microlube GBU Y 131

When using another lubricant, please verify compatibility with anticorrosion agent; otherwise rinse ballscrew unit prior to lubrication.

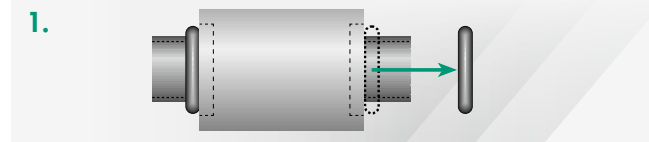
Do not use grease containing graphite or MoS!

### Surface coatings

... possible on request:

- generally to reduce sliding friction
- if lubrication is not possible (e.g. in the food industry)
- as corrosion protection > also see Materials, page 8

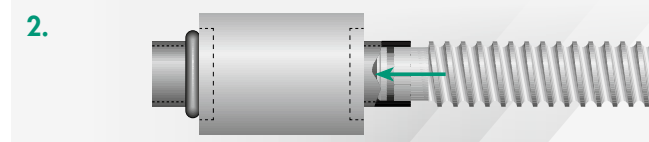
## Assembling of ballscrew units



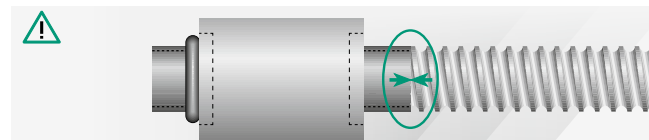
Remove transport lock (O-ring) on one side.

⚠ Please keep sleeve and nut in horizontal position. Otherwise, the nut may slide from the sleeve and balls may fall out of the ball race.

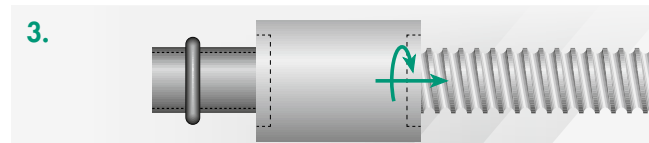
In the event such incident does occur, balls must be properly re-inserted to prevent damage to or blockage of the ballscrew. If in doubt, please contact Eichenberger Gewinde AG.



Insert screw end into mounting sleeve.



Operator must be able to advance sleeve up to the thread intake. Otherwise, balls may fall out of the ball race and damage or block the unit.



Gently turn nut onto the screw.

Please consult lubrication recommendation opposite before mounting or operating ballscrews.

Design fundamentals

The following are the relevant calculations which underlie screw design and safe operation.

For detailed information on ballscrew design, please refer to DIN 69051.

«Suitability test» rotational speed characteristics

When selecting a ballscrew it is important to first ensure that the correct nut design for the ball return system required to support the maximum rotational speed demanded by the application is used (independent of the screw length).

The maximum rotational speed is based on the system’s rotational speed characteristics and the outer screw diameter:

$$n_{max} = \frac{\text{rotational speed characteristic}}{d_1} \text{ [min}^{-1}\text{]}$$

$n_{max}$  = maximum rotational speed [min<sup>-1</sup>]

$d_1$  = outer screw diameter [mm]

Rotational speed characteristic [-] for:

- single-thread ball return: 60 000  
(Carry type ...I )
- tube ball return: 80 000  
(Carry type ...R )
- end cap ball return: 80 000  
(Carry type ...E/...F )

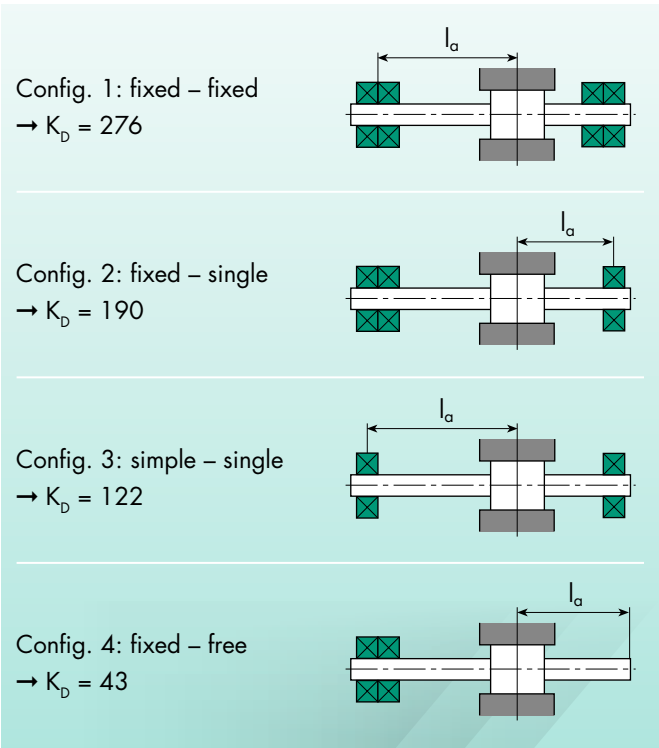
Calculations at dynamic load

Critical rotational speed  $n_{per}$

Permissible rotational speeds must differ substantially from the screw’s own frequency.

$$n_{per} = K_D \cdot 10^6 \cdot \frac{d_2}{l_a^2} \cdot S_n \text{ [min}^{-1}\text{]}$$

- $n_{per}$  = permissible rotational speed [min<sup>-1</sup>]
- $K_D$  = characteristic constant [-]  
as a function of bearing configuration > see below
- $d_2$  = core screw diameter [mm]
- $l_a$  = bearing distances [mm] > see below  
(always include maximum allowable  $l_a$  in calculation!)
- $S_n$  = safety factor [-], usually  $S_n = 0.5 \dots 0.8$



Nominal service life  $L_{10}$  or  $L_h$

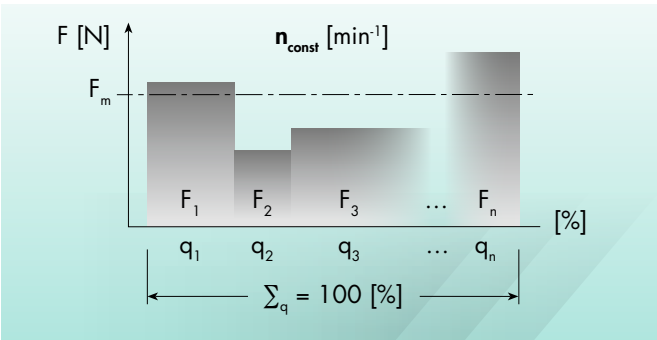
$$L_{10} = \left( \frac{C_{dyn}}{F_m} \right)^3 \cdot 10^6 \text{ [R]}$$

$$L_h = \frac{L_{10}}{n_m \cdot 60} \text{ [h]}$$

- $L_{10}$  = service life in revolutions [R]
- $L_h$  = service life in hours [h]
- $C_{dyn}$  = dynamic load rate [N]
- $F_m$  = average axial load [N]
- $F_{1...n}$  = load per cycle unit [N]
- $n_m$  = average rotational speed [min<sup>-1</sup>]
- $n_{1...n}$  = rotational speed per cycle unit [min<sup>-1</sup>]
- $q_{1...n}$  = cycles [%]
- $100 = \sum q$  (sum of cycles  $q_{1...n}$ ) [%]

Average axial load  $F_m$   
at constant rotational speed  $n_{const}$  and dynamic load  $C_{dyn}$

$$F_m = \sqrt[3]{F_1^3 \frac{q_1}{100} + F_2^3 \frac{q_2}{100} + \dots + F_n^3 \frac{q_n}{100}} \text{ [N]}$$



$$\rightarrow L_{10} = \left( \frac{C_{dyn}}{F_m} \right)^3 \cdot 10^6 \text{ [R]}$$

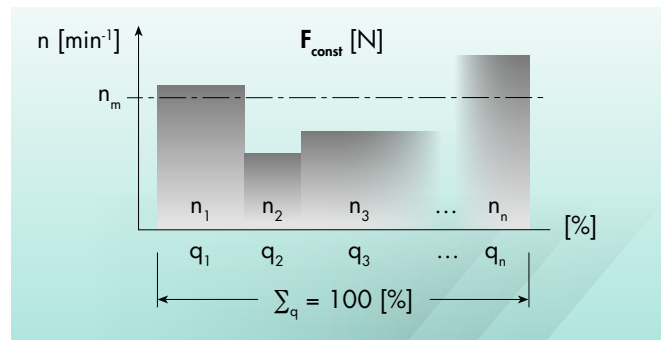
$$\rightarrow L_h = \frac{L_{10}}{n_{const} \cdot 60} \text{ [h]}$$

## Calculations at dynamic load (continued)

### Average rotational speed $n_m$

at constant load  $F_{const}$  and variable rotational speeds  $n_1 \dots n_n$

$$n_m = n_1 \frac{q_1}{100} + n_2 \frac{q_2}{100} + \dots + n_n \frac{q_n}{100} \text{ [min}^{-1}\text{]}$$



$$\rightarrow L_{10} = \left( \frac{C_{dyn}}{F_{const}} \right)^3 \cdot 10^6 \text{ [R]}$$

$$\rightarrow L_h = \frac{L_{10}}{n_m \cdot 60} \text{ [h]}$$

### Average axial load $F_m$

at constant rotational speeds  $n_1 \dots n_n$  and dynamic load  $C_{dyn}$

$$F_m = \sqrt[3]{\frac{F_1^3 \cdot n_1 \cdot \frac{q_1}{100} + F_2^3 \cdot n_2 \cdot \frac{q_2}{100} + \dots + F_n^3 \cdot n_n \cdot \frac{q_n}{100}}{n_m}} \text{ [N]}$$

$$n_m = n_1 \frac{q_1}{100} + n_2 \frac{q_2}{100} + \dots + n_n \frac{q_n}{100} \text{ [min}^{-1}\text{]}$$

$$\rightarrow L_{10} = \left( \frac{C_{dyn}}{F_m} \right)^3 \cdot 10^6 \text{ [R]}$$

$$\rightarrow L_h = \frac{L_{10}}{n_m \cdot 60} \text{ [h]}$$

### Efficiency $\eta$ (theoretical)

depends upon the type of power transmission

- Case 1: torque  $\rightarrow$  linear movement

$$\eta \approx \frac{\tan \alpha}{\tan (\alpha + \rho)} \text{ [-]}$$

- Case 2: axial force  $\rightarrow$  torque

$$\eta' \approx \frac{\tan (\alpha - \rho)}{\tan \alpha} \text{ [-]}$$

whereby

$$\tan \alpha \approx \frac{p}{d_o \cdot \pi} \text{ [-]}$$

$\eta$  = efficiency [%]

$\eta'$  = corrected efficiency [%]

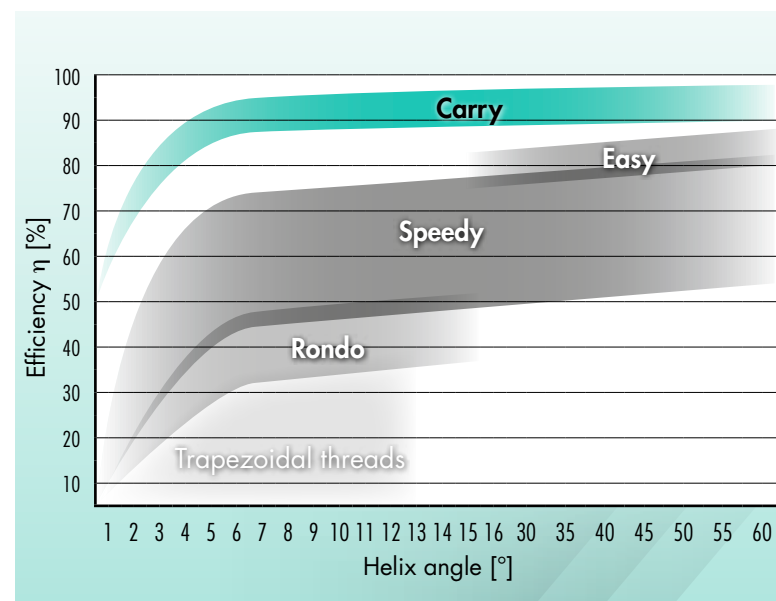
$p$  = pitch [mm]

$d_o$  = nominal screw diameter [mm]

$\rho$  = angle of friction  $[\circ] \rightarrow \rho = 0.30 \dots 0.60^\circ$

### Efficiency $\eta_p$ (practical)

The efficiency  $\eta$  for Carry ballscrews is better than 0.9



### Driving torque $M$

depends upon the type of power transmission

- Case 1: torque  $\rightarrow$  linear movement

$$M_o = \frac{F_o \cdot p}{2000 \cdot \pi \cdot \eta} \text{ [Nm]}$$

- Case 2: axial force  $\rightarrow$  torque

$$M_e = \frac{F_o \cdot p \cdot \eta'}{2000 \cdot \pi} \text{ [Nm]}$$

$M_o$  = input torque [Nm], case 1

$M_e$  = output torque [Nm], case 2

$F_o$  = axial force [N]

$p$  = pitch [mm]

$\eta$  = efficiency [%]

$\eta'$  = corrected efficiency [%]

### Input performance $P$

$$P = \frac{M_o \cdot n}{9550} \text{ [kW]}$$

$P$  = input performance [kW]

$n$  = rotational speed [min<sup>-1</sup>]

A safety margin of 20% is recommended when selecting drives.

## Calculations at static load

### Permissible maximum load $F_{per}$

$$F_{per} = \frac{C_{stat}}{f_s} \text{ [N]}$$

$C_{stat}$  = static load rate [N]

$f_s$  = operating coefficient

$\rightarrow$  normal operation: 1 ... 2 [-]

$\rightarrow$  shock load: 2 ... 3 [-]

### Permissible buckling force $F_B$

$$F_B = \frac{K_B}{S_B} \cdot \frac{d_2^4}{l_a^2} \cdot 10^3 \text{ [N]}$$

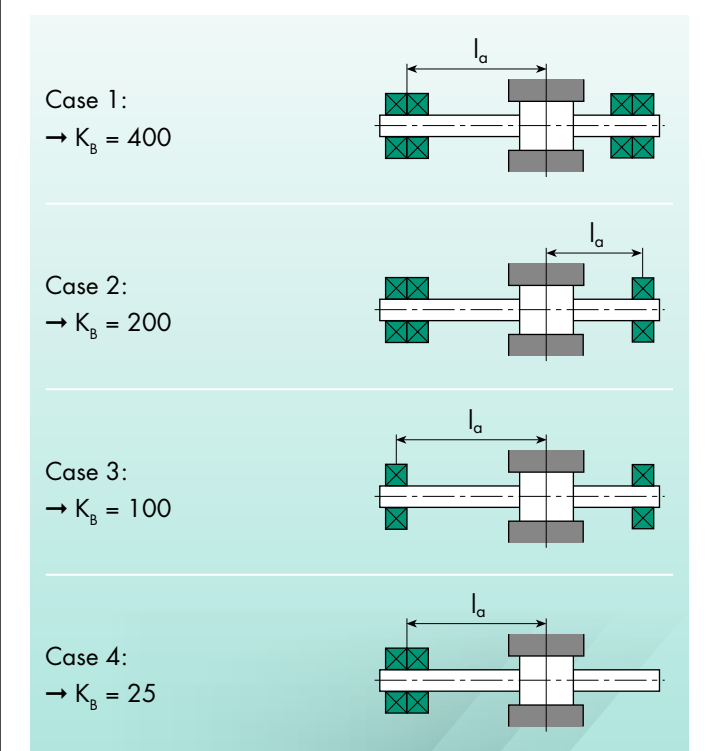
$K_B$  = characteristic constant of load [-]

depends on design  $\rightarrow$  see below

$d_2$  = core screw diameter [mm]

$S_B$  = buckling safety factor [-]  $\rightarrow$  usually  $S_B = 2 \dots 4$

$l_a$  = force-transferring screw length [mm]





Order system – Carry ballscrews

Example for complete Carry ballscrew

Type of thread drive  
KGT = Carry ballscrew

Nominal size (d<sub>0</sub> × p) [mm]

Nut type:  
▪ Shape  
ZY = cylindrical nut type ZY...  
FG = nut with mounting thread type FG...  
FB = flange nut type FB...  
FA = flange nut type FA...  
MS = special design according to drawing

▪ Ball return system (assignment to nut shapes acc. dimensional charts)  
I = single-thread ball return type ...I  
R = tube ball return type ...R  
E = end cap ball return type ...E  
F = end cap ball return type ...F

Right-hand / left-hand thread  
RH = right-hand thread (standard)  
LH = left-hand thread (availability see dimensional charts)

Number of ball circulations (i)  
1 = 1 ball circulation  
2 = 2 ball circulations  
3 = 3 ball circulations  
4 = 4 ball circulations

Wipers (SA)  
S = with wipers (technopolymer or brush)  
N = without wipers

Ballscrew overall length [mm]

Lead accuracy (class)  
G9 = ≤0.1 mm/300 mm (standard)  
G7 = ≤0.052 mm/300 mm (on request)  
G5 = ≤0.023 mm/300 mm (on request)

Backlash (T<sub>max</sub>)  
A = standard backlash (see dimensional charts)  
R = reduced backlash upon specification

Screw end machining  
O = no end machining (cut by grinding, hardened ends)  
E = end machining according to drawing

Assembly  
G = screw and nut separate  
M = screw and nut assembled according to drawing/specified orientation

KGT 16×5 FGR RH 1 S 350 G7 A E M

for nut only

for nut only

for nut only

for nut only

for screw only

for screw only

for screw only

for screw only

Example for screw only

Example for nut only

KGT 16×5 RH 350 G7 O G

KGT 16×5 FGR RH 1 S A G

Dimension map – Carry standard range

| d <sub>0</sub> × p [mm] |      | Nominal diameter d <sub>0</sub> [mm] |   |       |       |       |        |       |         |    |       |       |       |       |    |
|-------------------------|------|--------------------------------------|---|-------|-------|-------|--------|-------|---------|----|-------|-------|-------|-------|----|
|                         |      | 4                                    | 5 | 6     | 8     | 10    | 12     | 12.7  | 14      | 15 | 16    | 20    | 25    | 32    | 40 |
| Pitch p [mm]            | 1    | ■                                    |   | ■     | ■     |       |        |       |         |    |       |       |       |       |    |
|                         | 1.5  |                                      |   |       | ■     |       |        |       |         |    |       |       |       |       |    |
|                         | 2    |                                      | ■ | ■     | ■     | ■     | ■      |       | ■       |    | ■     | ■     |       |       |    |
|                         | 2.5  |                                      |   |       | ■     |       |        |       |         |    |       |       |       |       |    |
|                         | 3    |                                      | ■ |       | ■     | ■     | ■      |       |         |    |       |       |       |       |    |
|                         | 4    |                                      |   |       |       | ■     | ■      |       | ■       |    |       |       |       |       |    |
|                         | 5    |                                      |   |       | ■     |       | ■      |       |         |    | ■     | ■     | ■     | ■     | ■  |
|                         | 6    |                                      |   | ■     |       |       |        |       |         |    |       |       |       |       |    |
|                         | 8    |                                      |   |       | ■     |       |        |       |         |    |       |       |       |       |    |
|                         | 10   |                                      |   |       |       | ■     | ■      |       |         |    | ■     | ■     | ■     | ■     |    |
|                         | 12   |                                      |   |       | ■     |       | ■      |       |         |    |       |       |       |       |    |
|                         | 12.7 |                                      |   |       |       |       |        | ■     |         |    |       |       |       |       |    |
|                         | 15   |                                      |   |       |       |       |        |       |         |    |       |       |       | ■     |    |
|                         | 16   |                                      |   |       |       |       |        |       |         |    | ■     |       |       |       |    |
|                         | 20   |                                      |   |       |       |       |        |       |         | ■  |       | ■     |       |       | ■  |
|                         | 25   |                                      |   |       |       |       |        |       |         |    |       |       | ■     |       |    |
|                         | 25.4 |                                      |   |       |       |       |        | ■     |         |    |       |       |       |       |    |
|                         | 30   |                                      |   |       |       |       |        |       |         |    |       |       | ■     |       |    |
|                         | 32   |                                      |   |       |       |       |        |       |         |    |       |       |       | ■     |    |
|                         | 40   |                                      |   |       |       |       |        |       |         |    |       |       |       |       | ■  |
|                         | 50   |                                      |   |       |       |       |        |       |         |    | ■     |       |       |       |    |
| Register                |      | σ 4/5/6                              |   | σ 8   | σ 10  | σ 12  | σ 12.7 | σ 14  | σ 15/16 |    | σ 20  | σ 25  | σ 32  | σ 40  |    |
| Pages                   |      | 18/19                                |   | 20/21 | 22/23 | 24/25 | 26/27  | 28/29 | 30/31   |    | 32/33 | 34/35 | 36/37 | 38/39 |    |

Carry ballscrews

16

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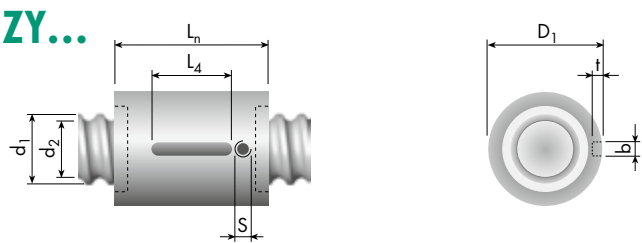
17

Carry

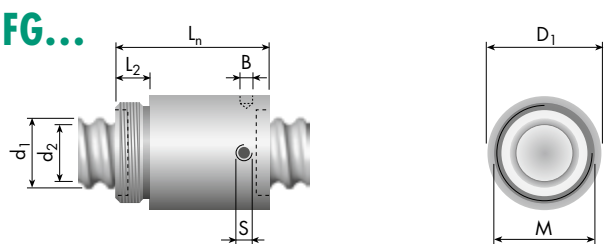


ø4/5/6

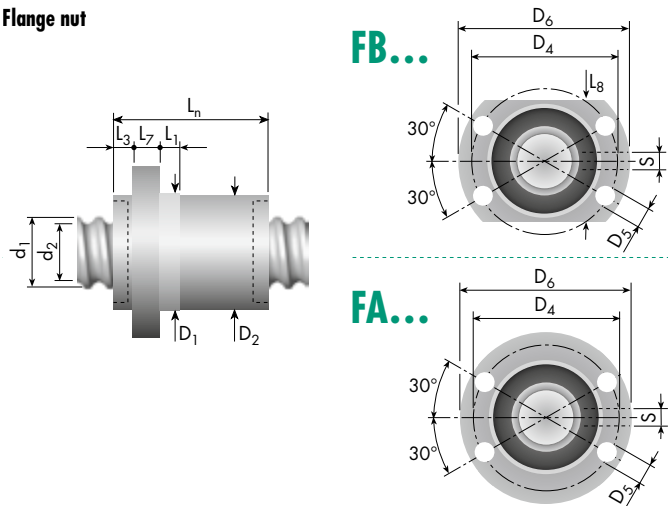
Cylindrical nut



Nut with mounting thread



Flange nut

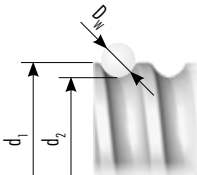


Ball return systems (details > page 9)



Legend

d<sub>0</sub> = nominal screw diameter [mm]  
d<sub>1</sub> = outer screw diameter [mm]  
d<sub>2</sub> = core diameter [mm]  
p = pitch [mm]



i = number of ball circulations [-]  
D<sub>w</sub> = ball diameter [mm]  
B = pin wrench hole \* [mm]  
S = lubrication hole \* [mm]  
SA = wipers (details > page 9)  
K = technopolymer wipers  
B = brush wipers  
F = felt rings (on request)

T<sub>max</sub> = max. standard backlash [mm]  
\*) = only on request  
\* position not defined  
Special designs available on request

⚠ When selecting a ballscrew, always observe the maximum rotational speed dependent on the system-specific rotational speed characteristics! Calculation > page 12

| Nominal size<br>d <sub>0</sub> × p [mm] | Ball return |      | Relative cost | Right-/left-hand thread | Dimensions [mm]         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  | Load rates [N]   |                   | Nominal size<br>d <sub>0</sub> × p [mm] |
|-----------------------------------------|-------------|------|---------------|-------------------------|-------------------------|----------------|-----------------------|----------------|-------------------|--------------------|--------------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|---------|----------------|-----------|------|-----|-----|------|------------------|------------------|-------------------|-----------------------------------------|
|                                         | Type        |      |               |                         | Screw<br>d <sub>1</sub> | d <sub>2</sub> | Nut<br>D <sub>1</sub> | D <sub>2</sub> | D <sub>4</sub> TK | D <sub>5</sub> H13 | D <sub>6</sub> h13 | M         | L <sub>a</sub> | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>7</sub> | L <sub>8</sub> h13 | i       | D <sub>W</sub> | B +0.5/0  | b P9 | t   | S   | SA   | T <sub>max</sub> | C <sub>dyn</sub> | C <sub>stat</sub> |                                         |
| 4 × 1                                   | ...I        |      | €€€           | RH / —                  | 4.0                     | 3.2            | 8 g <sub>6</sub>      | —              | —                 | —                  | —                  | 10        | —              | —              | —              | —              | —              | —              | 3 × 1              | 0.80    | —              | ø2 +0.1/0 | 1.0  | —   | —   | 0.03 | 430              | 580              | 4 × 1             |                                         |
| 5 × 2                                   | ...I        |      | €€€           | RH / —                  | 5.0                     | 4.0            | 10 g <sub>6</sub>     | —              | —                 | —                  | —                  | 14        | —              | —              | —              | 8              | —              | —              | 3 × 1              | 0.80    | —              | 2         | 1.0  | —   | —   | 0.03 | 500              | 800              | 5 × 2             |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
| 6 × 1                                   | ...I        |      | €€€           | RH / —                  | 6.0                     | 5.0            | 12 g <sub>6</sub>     | —              | —                 | —                  | —                  | 14        | —              | —              | —              | 8              | —              | —              | 3 × 1              | 0.80    | —              | 2         | 1.2  | —   | —   | 0.03 | 600              | 1 000            | 6 × 1             |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
| 5 × 2                                   | ...I        |      | €€            | RH / —                  | 5.0                     | 4.0            | 10 0/−0.1             | —              | —                 | —                  | —                  | M8 × 0.75 | 18             | —              | 6              | —              | —              | —              | 3 × 1              | 0.80    | 2.5            | —         | —    | —   | —   | 0.03 | 500              | 800              | 5 × 2             |                                         |
|                                         | 5 × 3       | ...I |               | €€                      | RH / —                  | 5.0            | 4.2                   | 10 0/−0.1      | —                 | —                  | —                  | —         | M8 × 0.75      | 19             | —              | 6              | —              | —              | —                  | 2 × 1   | 0.80           | 2.5       | —    | —   | —   | —    | 0.03             | 340              | 490               | 5 × 3                                   |
|                                         | 5 × 3       | ...I |               | €€                      | RH / —                  | 5.0            | 4.2                   | 10 0/−0.1      | —                 | —                  | —                  | —         | M8 × 0.75      | 23             | —              | 6              | —              | —              | —                  | 3 × 1   | 0.80           | 2.5       | —    | —   | —   | —    | 0.03             | 480              | 770               | 5 × 3                                   |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         | 6 × 2       | ...R |               | €€                      | RH / LH                 | 5.7            | 4.6                   | 16 0/−0.1      | —                 | —                  | —                  | —         | M12 × 1        | 22             | —              | 8              | —              | —              | —                  | 1 × 3.5 | 1.59           | 2.5       | —    | —   | —   | —    | 0.06             | 1 700            | 2 300             | 6 × 2                                   |
|                                         | 6 × 2       | ...F |               | €                       | RH / —                  | 5.7            | 4.6                   | 19 0/−0.1      | —                 | —                  | —                  | —         | M16 × 1        | 19             | —              | 8              | —              | —              | —                  | 1 × 3.7 | 1.59           | 2.5       | —    | —   | ø 2 | K    | 0.05             | 1 900            | 2 800             | 6 × 2                                   |
| 6 × 6                                   | ...F        |      | €             | RH / —                  | 5.9                     | 4.6            | 19 0/−0.1             | —              | —                 | —                  | —                  | M16 × 1   | 19             | —              | 8              | —              | —              | —              | 2 × 1.6            | 1.50    | 2.5            | —         | —    | ø 2 | K   | 0.05 | 1 700            | 2 600            | 6 × 6             |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
| 4 × 1                                   | ...I        |      | €€€           | RH / —                  | 4.0                     | 3.2            | 8 g <sub>6</sub>      | 7.9            | 12                | 2.7                | 17                 | —         | 14             | 2              | —              | —              | —              | 3              | 11                 | 3 × 1   | 0.80           | —         | —    | —   | —   | —    | 0.03             | 430              | 580               | 4 × 1                                   |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
| 6 × 1                                   | ...I        |      | €€€           | RH / —                  | 6.0                     | 5.0            | 12 g <sub>6</sub>     | 11.8           | 18                | 3.4                | 24                 | —         | 18             | 4              | —              | —              | —              | 4              | 16                 | 3 × 1   | 0.80           | —         | —    | —   | ø 2 | K    | 0.03             | 600              | 1 000             | 6 × 1                                   |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
| 6 × 2                                   | ...F        |      | €€            | RH / —                  | 5.7                     | 4.6            | 18 −0.01/−0.05        | 17.5           | 26                | 3.4                | 34                 | —         | 19             | 4              | —              | 4              | —              | 4              | —                  | 1 × 3.7 | 1.59           | —         | —    | —   | ø 2 | K    | 0.05             | 1 900            | 2 800             | 6 × 2                                   |
| 6 × 6                                   | ...F        |      | €€            | RH / —                  | 5.9                     | 4.6            | 18 −0.01/−0.05        | 17.5           | 26                | 3.4                | 34                 | —         | 19             | 4              | —              | 4              | —              | 4              | —                  | 2 × 1.6 | 1.50           | —         | —    | —   | ø 2 | K    | 0.05             | 1 700            | 2 600             | 6 × 6                                   |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |      |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |           |      |     |     |      |                  |                  |                   |                                         |

> CAD data > [www.gewinde.ch](http://www.gewinde.ch)

Technical drawing of a shaft-hub connection. The side view on the left shows a shaft with a central hub. Dimensions include:  $L_n$  (total length),  $L_2$  (length of the first section),  $B$  (width of the hub),  $d_1$  (outer diameter of the shaft),  $d_2$  (inner diameter of the shaft), and  $S$  (thickness of the hub). The end view on the right shows the outer diameter  $D_1$  and the inner diameter  $M$ .

**Flange nut**

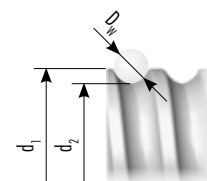
Side view dimensions:  $L_n$  (total length),  $L_3$  (thread length),  $L_7$  (flange thickness),  $L_1$  (flange width),  $d_1$  (outer diameter),  $d_2$  (inner diameter),  $D_1$  (flange outer diameter),  $D_2$  (flange inner diameter).

End view dimensions:  $D_6$  (outer diameter),  $D_4$  (flange outer diameter),  $L_8$  (flange thickness),  $S$  (flange width),  $D_5$  (flange inner diameter),  $30^\circ$  (flange chamfer angle).

> CAD data > [www.gewinde.ch](http://www.gewinde.ch)

Type ... Type ...R Type ...E / ...F 

$d_0$  = nominal screw diameter [mm]  
 $d_1$  = outer screw diameter [mm]  
 $d_2$  = core diameter [mm]  
 $p$  = pitch [mm]



SA = wipers (details > page 9)  
K = technopolymer wipers  
B = brush wipers  
F = felt rings (on request)

 When selecting a ballscrew, always observe the maximum rotational speed dependent on the system-specific rotational speed characteristics!

Calculation > page 12

### Cylindrical nut

Technical drawing of a shaft-hub connection. The side view shows a shaft with diameter  $d_1$  and  $d_2$  (with a tolerance of  $\pm 0.015$ ) inserted into a hub with bore diameter  $D_1$ . The total length of the assembly is  $L_n$ . The distance from the end of the shaft to the start of the hub is  $L_2$ . The hub has a width  $B$ . The shaft has a shoulder height  $S$ . The end view shows the hub's outer diameter  $D_1$  and the shaft's outer diameter  $M$ .

Single-thread ball return  
Type ...I

Tube ball return  
Type ...R

$d_0$  = nominal screw diameter [mm]  
 $d_1$  = outer screw diameter [mm]  
 $d_2$  = core diameter [mm]  
 $p$  = pitch [mm]

A schematic diagram showing a particle on a surface. An incident ray strikes the particle at an angle  $\theta_i$  relative to the surface normal. A reflected ray is shown at an angle  $\theta_r$  relative to the surface normal. The vertical distances from the surface to the incident and reflected rays are labeled  $d_1$  and  $d_2$  respectively.

|                |                                   |    |                             |
|----------------|-----------------------------------|----|-----------------------------|
| i              | = number of ball circulations [-] | SA | = wipers (details > page 9) |
| D <sub>W</sub> | = ball diameter [mm]              | K  | = technopolymer wipers      |
| B              | = pin wrench hole * [mm]          | B  | = brush wipers              |
| S              | = lubrication hole * [mm]         | F  | = felt rings (on request)   |

T<sub>max</sub> = max. standard backlash [mm]  
 3) = only on request  
 \* position not defined  
 Special designs available on request

 When selecting a ballscrew, always observe the maximum rotational speed dependent on the system-specific rotational speed characteristics!

Calculation > page 12

| Nominal size<br>d <sub>0</sub> × p [mm] | Ball return                                                                                | Relative cost | Right-/left-hand thread | Dimensions [mm] |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     | Load rates [N] |    | Nominal size<br>d <sub>0</sub> × p [mm] |                  |                  |                      |
|-----------------------------------------|--------------------------------------------------------------------------------------------|---------------|-------------------------|-----------------|----------------|-----------------------|----------------|-------------------|--------------------|--------------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|---------|----------------|----------|------|-----|----------------|----|-----------------------------------------|------------------|------------------|----------------------|
|                                         | Type                                                                                       |               |                         | d <sub>1</sub>  | d <sub>2</sub> | Nut<br>D <sub>1</sub> | D <sub>2</sub> | D <sub>4</sub> TK | D <sub>5</sub> H13 | D <sub>6</sub> h13 | M         | L <sub>n</sub> | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>7</sub> | L <sub>8</sub> h13 | i       | D <sub>W</sub> | B +0.5/0 | b p9 | t   | S              | SA |                                         | T <sub>max</sub> | C <sub>dyn</sub> | C <sub>stat</sub>    |
| 10 × 2                                  | ...I    | €€€           | RH / LH                 | 9.7             | 8.2            | 18 g <sub>6</sub>     | —              | —                 | —                  | —                  | —         | 14             | —              | —              | —              | 10             | —              | —                  | 2 × 1   | 1.59           | —        | 3    | 1.2 | —              | —  | 0.06                                    | 1 250            | 2 100            | 10 × 2               |
| 10 × 2 <sup>3)</sup>                    | ...I    | €€€           | RH / LH                 | 9.7             | 8.2            | 18 g <sub>6</sub>     | —              | —                 | —                  | —                  | —         | 20             | —              | —              | —              | 10             | —              | —                  | 3 × 1   | 1.59           | —        | 3    | 1.2 | —              | —  | 0.06                                    | 1 750            | 3 200            | 10 × 2 <sup>3)</sup> |
| 10 × 3                                  | ...R    | €€€           | RH / LH                 | 9.9             | 7.8            | 22 g <sub>6</sub>     | —              | —                 | —                  | —                  | —         | 24             | —              | —              | —              | 10             | —              | —                  | 1 × 3.5 | 2.00           | —        | 3    | 2.0 | —              | —  | 0.06                                    | 2 800            | 5 000            | 10 × 3               |
| 10 × 3                                  | ...R    | €€€           | RH / LH                 | 9.9             | 7.8            | 22 g <sub>6</sub>     | —              | —                 | —                  | —                  | —         | 24             | —              | —              | —              | 10             | —              | —                  | 1 × 3.5 | 2.00           | —        | 3    | 2.0 | ø 3.5          | K  | 0.06                                    | 2 800            | 5 000            | 10 × 3               |
| 10 × 4                                  | ...I    | €€€           | RH / —                  | 10.0            | 7.5            | 18 g <sub>6</sub>     | —              | —                 | —                  | —                  | —         | 35             | —              | —              | —              | 10             | —              | —                  | 4 × 1   | 2.50           | —        | 3    | 1.2 | —              | —  | 0.07                                    | 4 100            | 6 700            | 10 × 4               |
| 10 × 4                                  | ...I    | €€€           | RH / —                  | 10.0            | 7.5            | 18 g <sub>6</sub>     | —              | —                 | —                  | —                  | —         | 35             | —              | —              | —              | 10             | —              | —                  | 4 × 1   | 2.50           | —        | 3    | 1.2 | ø 2            | K  | 0.07                                    | 4 100            | 6 700            | 10 × 4               |
| 10 × 10                                 | ...R    | €€€           | RH / —                  | 9.8             | 7.9            | 23 g <sub>6</sub>     | —              | —                 | —                  | —                  | —         | 26             | —              | —              | —              | 10             | —              | —                  | 2 × 1.5 | 2.00           | —        | 3    | 2.0 | —              | —  | 0.06                                    | 2 500            | 4 500            | 10 × 10              |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
| 10 × 2                                  | ...I    | €€            | RH / LH                 | 9.7             | 8.2            | 18 0/−0.1             | —              | —                 | —                  | —                  | M16 × 1   | 22             | —              | 8              | —              | —              | —              | —                  | 2 × 1   | 1.59           | 2.5      | —    | —   | —              | —  | 0.06                                    | 1 250            | 2 100            | 10 × 2               |
| 10 × 2 <sup>3)</sup>                    | ...I    | €€            | RH / LH                 | 9.7             | 8.2            | 18 0/−0.1             | —              | —                 | —                  | —                  | M16 × 1   | 28             | —              | 8              | —              | —              | —              | —                  | 3 × 1   | 1.59           | 2.5      | —    | —   | —              | —  | 0.06                                    | 1 750            | 3 200            | 10 × 2 <sup>3)</sup> |
| 10 × 2                                  | ...R    | €€            | RH / LH                 | 9.7             | 8.2            | 19.5 0/−0.1           | —              | —                 | —                  | —                  | M17 × 1   | 22             | —              | 7              | —              | —              | —              | —                  | 1 × 3.5 | 1.59           | 2.5      | —    | —   | —              | —  | 0.06                                    | 2 300            | 4 000            | 10 × 2               |
| 10 × 2                                  | ...R    | €€            | RH / —                  | 9.7             | 8.2            | 19.5 0/−0.1           | —              | —                 | —                  | —                  | M17 × 1   | 22             | —              | 7              | —              | —              | —              | —                  | 1 × 3.5 | 1.59           | 2.5      | —    | —   | ø 2            | K  | 0.06                                    | 2 300            | 4 000            | 10 × 2               |
| 10 × 3                                  | ...I    | €€            | RH / —                  | 9.9             | 7.8            | 20 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 29             | —              | 8              | —              | —              | —              | —                  | 3 × 1   | 2.00           | 2.5      | —    | —   | —              | —  | 0.06                                    | 2 400            | 4 200            | 10 × 3               |
| 10 × 3                                  | ...I    | €€            | RH / —                  | 9.9             | 7.8            | 20 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 29             | —              | 8              | —              | —              | —              | —                  | 3 × 1   | 2.00           | 2.5      | —    | —   | ø 2            | K  | 0.06                                    | 2 400            | 4 200            | 10 × 3               |
| 10 × 3                                  | ...R   | €€            | RH / LH                 | 9.9             | 7.8            | 21 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 29             | —              | 9              | —              | —              | —              | —                  | 1 × 3.5 | 2.00           | 3.0      | —    | —   | —              | —  | 0.06                                    | 2 800            | 5 000            | 10 × 3               |
| 10 × 3                                  | ...R  | €€            | RH / LH                 | 9.9             | 7.8            | 21 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 29             | —              | 9              | —              | —              | —              | —                  | 1 × 3.5 | 2.00           | 3.0      | —    | —   | ø 2            | K  | 0.06                                    | 2 800            | 5 000            | 10 × 3               |
| 10 × 3                                  | ...F  | €             | RH / —                  | 9.9             | 7.8            | 27 0/−0.1             | —              | —                 | —                  | —                  | M24 × 1.5 | 27             | —              | 10             | —              | —              | —              | —                  | 1 × 3.7 | 2.00           | 3.0      | —    | —   | ø 2            | K  | 0.06                                    | 3 500            | 6 300            | 10 × 3               |
| 10 × 4                                  | ...I  | €€            | RH / —                  | 10.0            | 7.5            | 20 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 40             | —              | 8              | —              | —              | —              | —                  | 4 × 1   | 2.50           | 2.5      | —    | —   | —              | —  | 0.07                                    | 4 100            | 6 700            | 10 × 4               |
| 10 × 4                                  | ...I  | €€            | RH / —                  | 10.0            | 7.5            | 20 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 40             | —              | 8              | —              | —              | —              | —                  | 4 × 1   | 2.50           | 2.5      | —    | —   | ø 2            | K  | 0.07                                    | 4 100            | 6 700            | 10 × 4               |
| 10 × 10                                 | ...R  | €€            | RH / —                  | 9.8             | 7.9            | 23 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 35             | —              | 9              | —              | —              | —              | —                  | 2 × 1.5 | 2.00           | 3.0      | —    | —   | —              | —  | 0.06                                    | 2 500            | 4 500            | 10 × 10              |
| 10 × 10                                 | ...R  | €€            | RH / —                  | 9.8             | 7.9            | 23 0/−0.1             | —              | —                 | —                  | —                  | M18 × 1   | 35             | —              | 9              | —              | —              | —              | —                  | 2 × 1.5 | 2.00           | 3.0      | —    | —   | ø 4            | K  | 0.06                                    | 2 500            | 4 500            | 10 × 10              |
| 10 × 10                                 | ...F  | €             | RH / —                  | 9.9             | 7.9            | 27 0/−0.1             | —              | —                 | —                  | —                  | M24 × 1.5 | 27             | —              | 10             | —              | —              | —              | —                  | 2 × 1.7 | 2.00           | 3.0      | —    | —   | ø 2            | K  | 0.06                                    | 3 200            | 5 900            | 10 × 10              |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
| 10 × 4                                  | ...I  | €€€           | RH / —                  | 10.0            | 7.5            | 18 g <sub>6</sub>     | 17.8           | 28                | 4.5                | 36                 | —         | 38             | 6              | —              | —              | —              | 6              | 23                 | 4 × 1   | 2.50           | —        | —    | —   | —              | —  | 0.07                                    | 4 100            | 6 700            | 10 × 4               |
| 10 × 4                                  | ...I  | €€€           | RH / —                  | 10.0            | 7.5            | 18 g <sub>6</sub>     | 17.8           | 28                | 4.5                | 36                 | —         | 38             | 6              | —              | —              | —              | 6              | 23                 | 4 × 1   | 2.50           | —        | —    | —   | ø 2            | K  | 0.07                                    | 4 100            | 6 700            | 10 × 4               |
| 10 × 10                                 | ...R  | €€€           | RH / —                  | 9.8             | 7.9            | 23 g <sub>6</sub>     | 22.5           | 29                | 4.5                | 37                 | —         | 40             | 6              | —              | —              | —              | 8              | 24                 | 2 × 1.5 | 2.00           | —        | —    | —   | M5             | K  | 0.06                                    | 2 500            | 4 500            | 10 × 10              |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
| 10 × 3                                  | ...F  | €€            | RH / —                  | 9.9             | 7.8            | 24−0.01/−0.06         | 23.5           | 32                | 4.5                | 40                 | —         | 27             | 5              | —              | 4              | —              | 7              | —                  | 1 × 3.7 | 2.00           | —        | —    | —   | ø 3            | K  | 0.06                                    | 3 500            | 6 300            | 10 × 3               |
| 10 × 10                                 | ...F  | €€            | RH / —                  | 9.8             | 7.9            | 24−0.01/−0.06         | 23.5           | 32                | 4.5                | 40                 | —         | 27             | 5              | —              | 4              | —              | 7              | —                  | 2 × 1.7 | 2.00           | —        | —    | —   | ø 4            | K  | 0.06                                    | 3 200            | 5 900            | 10 × 10              |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |
|                                         |                                                                                            |               |                         |                 |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                |    |                                         |                  |                  |                      |

> CAD data > [www.gewinde.ch](http://www.gewinde.ch)

A diagram showing a circular cross-section of a pipe. The outer diameter is labeled  $D_1$  and the inner diameter is labeled  $M$ .

End cap ball return  
Type **...E** / **...F** 

 When selecting a ballscrew, always observe the maximum rotational speed dependent on the system-specific rotational speed characteristics!

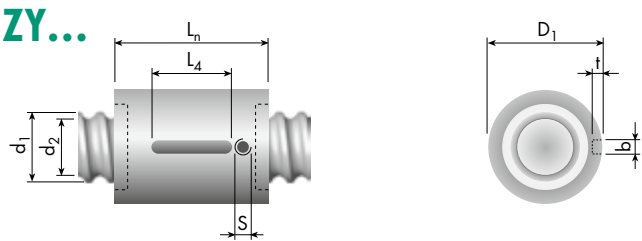
Calculation > page 12

| Nominal size<br>d <sub>0</sub> × p [mm] | Ball return                                                                                | Relative cost | Right-/left-hand thread | Dimensions [mm] |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     | Load rates [N]   |                   | Nominal size<br>d <sub>0</sub> × p [mm] |       |        |                      |
|-----------------------------------------|--------------------------------------------------------------------------------------------|---------------|-------------------------|-----------------|----------------|---------------------------|----------------|-------------------|--------------------|--------------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|---------|----------------|----------|------|-----|------------------|-------------------|-----------------------------------------|-------|--------|----------------------|
|                                         | Type                                                                                       |               |                         | Screw           |                |                           |                | Nut               |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     | C <sub>dyn</sub> | C <sub>stat</sub> |                                         |       |        |                      |
|                                         |                                                                                            |               |                         | d <sub>1</sub>  | d <sub>2</sub> | D <sub>1</sub>            | D <sub>2</sub> | D <sub>4</sub> TK | D <sub>5</sub> H13 | D <sub>6</sub> h13 | M         | L <sub>n</sub> | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>7</sub> | L <sub>8</sub> h13 | i       | D <sub>W</sub> | B +0.5/0 | b P9 | t   | S                | SA                | T <sub>max</sub>                        |       |        |                      |
| 12 × 2                                  | ...I    | €€€           | RH / —                  | 12.0            | 10.6           | 20 <sub>g6</sub>          | —              | —                 | —                  | —                  | —         | 15             | —              | —              | —              | 10             | —              | —                  | 2 × 1   | 1.59           | —        | 3    | 1.2 | —                | —                 | 0.06                                    | 1 380 | 2 500  | 12 × 2               |
| 12 × 2 <sup>3)</sup>                    | ...I    | €€€           | RH / LH                 | 12.0            | 10.6           | 20 <sub>g6</sub>          | —              | —                 | —                  | —                  | —         | 20             | —              | —              | —              | 10             | —              | —                  | 3 × 1   | 1.59           | —        | 3    | 1.2 | —                | —                 | 0.06                                    | 2 000 | 4 000  | 12 × 2 <sup>3)</sup> |
| 12 × 4                                  | ...R    | €€€           | RH / —                  | 12.0            | 9.8            | 26 <sub>g6</sub>          | —              | —                 | —                  | —                  | —         | 24             | —              | —              | —              | 10             | —              | —                  | 1 × 3.5 | 2.50           | —        | 3    | 1.8 | —                | —                 | 0.07                                    | 5 500 | 11 000 | 12 × 4               |
| 12 × 4                                  | ...R    | €€€           | RH / —                  | 12.0            | 9.8            | 26 <sub>g6</sub>          | —              | —                 | —                  | —                  | —         | 32             | —              | —              | —              | 10             | —              | —                  | 1 × 3.5 | 2.50           | —        | 3    | 1.8 | ø 4              | K                 | 0.07                                    | 5 500 | 11 000 | 12 × 4               |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
| 12 × 2                                  | ...I    | €€            | RH / —                  | 12.0            | 10.6           | 20 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M18 × 1   | 23             | —              | 8              | —              | —              | —              | —                  | 2 × 1   | 1.59           | 2.5      | —    | —   | —                | —                 | 0.06                                    | 1 380 | 2 500  | 12 × 2               |
| 12 × 2 <sup>3)</sup>                    | ...I    | €€            | RH / LH                 | 12.0            | 10.6           | 20 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M18 × 1   | 28             | —              | 8              | —              | —              | —              | —                  | 3 × 1   | 1.59           | 2.5      | —    | —   | —                | —                 | 0.06                                    | 2 000 | 4 000  | 12 × 2 <sup>3)</sup> |
| 12 × 4                                  | ...I    | €€            | RH / —                  | 12.0            | 9.8            | 24 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 39             | —              | 10             | —              | —              | —              | —                  | 3 × 1   | 2.50           | 2.5      | —    | —   | —                | —                 | 0.07                                    | 4 000 | 6 800  | 12 × 4               |
| 12 × 4                                  | ...I    | €€            | RH / —                  | 12.0            | 9.8            | 24 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 39             | —              | 10             | —              | —              | —              | —                  | 3 × 1   | 2.50           | 2.5      | —    | —   | ø 4              | K                 | 0.07                                    | 4 000 | 6 800  | 12 × 4               |
| 12 × 4                                  | ...R    | €€            | RH / —                  | 12.0            | 9.8            | 26 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 32             | —              | 8              | —              | —              | —              | —                  | 1 × 3.5 | 2.50           | 2.5      | —    | —   | —                | —                 | 0.07                                    | 5 500 | 11 000 | 12 × 4               |
| 12 × 4                                  | ...R    | €€            | RH / —                  | 12.0            | 9.8            | 26 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 34             | —              | 10             | —              | —              | —              | —                  | 1 × 3.5 | 2.50           | 2.5      | —    | —   | ø 4              | K                 | 0.07                                    | 5 500 | 11 000 | 12 × 4               |
| 12 × 5                                  | ...I   | €€            | RH / —                  | 12.0            | 9.5            | 23 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 42             | —              | 10             | —              | —              | —              | —                  | 3 × 1   | 2.78           | 3.0      | —    | —   | —                | —                 | 0.07                                    | 5 000 | 8 600  | 12 × 5               |
| 12 × 5                                  | ...I  | €€            | RH / —                  | 12.0            | 9.5            | 23 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 42             | —              | 10             | —              | —              | —              | —                  | 3 × 1   | 2.78           | 3.0      | —    | —   | ø 4              | K                 | 0.07                                    | 5 000 | 8 600  | 12 × 5               |
| 12 × 5                                  | ...R  | €€            | RH / LH                 | 12.0            | 9.5            | 26 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 37             | —              | 8              | —              | —              | —              | —                  | 1 × 3.5 | 2.78           | 3.0      | —    | —   | —                | —                 | 0.07                                    | 6 600 | 12 000 | 12 × 5               |
| 12 × 5                                  | ...R  | €€            | RH / —                  | 12.0            | 9.5            | 26 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 37             | —              | 8              | —              | —              | —              | —                  | 1 × 3.5 | 2.78           | 3.0      | —    | —   | ø 4              | K                 | 0.07                                    | 6 600 | 12 000 | 12 × 5               |
| 12 × 5                                  | ...F  | €             | RH / —                  | 12.0            | 9.5            | 32 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M28 × 1.5 | 30             | —              | 12             | —              | —              | —              | —                  | 1 × 3.7 | 2.78           | 3.5      | —    | —   | ø 4              | K                 | 0.06                                    | 5 900 | 10 600 | 12 × 5               |
| 12 × 10                                 | ...R  | €€            | RH / —                  | 11.9            | 9.7            | 26 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M20 × 1   | 37             | —              | 8              | —              | —              | —              | —                  | 2 × 1.5 | 2.50           | 3.0      | —    | —   | —                | —                 | 0.07                                    | 4 400 | 7 700  | 12 × 10              |
| 12 × 10                                 | ...F  | €             | RH / —                  | 11.9            | 9.7            | 32 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M28 × 1.5 | 38             | —              | 12             | —              | —              | —              | —                  | 2 × 2.4 | 2.50           | 3.5      | —    | —   | ø 4              | K                 | 0.06                                    | 6 400 | 12 600 | 12 × 10              |
| 12 × 12                                 | ...F  | €             | RH / —                  | 12.0            | 9.7            | 32 <sub>0/−0.1</sub>      | —              | —                 | —                  | —                  | M28 × 1.5 | 30             | —              | 12             | —              | —              | —              | —                  | 2 × 1.6 | 2.50           | 3.5      | —    | —   | ø 4              | K                 | 0.06                                    | 4 600 | 8 500  | 12 × 12              |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
| 12 × 2                                  | ...R  | €€€           | RH / —                  | 12.0            | 10.6           | 22 <sub>g6</sub>          | 21.5           | 29                | 4.5                | 37                 | —         | 30             | 5              | —              | —              | —              | 8              | 24                 | 1 × 3.5 | 1.59           | —        | —    | —   | ø 4              | K                 | 0.06                                    | 2 500 | 5 100  | 12 × 2               |
| 12 × 3                                  | ...R  | €€€€          | RH / —                  | 12.3            | 10.2           | 24 <sub>g6</sub>          | 23.5           | 32                | 4.5                | 40                 | —         | 36             | 5              | —              | —              | —              | 8              | 26                 | 2 × 2.5 | 2.00           | —        | —    | —   | —                | —                 | 0.06                                    | 5 000 | 11 000 | 12 × 3               |
| 12 × 4                                  | ...R  | €€€€          | RH / —                  | 12.0            | 9.8            | 26 <sub>g6</sub>          | 25.5           | 32                | 4.5                | 39.5               | —         | 36             | 5              | —              | —              | —              | 8              | 28                 | 1 × 3.5 | 2.50           | —        | —    | —   | M5               | K                 | 0.07                                    | 5 500 | 11 000 | 12 × 4               |
| 12 × 5                                  | ...I  | €€€€          | RH / —                  | 12.0            | 9.5            | 24 <sub>g6</sub>          | 23.5           | 32                | 4.5                | 40                 | —         | 40             | 6              | —              | —              | —              | 8              | 26                 | 3 × 1   | 2.78           | —        | —    | —   | ø 4              | K                 | 0.07                                    | 5 000 | 8 600  | 12 × 5               |
| 12 × 5                                  | ...R  | €€€€          | RH / —                  | 12.0            | 9.5            | 26 <sub>g6</sub>          | 25.5           | 32                | 4.5                | 39.5               | —         | 40             | 5              | —              | —              | —              | 7              | 28                 | 1 × 3.5 | 2.78           | —        | —    | —   | M5               | K                 | 0.07                                    | 6 600 | 12 000 | 12 × 5               |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
| 12 × 5                                  | ...F  | €€            | RH / —                  | 12.0            | 9.5            | 26 <sub>−0.01/−0.06</sub> | 25.5           | 34                | 4.5                | 42                 | —         | 30             | 6              | —              | 6              | —              | 8              | —                  | 1 × 3.7 | 2.78           | —        | —    | —   | ø 4              | K                 | 0.06                                    | 5 900 | 10 600 | 12 × 5               |
| 12 × 10                                 | ...F  | €€            | RH / —                  | 11.9            | 9.7            | 26 <sub>−0.01/−0.06</sub> | 25.5           | 34                | 4.5                | 42                 | —         | 38             | 6              | —              | 6              | —              | 8              | —                  | 2 × 2.4 | 2.50           | —        | —    | —   | ø 4              | K                 | 0.06                                    | 6 400 | 12 600 | 12 × 10              |
| 12 × 12                                 | ...F  | €€            | RH / —                  | 12.0            | 9.7            | 26 <sub>−0.01/−0.06</sub> | 25.5           | 34                | 4.5                | 42                 | —         | 30             | 6              | —              | 6              | —              | 8              | —                  | 2 × 1.6 | 2.50           | —        | —    | —   | ø 4              | K                 | 0.06                                    | 4 600 | 8 500  | 12 × 12              |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |
|                                         |                                                                                            |               |                         |                 |                |                           |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |                  |                   |                                         |       |        |                      |

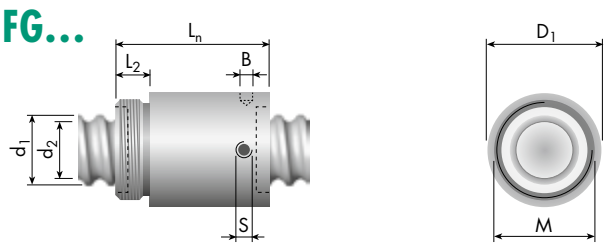


ø12.7 (1/2")

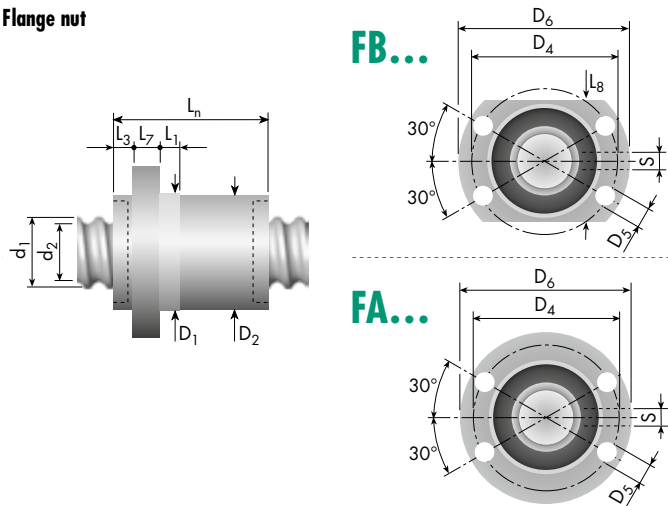
Cylindrical nut



Nut with mounting thread



Flange nut

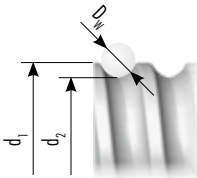


Ball return systems (details > page 9)



Legend

- d<sub>0</sub> = nominal screw diameter [mm]
- d<sub>1</sub> = outer screw diameter [mm]
- d<sub>2</sub> = core diameter [mm]
- p = pitch [mm]



- i = number of ball circulations [-]
- D<sub>w</sub> = ball diameter [mm]
- B = pin wrench hole \* [mm]
- S = lubrication hole \* [mm]
- SA = wipers (details > page 9)
- K = technopolymer wipers
- B = brush wipers
- F = felt rings (on request)

- T<sub>max</sub> = max. standard backlash [mm]
- <sup>3)</sup> = only on request
- \* position not defined
- Special designs available on request

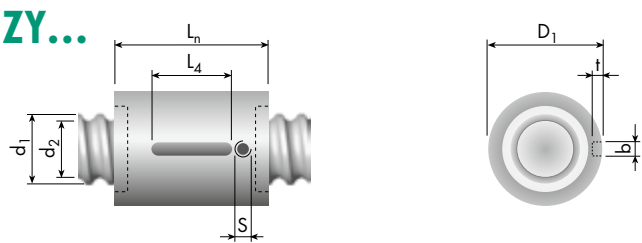
⚠ When selecting a ballscrew, always observe the maximum rotational speed dependent on the system-specific rotational speed characteristics! Calculation > page 12

ø12.7 (1/2")

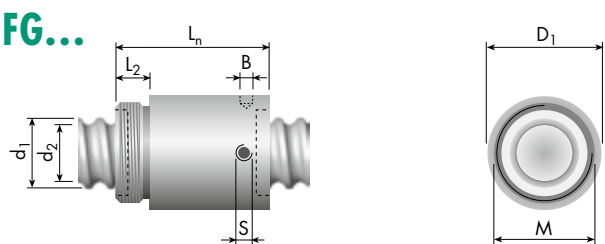


ø14

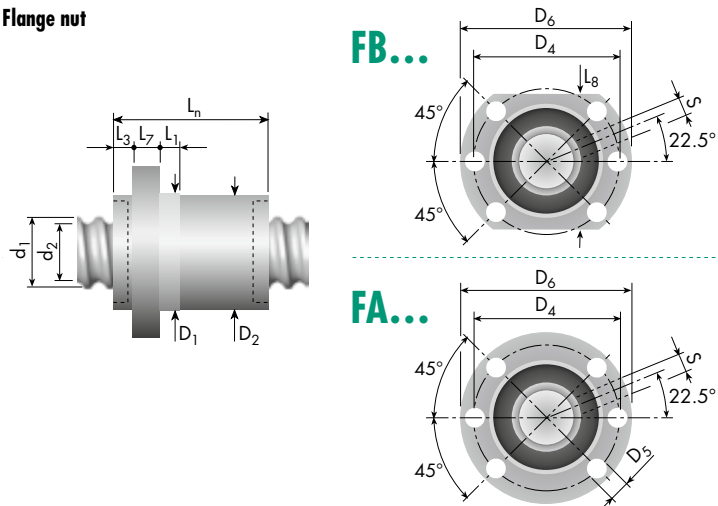
Cylindrical nut



Nut with mounting thread



Flange nut

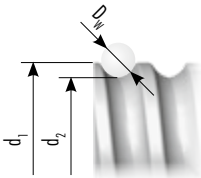


Ball return systems (details > page 9)



Legend

- d<sub>0</sub> = nominal screw diameter [mm]
- d<sub>1</sub> = outer screw diameter [mm]
- d<sub>2</sub> = core diameter [mm]
- p = pitch [mm]



- i = number of ball circulations [-]
- D<sub>w</sub> = ball diameter [mm]
- B = pin wrench hole \* [mm]
- S = lubrication hole \* [mm]
- SA = wipers (details > page 9)
- K = technopolymer wipers
- B = brush wipers
- F = felt rings (on request)

- T<sub>max</sub> = max. standard backlash [mm]
- <sup>3)</sup> = only on request
- \* position not defined
- Special designs available on request

⚠ When selecting a ballscrew, always observe the maximum rotational speed dependent on the system-specific rotational speed characteristics! Calculation > page 12

| Nominal size<br>d <sub>0</sub> × p [mm] | Ball return |  | Relative cost | Right-/left-hand thread | Dimensions [mm]         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  | Load rates [N]   |                   | Nominal size<br>d <sub>0</sub> × p [mm] |
|-----------------------------------------|-------------|--|---------------|-------------------------|-------------------------|----------------|-----------------------|----------------|-------------------|--------------------|--------------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|---------|----------------|----------|------|-----|-----|------|------------------|------------------|-------------------|-----------------------------------------|
|                                         | Type        |  |               |                         | Screw<br>d <sub>1</sub> | d <sub>2</sub> | Nut<br>D <sub>1</sub> | D <sub>2</sub> | D <sub>4</sub> TK | D <sub>5</sub> H13 | D <sub>6</sub> h13 | M         | L <sub>a</sub> | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>7</sub> | L <sub>8</sub> h13 | i       | D <sub>W</sub> | B +0.5/0 | b P9 | t   | S   | SA   | T <sub>max</sub> | C <sub>dyn</sub> | C <sub>stat</sub> |                                         |
| 14 × 4                                  | ...I        |  | €€€           | RH / —                  | 14.0                    | 11.5           | 25 g6                 | —              | —                 | —                  | —                  | 24        | —              | —              | —              | 10             | —              | —              | 3 × 1              | 2.78    | —              | 4        | 2.5  | —   | —   | 0.07 | 5 000            | 8 800            | 14 × 4            |                                         |
| 14 × 4                                  | ...I        |  | €€€           | RH / —                  | 14.0                    | 11.5           | 25 g6                 | —              | —                 | —                  | —                  | 32        | —              | —              | —              | 10             | —              | —              | 3 × 1              | 2.78    | —              | 4        | 2.5  | ø 4 | K   | 0.07 | 5 000            | 8 800            | 14 × 4            |                                         |
| 14 × 4                                  | ...R        |  | €€€           | RH / LH                 | 14.0                    | 11.5           | 29 g6                 | —              | —                 | —                  | —                  | 24        | —              | —              | —              | 16             | —              | —              | 1 × 3.5            | 2.78    | —              | 4        | 2.5  | —   | —   | 0.07 | 8 100            | 16 000           | 14 × 4            |                                         |
| 14 × 4                                  | ...R        |  | €€€           | RH / LH                 | 14.0                    | 11.5           | 29 g6                 | —              | —                 | —                  | —                  | 32        | —              | —              | —              | 16             | —              | —              | 1 × 3.5            | 2.78    | —              | 4        | 2.5  | ø 4 | K   | 0.07 | 8 100            | 16 000           | 14 × 4            |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
| 14 × 2                                  | ...R        |  | €€            | RH / —                  | 14.0                    | 12.5           | 26 0/−0.1             | —              | —                 | —                  | —                  | M22 × 1.5 | 32             | —              | 10             | —              | —              | —              | 2 × 2.5            | 1.59    | 3.0            | —        | —    | —   | —   | 0.06 | 4 500            | 10 000           | 14 × 2            |                                         |
| 14 × 2                                  | ...R        |  | €€            | RH / —                  | 14.0                    | 12.5           | 26 0/−0.1             | —              | —                 | —                  | —                  | M22 × 1.5 | 32             | —              | 10             | —              | —              | —              | 2 × 2.5            | 1.59    | 3.0            | —        | —    | ø 2 | K   | 0.06 | 4 500            | 10 000           | 14 × 2            |                                         |
| 14 × 4                                  | ...I        |  | €€            | RH / —                  | 14.0                    | 11.5           | 25 0/−0.1             | —              | —                 | —                  | —                  | M22 × 1.5 | 34             | —              | 10             | —              | —              | —              | 3 × 1              | 2.78    | 2.5            | —        | —    | —   | —   | 0.07 | 5 000            | 8 800            | 14 × 4            |                                         |
| 14 × 4                                  | ...I        |  | €€            | RH / —                  | 14.0                    | 11.5           | 25 0/−0.1             | —              | —                 | —                  | —                  | M22 × 1.5 | 38             | —              | 10             | —              | —              | —              | 3 × 1              | 2.78    | 2.5            | —        | —    | ø 4 | K   | 0.07 | 5 000            | 8 800            | 14 × 4            |                                         |
| 14 × 4                                  | ...R        |  | €€            | RH / LH                 | 14.0                    | 11.5           | 29 0/−0.1             | —              | —                 | —                  | —                  | M22 × 1.5 | 32             | —              | 8              | —              | —              | —              | 1 × 3.5            | 2.78    | 3.0            | —        | —    | —   | —   | 0.07 | 8 100            | 16 000           | 14 × 4            |                                         |
| 14 × 4                                  | ...R        |  | €€            | RH / LH                 | 14.0                    | 11.5           | 29 0/−0.1             | —              | —                 | —                  | —                  | M22 × 1.5 | 38             | —              | 10             | —              | —              | —              | 1 × 3.5            | 2.78    | 3.0            | —        | —    | ø 4 | K   | 0.07 | 8 100            | 16 000           | 14 × 4            |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
| 14 × 2                                  | ...R        |  | €€€           | RH / —                  | 14.0                    | 12.5           | 26 g6                 | 25.5           | 32                | 4.5                | 39.5               | —         | 32             | 5              | —              | —              | —              | 7              | 28                 | 2 × 2.5 | 1.59           | —        | —    | —   | ø 4 | K    | 0.06             | 4 500            | 10 000            | 14 × 2                                  |
| 14 × 4                                  | ...R        |  | €€€           | RH / LH                 | 14.0                    | 11.5           | 29 g6                 | 28.6           | 38                | 5.5                | 48                 | —         | 40             | 6              | —              | —              | —              | 8              | 36                 | 1 × 3.5 | 2.78           | —        | —    | —   | M5  | K    | 0.07             | 8 100            | 16 000            | 14 × 4                                  |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
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|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |           |                |                |                |                |                |                |                    |         |                |          |      |     |     |      |                  |                  |                   |                                         |

> CAD data > www.gewinde.ch

ZY...



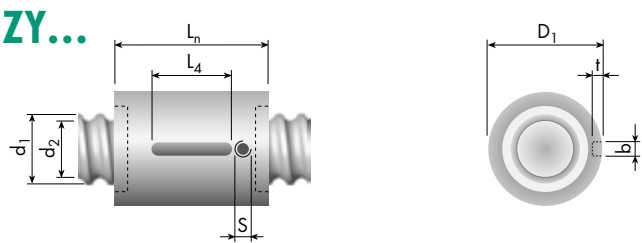




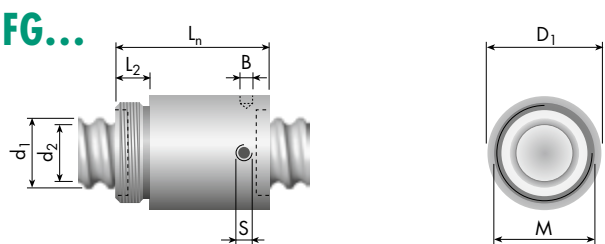


ø32

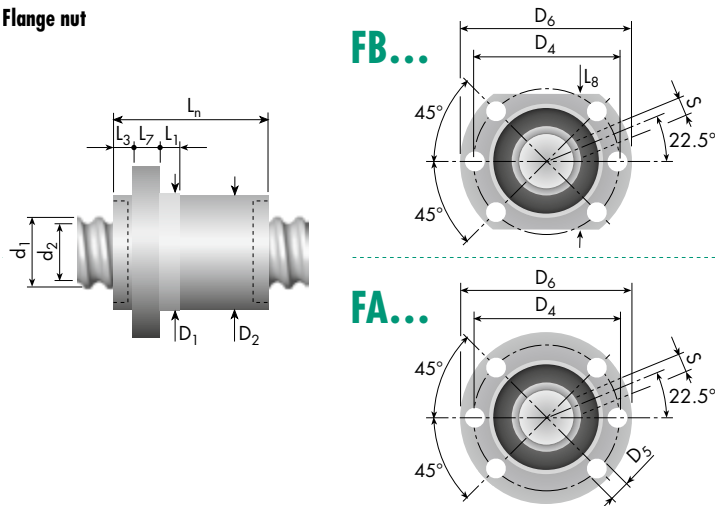
Cylindrical nut



Nut with mounting thread



Flange nut



Ball return systems (details > page 9)

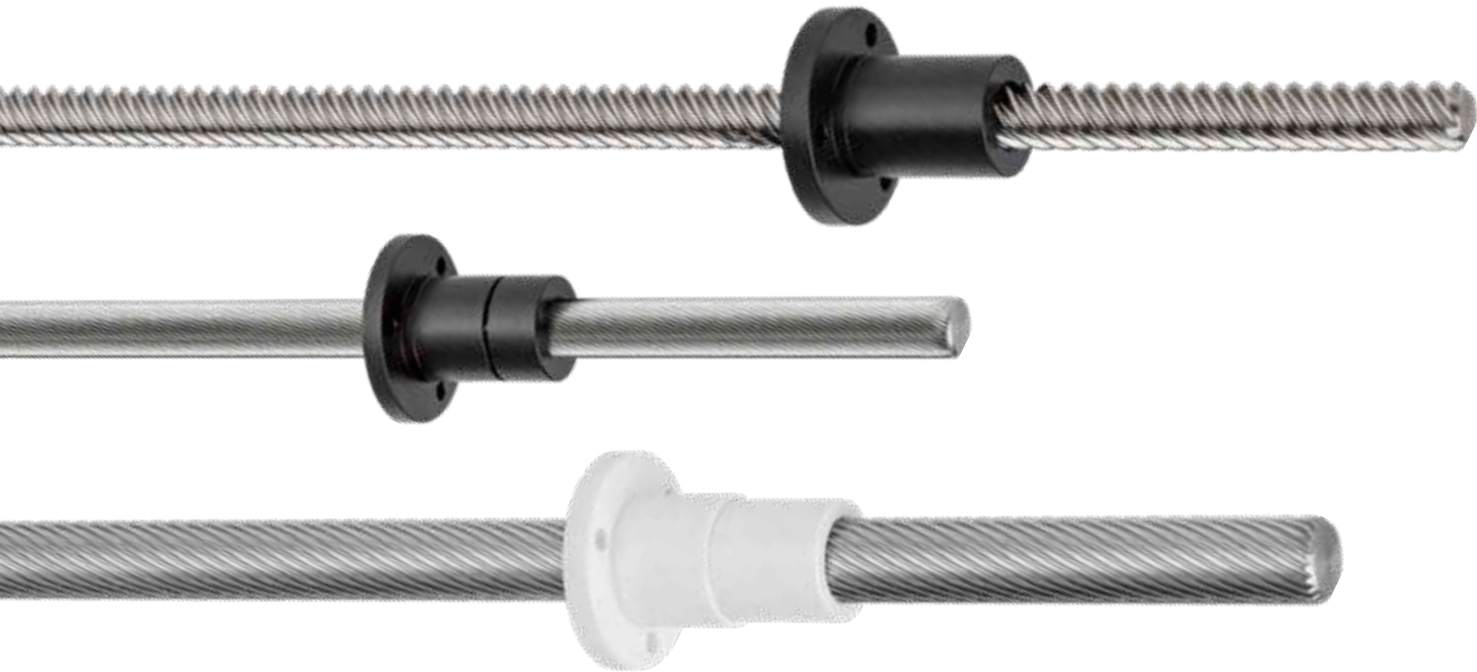


| Nominal size<br>d <sub>0</sub> × p [mm] | Ball return |  | Relative cost | Right-/left-hand thread | Dimensions [mm]         |                |                       |                |                   |                    |                    |   |                |                |                |                |                |                |                    |       |                |          |      |     |    |    |                  | Load rates [N]   |                   | Nominal size<br>d <sub>0</sub> × p [mm] |
|-----------------------------------------|-------------|--|---------------|-------------------------|-------------------------|----------------|-----------------------|----------------|-------------------|--------------------|--------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|-------|----------------|----------|------|-----|----|----|------------------|------------------|-------------------|-----------------------------------------|
|                                         | Type        |  |               |                         | Screw<br>d <sub>1</sub> | d <sub>2</sub> | Nut<br>D <sub>1</sub> | D <sub>2</sub> | D <sub>4</sub> TK | D <sub>5</sub> H13 | D <sub>6</sub> h13 | M | L <sub>a</sub> | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | L <sub>7</sub> | L <sub>8</sub> h13 | i     | D <sub>W</sub> | B +0.5/0 | b P9 | t   | S  | SA | T <sub>max</sub> | C <sub>dyn</sub> | C <sub>stat</sub> |                                         |
| 32 × 5                                  | ...I        |  | €€€           | RH / —                  | 31.6                    | 28.5           | 48 g6                 | —              | —                 | —                  | —                  | — | 48             | —              | —              | —              | 20             | —              | —                  | 4 × 1 | 3.50           | —        | 5    | 3.0 | M5 | K  | 0.07             | 19 000           | 54 000            | 32 × 5                                  |
|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |   |                |                |                |                |                |                |                    |       |                |          |      |     |    |    |                  |                  |                   |                                         |
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|                                         |             |  |               |                         |                         |                |                       |                |                   |                    |                    |   |                |                |                |                |                |                |                    |       |                |          |      |     |    |    |                  |                  |                   |                                         |
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A schematic diagram of a circular cross-section of a fiber. It consists of concentric circles. The innermost circle is the core with diameter  $d$ . The next layer is the cladding with thickness  $b$ . The outermost layer has thickness  $t$ . The total diameter of the fiber is labeled  $D_1$ .

A diagram showing a circular cross-section of a pipe. The outer diameter is labeled  $D_1$  and the inner diameter is labeled  $M$ .

## FA...



Design features

Eichenberger high-helix leadscrews are called Speedy for good reason: never before have such high moving speeds been obtained at such low rotational speeds. The Eichenberger Speedy has made this possible by using a helix pitch unheard of before.

High-helix leadscrews are made of corrosion-protected steel and are formed by the cold-rolling process. They are coupled with high wear-resistant technopolymer flange nuts in non-preloaded or preloaded designs.

For higher loads or special applications, alternative technopolymer materials or bronze may be used to make the nuts.

Materials

- Screw**
- standard: corrosion-protected steel
    - 1.4021 (X20Cr13)
  - on request: other materials such as
    - corrosion and acid resistant steel 1.4404 (X2CrNiMo17-12-2)
    - aluminium
  - on request:
    - coating to reduce sliding friction
- Nut**
- non-preloaded:
    - POM-C black
    - bronze 2.1052 (CuSn12)
  - preloaded:
    - axial-preloaded (if  $p_o < d_o$ ): POM-C black
    - torsion-preloaded (if  $p_o \geq d_o$ ): EX100 white
    - bronze on request
  - on request: other materials such as
    - iglidur® J \*

\* iglidur® is a registered trademark of igus® GmbH

Speedy high-helix leadscrews – design features

Nut types (shapes)

For all Speedy high-helix leadscrews one standard flange nut design has been defined (flange nut type A following DIN 69051), which is deliverable in the following types:



- Flange nut, non-preloaded
- **Type SFM:** POM-C black
  - **Type SBM:** bronze



- Flange nut axial-preloaded (if  $p_o < d_o$ )
- **Type SFV:** POM-C black
  - on request:
    - nut body made of bronze



- Flange nut torsion-preloaded (if  $p_o \geq d_o$ )
- **Type SFT:** EX100 white
  - on request:
    - nut body made of bronze

If required, any application-specific nut shapes can be manufactured, for large series also from injection molding. Contact us with your revolutionary idea – we'll provide YOUR tailor-made high-helix leadscrew!

Operational temperatures

- POM-C / EX100 –40 to +60 °C
- iglidur® J –50 to +90 °C
- bronze –40 to +200 °C

Lead accuracy

- standard:
  - $G9 \triangleq \leq 0.1 \text{ mm}/300 \text{ mm}$  (in accordance with DIN 69051)
- on request:
  - other lead accuracies

Efficiency

The efficiency  $\eta$  depends on the helix angle and reaches values from ~0.5 to 0.75  
➤ also see diagram, page 44



Production / Handling / Lubrication

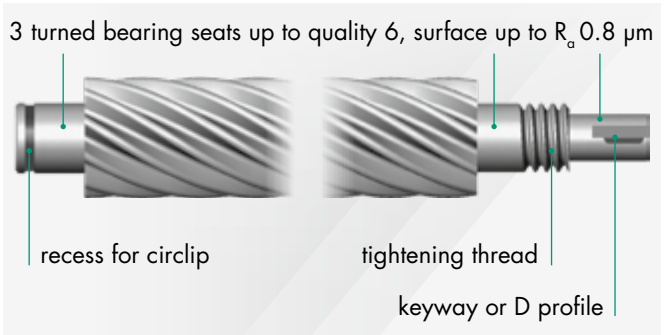
Production lengths

In general, Eichenberger screws are produced as bars with a length of 3 m. Depending on the diameter and the material availability, lengths up to 6 m are also possible on request.

Any kind of end machining

By default leadscrews are cut to the desired length without special machining.

Upon request, a so-called standard screw end journal with three turned bearing seats is available. Dimensions are as per customer specifications. Note also the links to the CAD data at [www.gewinde.ch](http://www.gewinde.ch)



Our speciality is any application-specific end machining: Tell us your requirements, and we'll provide YOUR tailor-made screw!

In each instance, a detailed drawing would be necessary.

Handling

Speedy, Easy and Rondo leadscrews are precision parts and must be protected from shock, dirt or moisture when transported or stored. Please do not unpack until ready for use.

Please check for cleanness when mounting a leadscrew. Dirt or foreign matter on the thread may cause increased wear and premature failure.

Please consult lubrication recommendation before mounting or operating leadscrews.

Radial loads and torque

Radial loads or torque brought to bear upon the nut result in overload of individual contact surfaces, thus seriously affecting the service life of the leadscrew assembly. Therefore it is important to properly mount the screw and to comply with all relevant form and positional tolerances.

Lubrication

⚠ In some cases, a single lubrication with grease or oil is sufficient. However, any lubrication cycle depends on the application environment.

Bronze nuts have to be lubricated regularly.

Recommended all-purpose lubricant:  
▪ Klüber Microlube GBU Y 131

Surface coatings

... possible on request:  
▪ generally to reduce sliding friction  
▪ if lubrication is not possible (e.g. in the food industry)  
> also see Materials, page 40

Application examples for Eichenberger leadscrews

Eichenberger Speedy, Easy and Rondo leadscrews are suitable for numerous applications: On the one hand, for shorter lifts, they are a great substitute for belt drive systems because of their lower engineering effort. On the other hand, they are also an excellent substitute for hydraulic and pneumatic lift cylinders because they can be freely accelerated and positioned, and work independently of secondary energy sources. Thanks to high efficiency and excellent value for money, they are an ideal alternative to trapezoidal screws or ballscrews in particular areas of use.

Typical areas of application:

- Drives for doors, gates and windows
- Air-conditioning technology (valve/slide drives)
- Construction industry (e.g. automatic shading systems)
- Handling systems
- Graphics equipment and devices
- Medical technology
- Textile machines
- Food and packaging industry
- Electric cylinders (actuators)
- Electronics industry



Rondo: Pressing of freshly ground coffee in a modern gastro coffee machine



Speedy: Automatic shading systems for modern glass façades



Easy: Door drives in train carriages

The following are the relevant calculations which underlie screw design and safe operation of a Speedy, Easy or Rondo leadscrew.

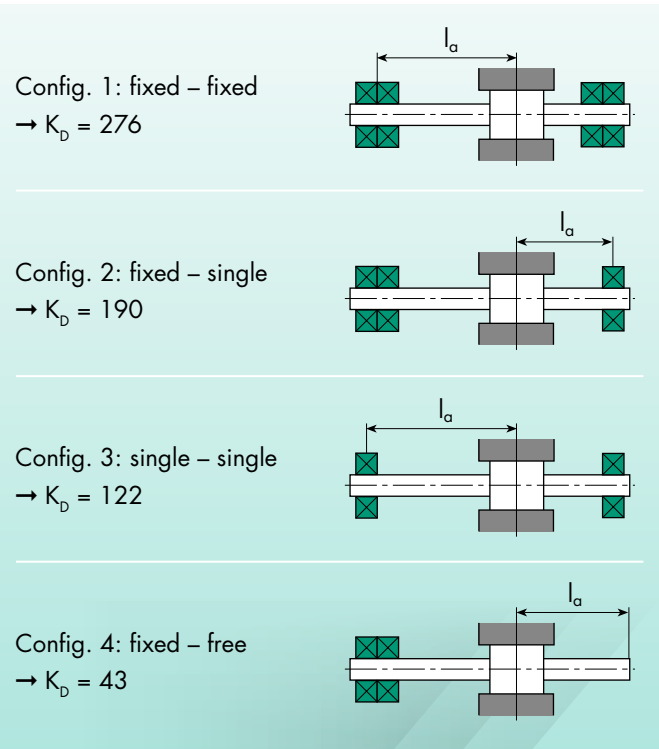
Calculations at dynamic load:

Critical rotational speed  $n_{per}$

Permissible rotational speeds must differ substantially from the screw's own frequency.

$$n_{per} = K_D \cdot 10^6 \cdot \frac{d_2}{l_a^2} \cdot S_n \text{ [min}^{-1}\text{]}$$

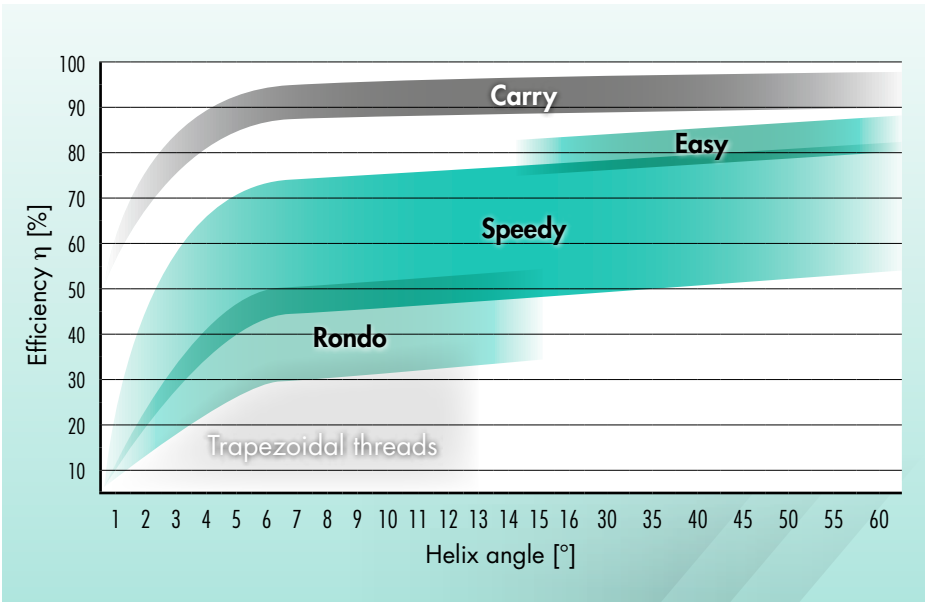
- $n_{per}$  = permissible rotational speed [min<sup>-1</sup>]
- $K_D$  = characteristic constant [-]  
as a function of bearing configuration > see aside
- $d_2$  = core screw diameter [mm]
- $l_a$  = bearing distances [mm] > see aside  
(always include maximum allowable  $l_a$  in calculation!)
- $S_n$  = safety factor [-], usually  $S_n = 0.5 \dots 0.8$



Efficiency  $\eta_p$  (practical)

The efficiency  $\eta$  depends on the helix angle and reaches the following values:

- Speedy** ~0.5 ... 0.75
- Easy** >0.8
- Rondo** ~0.3 ... 0.5



Driving torque  $M$

depends upon the type of power transmission

- Case 1: torque → linear movement

$$M_a = \frac{F_a \cdot p}{2000 \cdot \pi \cdot \eta} \text{ [Nm]}$$

- Case 2: axial force → torque

$$M_e = \frac{F_a \cdot p \cdot \eta'}{2000 \cdot \pi} \text{ [Nm]}$$

- $M_a$  = input torque [Nm], case 1
- $M_e$  = output torque [Nm], case 2
- $F_a$  = axial force [N]
- $p$  = pitch [mm]
- $\eta$  = efficiency [%]
- $\eta'$  = corrected efficiency [%]

Input performance  $P$

$$P = \frac{M_a \cdot n}{9550} \text{ [kW]}$$

- $P$  = input performance [kW]
- $n$  = rotational speed [min<sup>-1</sup>]

A safety margin of 20% is recommended when selecting drives.

Basic calculations

Maximum authorized load depending on speed

$$F_{per.} = C_0 \cdot f_L \text{ [N]}$$

- $C_0$  = static load rate [N]
- $f_L$  = load factor [-] for POM-C nuts

| Circumferential speed $v_c$ [m/min] | Load factor $f_L$ [-] |
|-------------------------------------|-----------------------|
| 5                                   | 0.95                  |
| 10                                  | 0.75                  |
| 20                                  | 0.45                  |
| 30                                  | 0.37                  |
| 40                                  | 0.12                  |
| 50                                  | 0.08                  |

Example

- Parameters:  
Speedy 10/50 with non-preloaded POM-C nut,  $d_0 = 10$  mm,  
 $p = 50$  mm and  $C_0 = 1250$  N;  
required moving speed  $v_s = 200$  mm/sec.
- We need to find:  $F_{per.}$

Therefore we calculate  $n$  [min<sup>-1</sup>],

$$n = \frac{v_s \text{ [mm/sec.]} \cdot 60}{p \text{ [mm]}} = \frac{200 \cdot 60}{50} = 240 \text{ min}^{-1}$$

the circumferential speed  $v_c$  [m/min]

$$v_c = \frac{d_0 \text{ [mm]} \cdot \pi \cdot n \text{ [min}^{-1}\text{]}}{1000} = \frac{10 \cdot \pi \cdot 240}{1000} = 7.53 \text{ m/min}$$

and find the load factor  $f_L$  in above table:

$$f_L \text{ at } v_c \text{ of } 7.53 \text{ m/min} \approx 0.85 \text{ [-]}$$

- It follows:

$$F_{per.} = C_{stat} \cdot f_L = 1250 \cdot 0.85 = 1062.5 \text{ N}$$

So the maximum load for a Speedy 10/50 at  $v_s = 200$  mm/sec.  
(→  $n = 240$  min<sup>-1</sup>) is 1060 N.

# Speedy



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7



Easy light leadscrews (EGS)

100% Swiss made



Design features

Eichenberger Easy light leadscrews set new benchmarks for net weight and smooth running properties. Thanks to the rolled aluminium screw and the associated nut made of high-performance technopolymer, the screw unit is a real lightweight. The screw's robust sliding coating (hard-anodised) makes the screw unit very smooth. With correct lubrication, efficiency of more than 0.8 can be achieved – an excellent figure for a leadscrew!

Thanks to the special thread geometry, the screw unit is also relatively impervious to dirt and tilting torque.

Materials

Screw

- standard:
  - aluminium, hard-anodised
- on request:
  - other materials and coatings

Nut

- standard:
  - EX100 white
- on request:
  - other materials

Nut type (shape)



- Easy standard flange nut
- Type **EFM**
- flange nut type A following DIN 69051
  - not preloaded
  - wear-resistant technopolymer EX100 white

If required, any application-specific nut shapes can be manufactured, for large series also from injection molding. Contact us with your revolutionary idea – we'll provide YOUR tailor-made light leadscrew!

Operational temperatures

- EX100 –40 to +60 °C

Lead accuracy

- standard:
  - G9  $\triangleq \leq 0.1$  mm/300 mm (in accordance with DIN 69051)
- on request:
  - other lead accuracies

Order system – Easy light leadscrews

|                                                                        |                             |
|------------------------------------------------------------------------|-----------------------------|
| Example for complete Easy light leadscrews                             | EGS 20×80 EFM RH 650 G9 E M |
| Type of thread drive                                                   | EGS = Easy light leadscrew  |
| Nominal size (d <sub>0</sub> ×p) [mm]                                  |                             |
| Nut type                                                               | for nut only                |
| EFM = Easy standard flange nut (EX100 white) <sup>1)</sup>             |                             |
| MSX = special design according to drawing                              |                             |
| Right-hand / left-hand thread                                          |                             |
| RH = right-hand thread (standard)                                      |                             |
| LH = left-hand thread (availability see dimensional chart)             |                             |
| Leadscrew overall length [mm]                                          | for screw only              |
| standard material quality: aluminium, hard-anodised <sup>1)</sup>      |                             |
| Lead accuracy (class)                                                  | for screw only              |
| G9 = $\leq 0.1$ mm/300 mm (standard)                                   |                             |
| GX = lead accuracy upon specification                                  |                             |
| Screw end machining                                                    | for screw only              |
| O = no end machining (cut by grinding)                                 |                             |
| E = end machining according to drawing                                 |                             |
| Assembly                                                               |                             |
| G = screw and nut separate (standard)                                  |                             |
| M = screw and nut assembled according to drawing/specified orientation |                             |
| <sup>1)</sup> other materials on request                               |                             |
| Example for screw only                                                 | EGS 20×80 RH 650 G9 O G     |
| Example for nut only                                                   | EGS 20×80 EFM RH G          |

Efficiency

The efficiency  $\eta$  depends on the helix angle and reaches impressive values over 0.8  
➤ also see diagram, page 44

Production / Handling / Lubrication

➤ see Speedy, page 42

Application examples for Eichenberger leadscrews

➤ see Speedy, page 43

Design fundamentals for leadscrews

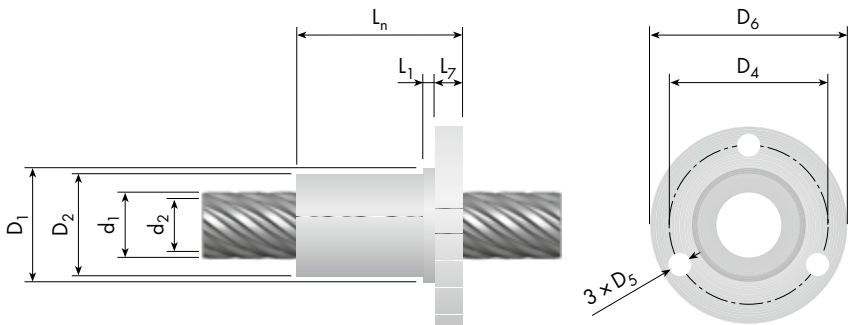
➤ see Speedy, pages 44–45



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Standard flange nut

EFM



| Nominal size           | Right-hand/<br>left-hand<br>thread | Dimensions [mm] |                |   |                   |                      |                   |                |                |                |                |                | Load rates            | Nominal size           |
|------------------------|------------------------------------|-----------------|----------------|---|-------------------|----------------------|-------------------|----------------|----------------|----------------|----------------|----------------|-----------------------|------------------------|
| d <sub>0</sub> ×p [mm] |                                    | Screw           |                |   | Nut               |                      |                   |                |                |                |                |                | C <sub>stat</sub> [N] | d <sub>0</sub> ×p [mm] |
|                        |                                    | d <sub>1</sub>  | d <sub>2</sub> | g | D <sub>1</sub> h8 | D <sub>2</sub> ±0.05 | D <sub>4</sub> TK | D <sub>5</sub> | D <sub>6</sub> | L <sub>n</sub> | L <sub>1</sub> | L <sub>7</sub> |                       |                        |
| 20×80                  | RH / LH                            | 20.0            | 15.2           | 8 | 36                | 35.5                 | 47                | 6.2            | 59             | 46             | 5              | 8              | 4000                  | 20×80                  |
|                        |                                    |                 |                |   |                   |                      |                   |                |                |                |                |                |                       |                        |
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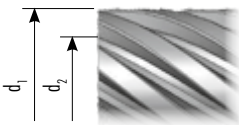
Nut type (details > page 58)



Flange nut, not preloaded  
Type EFM

Legend

- $d_0$  = nominal screw diameter [mm]
- $d_1$  = outer screw diameter [mm]
- $d_2$  = core diameter [mm]



- $p$  = pitch [mm]
- $g$  = number of threads [-]
- Special designs available on request

Design fundamentals for  
leadscrews  
> see Speedy, pages 44–45

> CAD data > www.gewinde.ch

Application examples

Thanks to their low weight, excellent smooth running properties and robust thread profile, Eichenberger Easy light leadscrews are suitable for numerous applications including:

- Drives for doors, gates and windows
- Handling technology
- Graphics equipment and devices
- Construction industry
- Air-conditioning technology (valve/slide drives)
- Textile machines
- Food and packaging industry
- Electric cylinders (actuators)
- etc.

Easy light leadscrews are preferred for increased demand from

- major temperature fluctuation based on climate,
- impact on environmental conditions such as pollution,
- limited lubrication options,
- tilting torque.

Eichenberger Easy light leadscrews always offer great value for money.

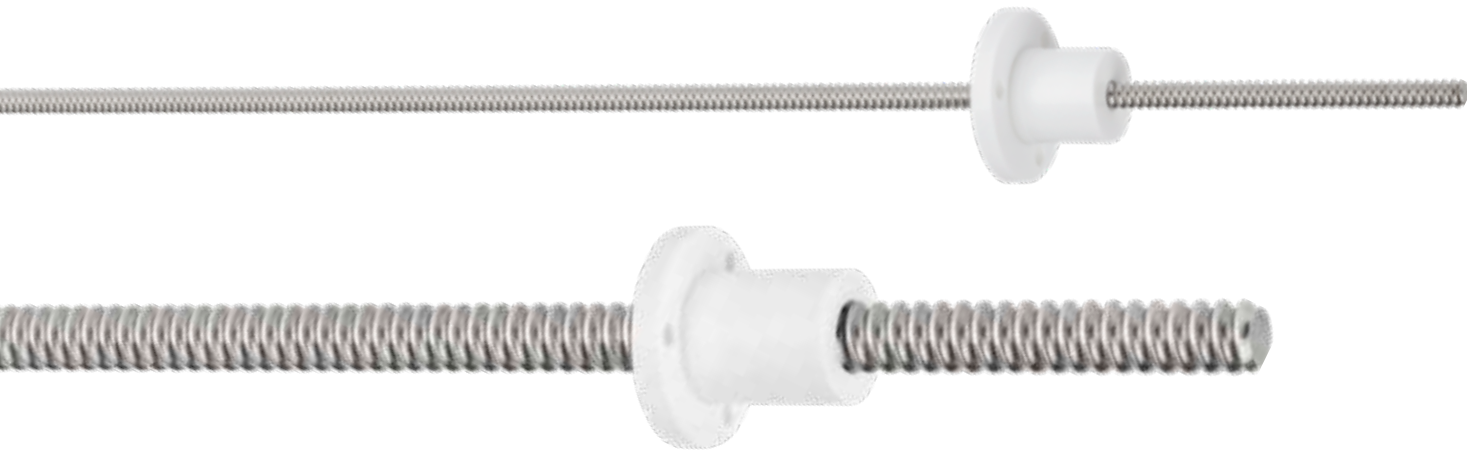


Easy door drives in train carriages of high speed trains withstand the harshest weather conditions and maximum physical forces



Rondo round-thread leadscrews (RGS)

100% Swiss made



Design features

Eichenberger Rondo round-thread leadscrews are a true alternative to conventional trapezoidal screws. They deliver outstanding efficiency and quiet running due to their round-thread profile. Made of corrosion-protected steel or alternatively aluminium, the screws are combined with high-performance technopolymer flange nuts (outer dimensions equal those of Speedy standard flange nuts)

Materials

- Screw**
- standard: corrosion-protected steel
    - 1.4021 (X20Cr13)
  - on request:
    - steel 1.0401 (C15)
    - aluminium
  - on request:
    - coating to reduce sliding friction

- Nut**
- standard:
    - EX100 white
  - on request:
    - iglidur® J \*
    - other materials

Nut type (shape)



- Rondo standard flange nut  
**Type RFM**
- flange nut type A following DIN 69051
  - not preloaded
  - wear-resistant technopolymer EX100 white

If required, any application-specific nut shapes can be manufactured, for large series also from injection molding. Contact us with your revolutionary idea – we'll provide YOUR tailor-made round-thread leadscrew!

Operational temperatures

- EX100 –40 to +60 °C
- iglidur® J \* –50 to +90 °C

Lead accuracy

- standard:
  - G9  $\triangleq$   $\leq 0.1$  mm/300 mm (in accordance with DIN 69051)
- on request:
  - other lead accuracies

Order system – Rondo round-thread leadscrews

|                                                                        |                            |
|------------------------------------------------------------------------|----------------------------|
| Example for complete Rondo round-thread leadscrew                      | RGS 10×3 RFM RH 350 G9 E M |
| Type of thread drive                                                   |                            |
| RGS = Rondo round-thread leadscrew                                     |                            |
| Nominal size (d <sub>0</sub> ×p) [mm]                                  |                            |
| Nut type                                                               | for nut only               |
| RFM = Rondo standard flange nut (EX100 white) <sup>1)</sup>            |                            |
| MSX = special design according to drawing                              |                            |
| Right-hand / left-hand thread                                          |                            |
| RH = right-hand thread (standard)                                      |                            |
| LH = left-hand thread (availability see dimensional chart)             |                            |
| Leadscrew overall length [mm]                                          | for screw only             |
| standard quality: 1.4021 (X20Cr13) <sup>1)</sup>                       |                            |
| Lead accuracy (class)                                                  | for screw only             |
| G9 = $\leq 0.1$ mm/300 mm (standard)                                   |                            |
| GX = lead accuracy upon specification                                  |                            |
| Screw end machining                                                    | for screw only             |
| O = no end machining (cut by grinding)                                 |                            |
| E = end machining according to drawing                                 |                            |
| Assembly                                                               |                            |
| G = screw and nut separate (standard)                                  |                            |
| M = screw and nut assembled according to drawing/specified orientation |                            |
| <sup>1)</sup> other materials on request                               |                            |
| Example for screw only                                                 | RGS 10×3 RH 350 G9 O G     |
| Example for nut only                                                   | RGS 10×3 RFM RH G          |

Efficiency

The efficiency  $\eta$  depends on the helix angle and reaches values from ~0.3 up to 0.5  
➤ also see diagram, page 44

Production / Handling / Lubrication

➤ see Speedy, page 42

Application examples for Eichenberger leadscrews

➤ see Speedy, page 43

Design fundamentals for leadscrews

➤ see Speedy, pages 44–45

\* iglidur® is a registered trademark of igus® GmbH

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► CAD data ► [www.gewinde.ch](http://www.gewinde.ch)

# Thread rolling

## Advantageous thread production for everyone



The core competency of Eichenberger Gewinde AG is thread rolling. Production companies can also benefit from this if they want to have any type of threads efficiently manufactured.

State-of-the-art production methods, extensive product expertise and access to more than 1000 machine tools, enable us to meet each and every demand for rolled threads – however exotic they may be:

- pitches up to 6 x diameter
- spindle length up to 6 m
- spindle diameter from 2 to 160 mm
- all standard profiles (M, Tr, UNC, UNF, UNEF, Whitworth)
- high-helix thread profiles
- ballscrew thread profiles
- special profiles
- multiple start threads including right-hand/left-hand threads
- worm gears (quality and price advantages)
- serrations and knurlings
- conical threads
- threads on prefabricated and/or irregular parts, e.g. also on forged parts



Suitable materials for thread rolling:

- high-alloy, corrosion and acid-resistant steel
- special aluminium alloys
- riveting-quality brass
- copper alloys

Threads can be rolled on hollow bodies and tubes only if wall thickness is sufficient; this wall thickness depends upon the type and depth of intended profile as well as material used. We are happy to provide advice.

We look forward to your challenge!

# Eichenberger Gewinde AG

## About us

The name Eichenberger Gewinde AG has stood for work in the area of thread production of the highest quality since 1953. With our innovative drive technology products as well as our comprehensive services as a supplier (thread production using cold-forming), we are supporting our customers with unique products and extensive know-how as a thread specialist and partner.

### Development, production and IMS

“Quality first”: As a certified company, we leave nothing to chance, from development and manufacture to delivery. Our integrated management system complies with **ISO 9001** (Quality Management) and **ISO 14001** (Environmental Management). This guarantees a quality benchmark that makes us the preferred partner of many well-known companies all over the world.

### A company of the Festo Group

Eichenberger Gewinde AG – together with its affiliate for the automotive industry, Eichenberger Motion AG – has been a company of the globally active Festo Group since 2016.



### History

- 1953 Founding of precision turning workshop Hans Eichenberger
- 1986 Change of name to Eichenberger Gewinde AG
- 1988 Start of in-house ballscrew development
- 1995 Introduction of automated manufacture
- 1998 Take-over of Eichenberger Gewinde AG by the management
- 2004 Founding of Eichenberger Motion AG (large-scale production for the automotive industry)
- 2006 Production site expansion; doubling the production space
- 2016 Integration into Festo Group
- 2018 With 150 employees, we are supplying about 900 customers in 45 countries all over the world – with an export share of 80%



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Map and directions

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