



Ballscrews

Technical Information





Multi-Axis Robot

- Pick-and-place / Assembly / Array and packaging / Semiconductor / Electro-Optical industry / Automotive industry / Food industry
- Articulated Robot
 - Delta Robot
 - SCARA Robot
 - Wafer Robot
 - Electric Gripper
 - Integrated Electric Gripper
 - Rotary Joint



Single-Axis Robot

- Precision / Semiconductor / Medical / FPD
- KK, SK
 - KS, KA
 - KU, KE, KC



Direct Drive Rotary Table

- Aerospace / Medical / Automotive industry / Machine tools / Machinery industry
- RAB Series
 - RAS Series
 - RCV Series
 - RCH Series



Ball Screw

- Precision Ground / Rolled
- Super S series
 - Super T series
 - Mini Roller
 - Ecological & Economical lubrication Module E2
 - Rotating Nut (R1)
 - Energy-Saving & Thermal-Controlling (C1)
 - Heavy Load Series (RD)
 - Ball Spline



Linear Guideway

- Automation / Semiconductor / Medical
- Ball Type--HG, EG, WE, MG, CG
 - Quiet Type--QH, QE, QW, QR
 - Other--RG, E2, PG, SE, RC



Medical Equipment

- Hospital / Rehabilitation centers / Nursing homes
- Robotic Gait Training System
 - Hygiene System
 - Robotic Endoscope Holder



Bearing

- Machine tools / Robot
- Crossed Roller Bearings
 - Ball Screw Bearings
 - Linear Bearing
 - Support Unit



AC Servo Motor & Drive

- Semiconductor / Packaging machine / SMT / Food industry / LCD
- Drives-D1, D1-N, D2T
 - Motors-50W-2000W



Driven Tool Holders

- All kinds of turret
- VDI Systems
 - Radial Series, Axial Series, MT
 - BMT Systems
 - DS, NM, GW, FO, MT, OM, MS



Linear Motor

- Automated transport / AOI application / Precision / Semiconductor
- Iron-core Linear Motor
 - Coreless Linear Motor
 - Linear Turbo Motor LMT
 - Planar Servo Motor
 - Air Bearing Platform
 - X-Y Stage
 - Gantry Systems



Torque Motor (Direct Drive Motor)

- Inspection / Testing equipment / Machine tools / Robot
- Rotary Tables-TMS,TMY,TMN
 - TMRW Series
 - TMRI Series

Ballscrews

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(The specifications in this catalogue are subject to change without notification.)

1. Introduction

Ballscrews, also called a ball bearing screws, recirculating ballscrews, etc., consist of a screw spindle and a nut integrated with balls and the balls' return mechanism, return tubes or return caps. Ballscrews are the most common type of screws used in industrial machinery and precision machines. The primary function of a ballscrew is to convert rotary motion to linear motion or torque to thrust, and vice versa, with the features of high accuracy, reversibility and efficiency. HIWIN provides a wide range of ballscrews to satisfy your special requirements.

The combination of state-of-the-art machining technology, manufacturing experiences, and engineering expertise makes HIWIN ballscrew users "High-Tech Winners". HIWIN uses precise procedures to create exact groove profiles, either by grinding or precision rolling. Accurate heat treatment is also used to ensure the hardness of our ballscrews. These result in maximum load capacity and service life.

HIWIN precision ballscrews provide the most smooth and accurate movement, together with low drive torque, high stiffness and quiet motion with predictable lengthened service life. HIWIN rolled ballscrews also provide smooth movement and long life for general applications with less precision in lower price. HIWIN has modern facilities, highly skilled engineers, quality manufacturing and assembly processes, and uses quality materials to meet your special requirements.

It is our pleasure to provide you with the technical information and selection procedure to choose the right ballscrews for your applications through this catalogue.

2. Features & Applications

2.1 Features

There are many benefits in using HIWIN ballscrews, such as high efficiency and reversibility, backlash elimination, high stiffness, high lead accuracy, and many other advantages. Compared with the contact thread lead screws as shown in (Fig. 2.1), a ballscrew adds balls between the nut and spindle. The sliding friction of the conventional screw is thus replaced by the rolling motion of the balls. The basic characteristics and resultant benefits of HIWIN ballscrews are listed in more details as follows:

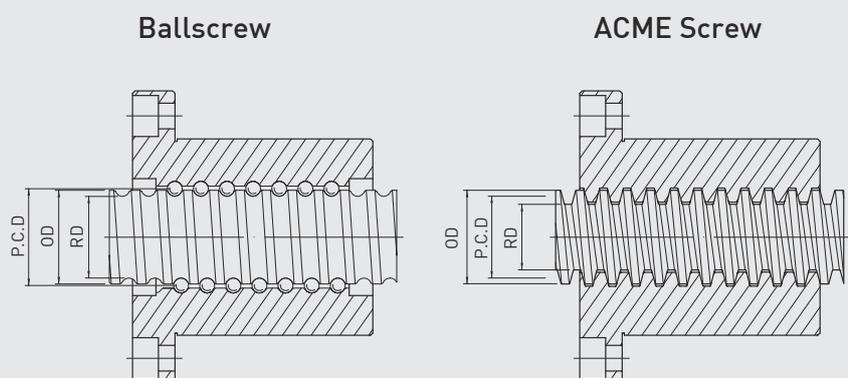


Fig 2.1 Basic configuration of ballscrews and contact thread lead screws

(1) High efficiency and reversibility

Ballscrews can reach an efficiency as high as 90% because of the rolling contact between the screw and the nut. Therefore, the torque requirement is approximately one third of that of conventional screws. It can be seen from Fig. 2.2 that the mechanical efficiency of ball screws are much higher than conventional lead screws.

HIWIN ballscrews have super surface finish in the ball tracks which reduce the contact friction between the balls and the ball tracks. Through even contact and the rolling motion of the balls in the ball tracks, a low friction force is achieved and the efficiency of the ballscrew is increased. High efficiency renders low drive torque during ballscrew motion. Hence, less drive motor power is needed in operation resulting in lower operation cost.

HIWIN uses a series of test equipment and testing procedures to guarantee the efficiency.

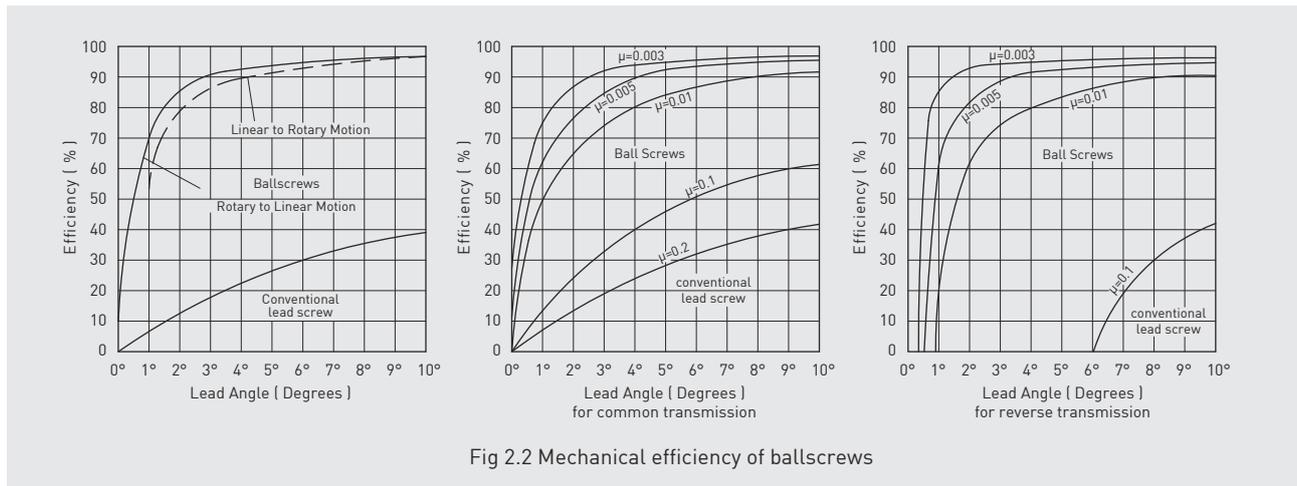


Fig 2.2 Mechanical efficiency of ballscrews

(2) Backlash elimination and high stiffness

Computer Numerically Controlled (CNC) machine tools require ballscrews with zero axial backlash and minimal elastic deformation (high stiffness). Backlash is eliminated by our special designed Gothic arch form balltrack (Fig. 2.3) and preload.

In order to achieve high overall stiffness and repeatable positioning in CNC machines, preloading of the ballscrews is commonly used. However, excessive preload increases friction torque in operation. This induced friction torque will generate heat and reduce the life expectancy. With our special design and fabrication process, we provide optimized ballscrews with no backlash and less heat losses for your application.

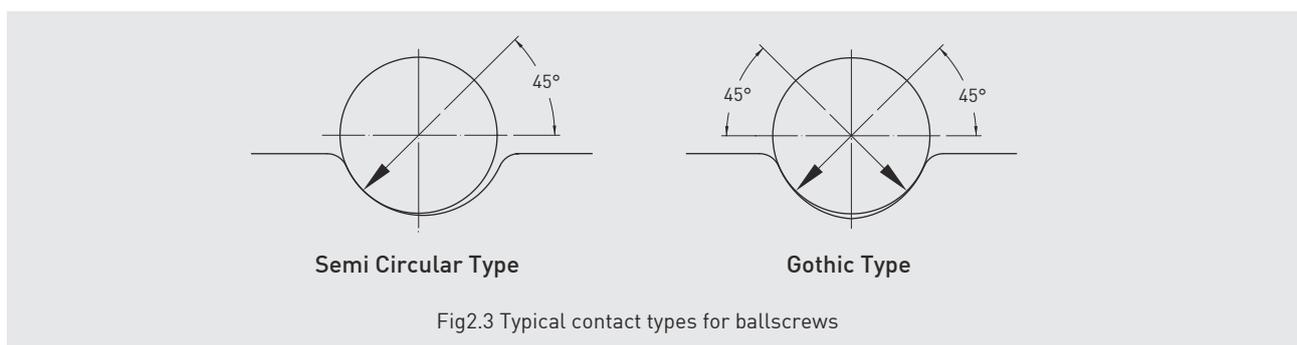


Fig2.3 Typical contact types for ballscrews

(3) High lead accuracy

For applications where high accuracy is required, HIWIN modern facilities permit the achievement of ISO, JIS and DIN standards or specific customer requirements.

This accuracy is guaranteed by our precise laser measurement equipment and reported to each customer.

(4) Predictable life expectancy

Unlike the useful life of conventional screws which is governed by the wear on the contact surfaces, HIWIN's ballscrews can usually be used until the metal fatigues. By careful attention to design, quality of materials, heat treatment and manufacture, HIWIN's ballscrews have proved to be reliable and trouble free during the period of expected service

life. The life achieved by any ballscrew depends upon several factors including design, quality, maintenance, and the major factor, dynamic axial load (C).

Profile accuracy, material characteristics and the surface hardness are the basic factors which influence the dynamic axial load.

It is recommended that the life at average axial load should be a minimum of 1×10^6 revs). High quality ballscrews are designed to conform with the B rating (i.e. 90% probability of achieving the design life). Fifty percent of the ballscrews can exceed 2 to 4 times of the design life.

(5) Low starting torque and smooth running

Due to metal to metal contact, conventional contact thread lead screws require high starting force to overcome the starting friction. However, due to rolling ball contact, ballscrews need only a small starting force to overcome their starting friction.

HIWIN uses a special design factor in the balltrack (conformance factor) and manufacturing technique to achieve a true balltrack. This guarantees the required motor torque to stay in the specified torque range.

HIWIN has special balltrack profile tracing equipment to check each balltrack profile during the manufacturing process. A sample trace is shown in Fig. 2.4.

HIWIN also uses computer measurement equipment to accurately measure the friction torque of ballscrews. A typical distance-torque diagram is shown in Fig. 2.5.

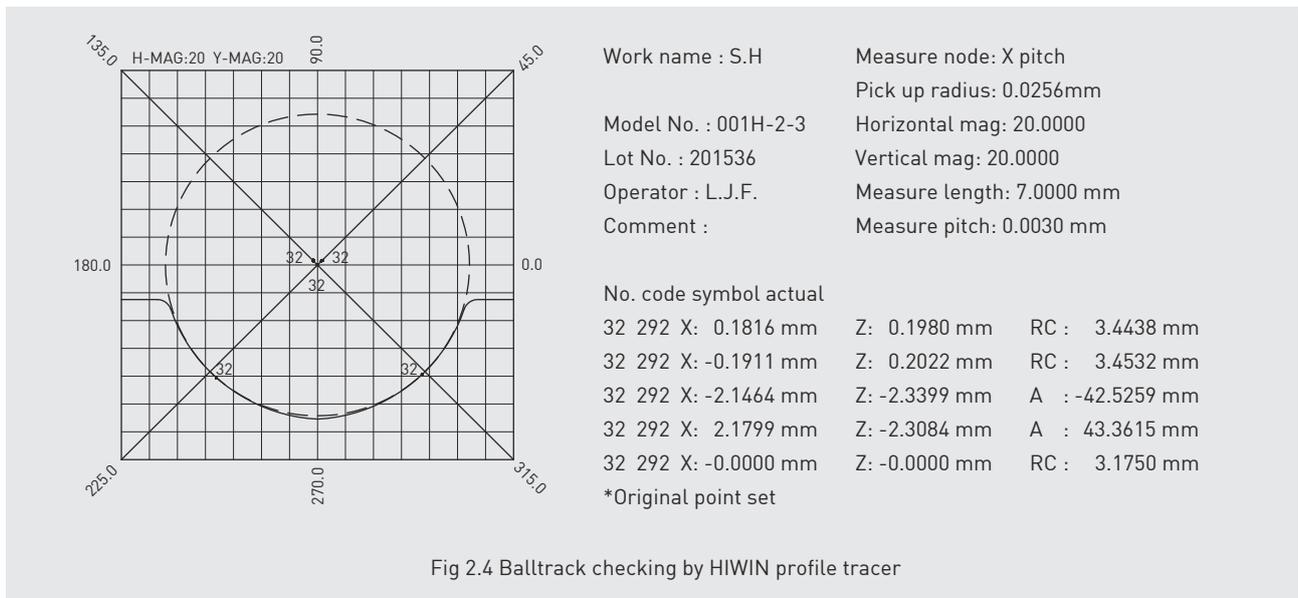


Fig 2.4 Balltrack checking by HIWIN profile tracer

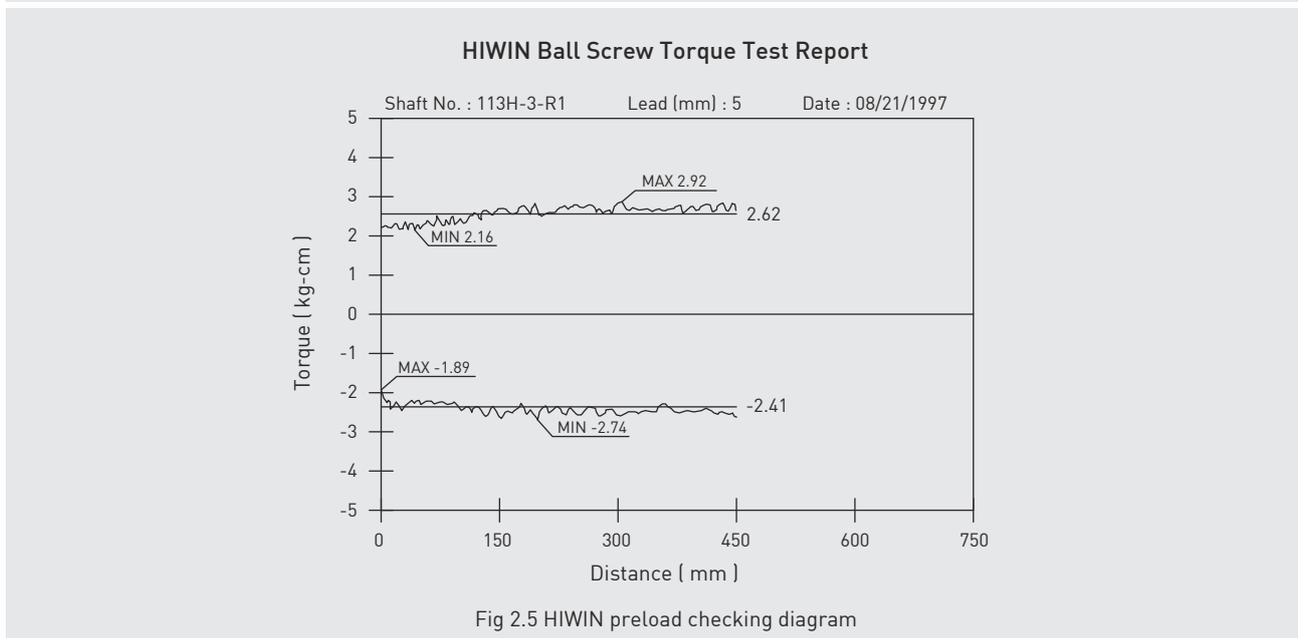


Fig 2.5 HIWIN preload checking diagram

(6) Quietness

High quality machine tools require low noise during fast feeding and heavy load conditions.

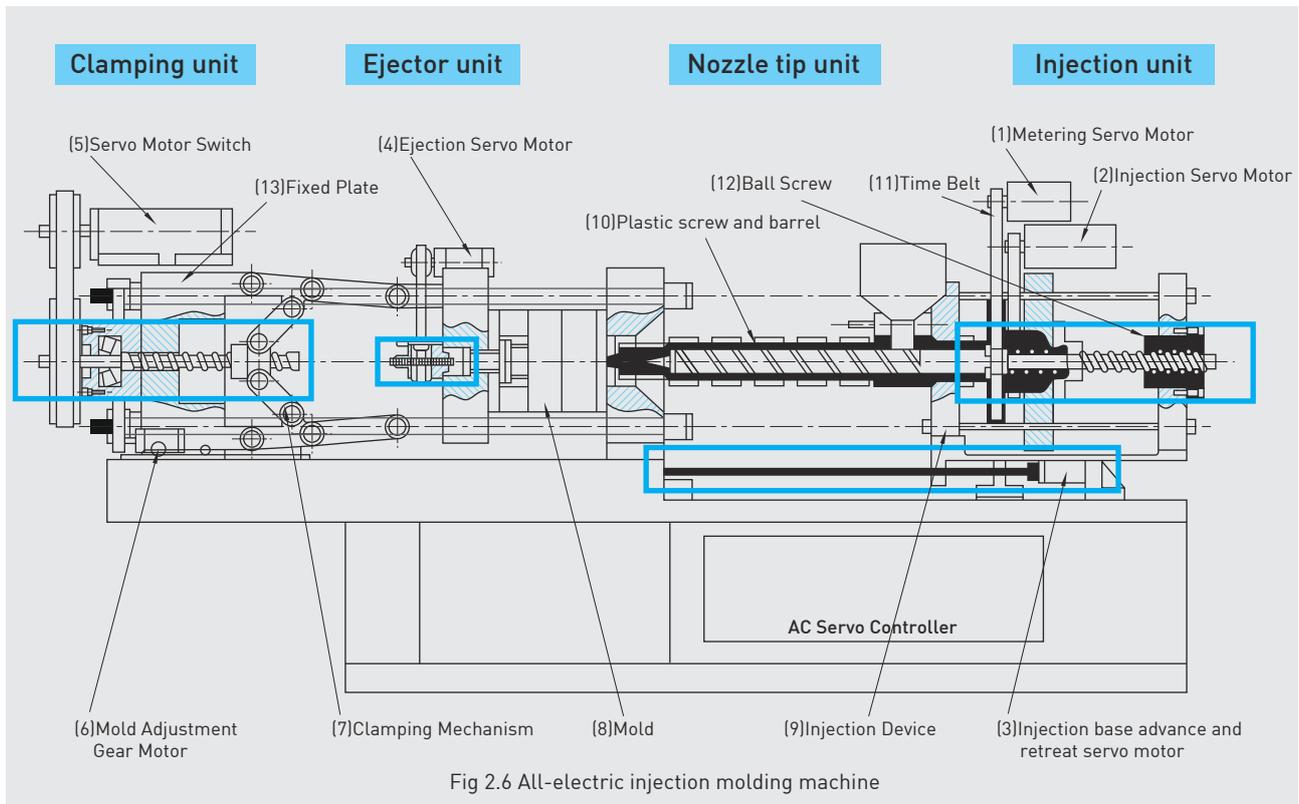
HIWIN achieves this by virtue of its return system, balltrack designs, assembly technique, and careful control of surface finish and dimensions.

(7) Short lead time

HIWIN has a fast production line and can stock ballscrews to meet short lead times.

(8) Advantages over hydraulic and pneumatic actuators

The ballscrew used in an actuator to replace the traditional hydraulic or pneumatic actuator has many advantages, i.e. fast response, no leakage, no filtering, energy savings and good repeatability.



2.2 Applications

HIWIN ballscrews are used in the following fields and the recommended application grade can be found in Table 4.5.

1. **CNC machinery** : CNC machine center, CNC lathe, CNC milling machine, CNC EDM, CNC grinder, wire cutting machine, boring machine, etc.
2. **Precision machine tools** : Milling machine, grinder, EDM, tool grinder, gear manufacturing machine, drilling machine, planer, etc.
3. **Industrial machinery** : Printing machine, paper-processing machine, automatic machine, textile machine, drawing machine, special purpose machine, injection molding machine, etc.
4. **Electronic machinery** : Robot measuring instrument, X-Y table, medical equipment, surface mounting device, semi-conductor equipment, factory automation equipment, etc.
5. **Transport machinery** : Material handling equipment, elevated actuator, etc.
6. **Aerospace industry** : Aircraft flaps, thrust open-close reverser, airport loading equipment, fin actuator, etc.
7. **Miscellaneous** : Antenna leg actuator, valve operator, etc.

3. Classification of Standard Ballscrews

3.1 Standard Ballscrew Spindle

HIWIN recommends our standard regular ballscrews for your design. However, high lead, miniature or other special types of ballscrews, may also be available upon your request. Table 3.1 shows the standard ballscrew spindles that are available.

3.2 Nut Configuration

The circuiting systems of the nut of a HIWIN ball screw can be divided into: Super S, Super T, external circuit, internal circuit, and end caps. For each circuiting way the features are as follows: external recirculation type, internal recirculation type, endcap recirculation type, and Super S. The features of these types are specified below.

3.2.1 Type of return tube design

(1) Super S Series

a. application

CNC Machinery, Industrial Machinery, Electronic Machinery, Precision Machine and other High Speed Machinery.

b. features

(a) Low noise (5~7dB lower than traditional series):

The patented design of return unit can absorb noises caused by the impact of the steel balls, thus greatly reducing noise intensity.

(b) Space-saving and weight-lightening design:

The ballnut diameter is 18%~32% smaller than traditional series.

(c) Dm-N value up to 220,000:

The patented design of the return unit can improve the strength of the return structure, achieving a Dm-N value of up to 220,000.

(d) High acceleration and deceleration velocity:

The pathway of the specialized return unit, as well as the ballnut's strengthened design diminish the impact experienced by the balls, So, it can sustain peak performance in more rigorous operating environments, such as high acceleration and deceleration.

(e) Accuracy grade:

Precision ground ballscrews available in JIS Grade C0~C7; Rolled ballscrews available in JIS Grade C6~C10.

c. performance

Specification: 2R40 - 40K4 - DFSC - 1200 - 1600 - 0.008

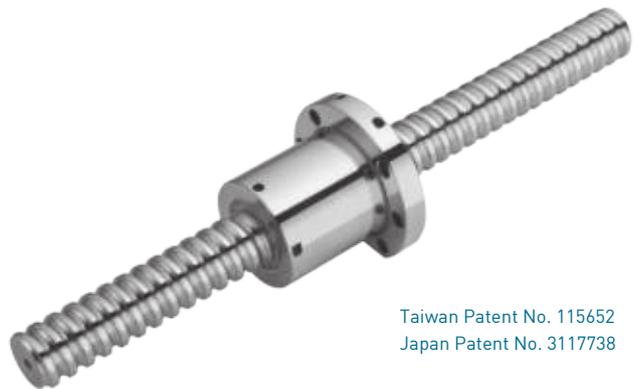
Lead: 40 mm

Acceleration: 1g (9.8m/sec²)

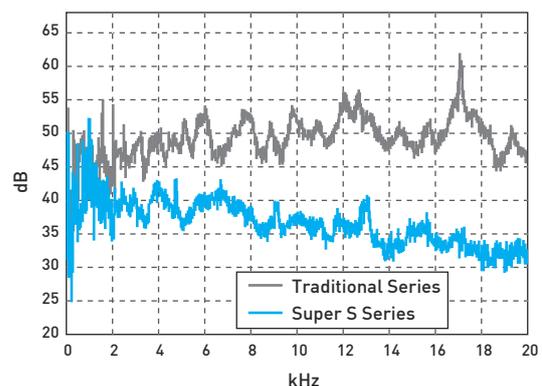
Dm-N Value: 120,000

d. pattern nomenclature

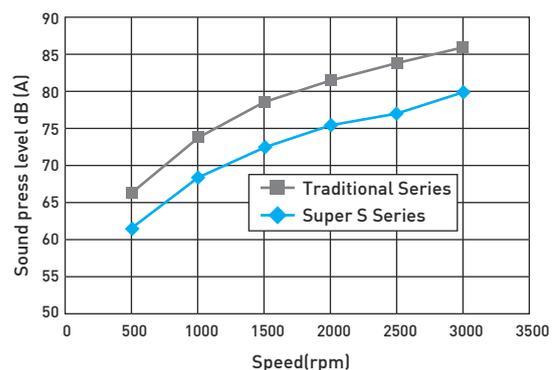
Ex: R40-10K4 -FSC -1200 -1600 - 0.008



Taiwan Patent No. 115652
Japan Patent No. 3117738

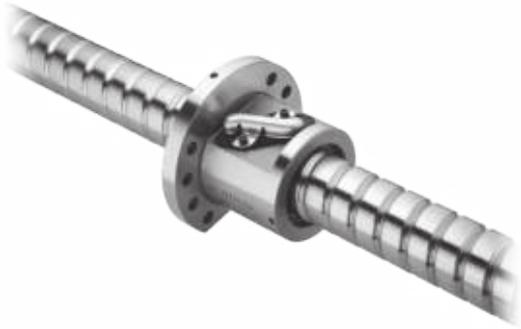


Noise Frequency Analysis



Speed(rpm)

(2) Super T Series

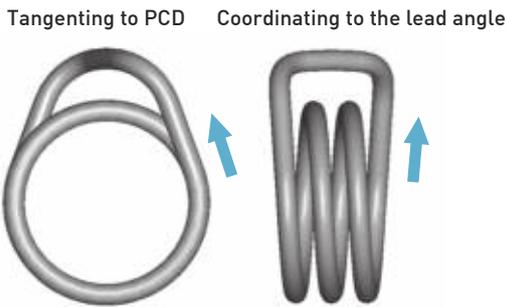


a. application

CNC machinery, precision machine tools, industrial machinery, electrical machinery, high speed machinery.

b. Design Principles:

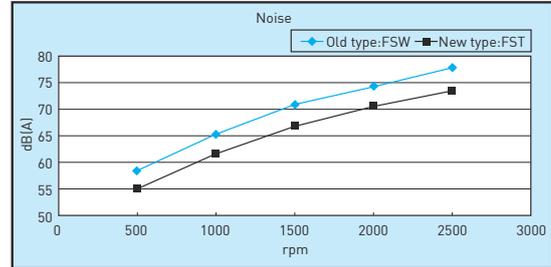
Optimal design of the recirculation path can reduce noise generated by impact of balls to reduce noise level. (Note: the DN value should be defined by ball diameters and using conditions)



c. features

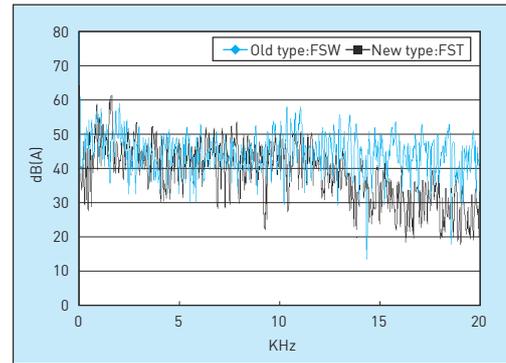
(a) Low noise (lower 3~5dB than general series)

Finest design of recirculation can absorb noise from the impact of balls to reduce noise level.



(b) Qualified tone

Super T recirculating components not only can reduce the sound pressure level, but also efficiently lower the middle and high frequency range better than conventional ballscrews, producing no shrill fricative and better sound quality.



(c) Low vibration and smooth operation

The tangent recirculation substantially reduces impact force of running balls and the resistance of guiding balls, so the vibration of the nut is gentler and the rotation is smoother and more stable.

(3) External recirculation type

a. structure

The first, called the external recirculation type ballscrew, consists of the screw shaft, the ball nut, the steel balls, the return tubes and the fixing plate. The steel balls are introduced into the space between the screw shaft and the ball nut. The balls are diverted from the ball tracks and carried back by the ball guide return tube form a loop. Since the return tubes are located outside the nut body, this type is called the external recirculation type ball screw Fig. 3.1.

b. features

- (a) Adapted to wide kinds of shaft diameters and leads of ballscrew
- (b) Complete specifications

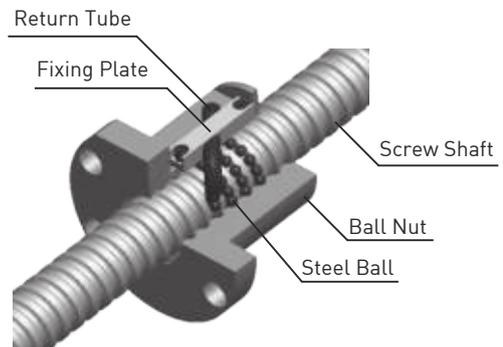


Fig. 3.1 External recirculation type nut with return tubes

3.3 Spindle End and Journal Configuration

Mounting methods

Bearing mounting methods on the end journals of ballscrews are crucial for stiffness, critical speed and column buckling load. Careful consideration is required when designing the mounting method. The basic mounting configuration are shown as follows Fig. 3.8.

Spindle end journal configurations

The most popular journal configurations are shown in Fig. 3.9.

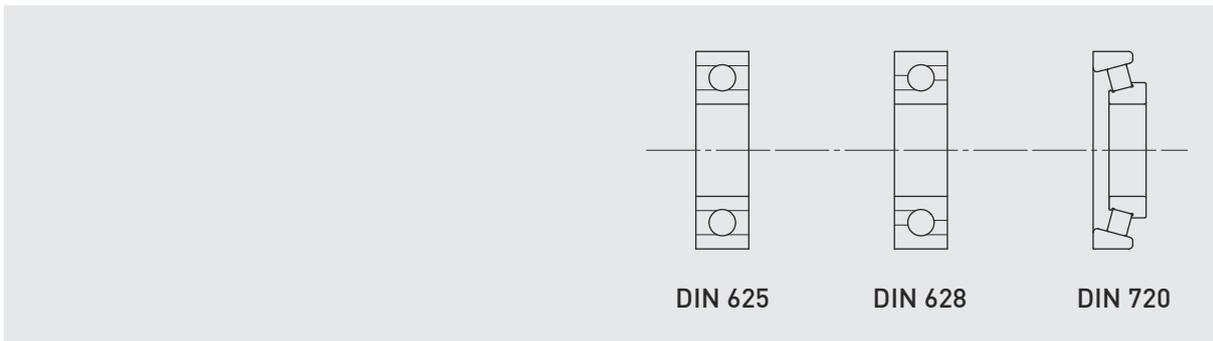
Table 3.2 lists the recommended dimensions and the bearings for the configurations of Fig. 3.9.

Table 3.2 Dimension for spindle ends

| Model | d1 | d5 | d6 | d7 | d8 | E | L3 | L4 | L5 | L6 | L7 | L8 | L9 | L10 | L11 | L12 | L13 | bxt1 | Recommended Bearing | |
|-------|-----|----|------|----------|----|----|----|----|-----|-----|------|-----|-----|-----|-----|-----|-----|----------|---------------------|----------------------------|
| | | | | | | | | | | | | | | | | | | | I,II,III DIN625 | III,IV,V DIN625 628 720 |
| 10 | 10 | 8 | 7.6 | M8x0.75 | 6 | 6 | 16 | 7 | 29 | 26 | 0.9 | 39 | 50 | 56 | 18 | 10 | 12 | 3.0x1.8 | 608 | 738B |
| 12 | 12 | 8 | 7.6 | M8x0.75 | 6 | 6 | 16 | 7 | 29 | 26 | 0.9 | 39 | 50 | 56 | 18 | 10 | 12 | 3.0x1.8 | 608 | 738B |
| 14 | 14 | 10 | 9.6 | M10x0.75 | 8 | 8 | 20 | 9 | 37 | 34 | 1.15 | 45 | 54 | 62 | 20 | 10 | 14 | 3.0x1.8 | 6200 | 7200BTVP |
| 16 | 16 | 12 | 11.5 | M12x1 | 10 | 8 | 21 | 10 | 41 | 38 | 1.15 | 46 | 56 | 66 | 20 | 10 | 14 | 4.0x2.5 | 6201 | 7301BTVP |
| 20 | 20 | 15 | 14.3 | M15x1 | 12 | - | 22 | 11 | 47 | 44 | 1.15 | 55 | 70 | 84 | 25 | 13 | 16 | 5.0x3.0 | 6202 | 7202BTVP |
| 25 | 25 | 17 | 16.2 | M17x1 | 15 | - | 23 | 12 | 49 | 46 | 1.15 | 56 | 72 | 86 | 25 | 13 | 16 | 5.0x3.0 | 6203 | 7203BTVP |
| 28 | 28 | 20 | 19 | M20x1 | 16 | - | 26 | 14 | 58 | 54 | 1.35 | 68 | 82 | 100 | 28 | 20 | 18 | 6.0x3.5 | 6204 | 7602020TVP |
| 32 | 32 | 25 | 23.9 | M25x1.5 | 20 | - | 27 | 15 | 64 | 60 | 1.35 | 79 | 94 | 116 | 36 | 22 | 26 | 7.0x4.0 | 6205 | 7602025TVP |
| 36 | 36 | 25 | 23.9 | M25x1.5 | 20 | - | 27 | 15 | 64 | 60 | 1.35 | 79 | 94 | 116 | 36 | 22 | 26 | 7.0x4.0 | 6205 | 7602025TVP |
| 40 | 40 | 30 | 28.6 | M30x1.5 | 25 | - | 28 | 16 | 68 | 64 | 1.65 | 86 | 102 | 126 | 42 | 22 | 32 | 8.0x4.0 | 6206 | 7602030TVP |
| 45 | 45 | 35 | 33.3 | M35x1.5 | 30 | - | 29 | 17 | 80 | 76 | 1.65 | 97 | 114 | 148 | 50 | 24 | 40 | 10.0x5.0 | 6207 | 7602035TVP |
| 50 | 50 | 40 | 38 | M40x1.5 | 35 | - | 36 | 23 | 93 | 88 | 1.95 | 113 | 126 | 160 | 60 | 24 | 45 | 12.0x5.0 | 6308 | 7602040TVP |
| 55 | 55 | 45 | 42.5 | M45x1.5 | 40 | - | 38 | 25 | 93 | 88 | 1.95 | 125 | 138 | 168 | 70 | 24 | 50 | 14.0x5.5 | 6309 | 7602045TVP |
| 63 | 63 | 50 | 47 | M50x1.5 | 45 | - | 33 | 27 | 102 | 97 | 2.2 | 140 | 153 | 188 | 80 | 27 | 60 | 14.0x5.5 | 6310 | 7602050TVP |
| 70 | 70 | 55 | 52 | M55x2.0 | 50 | 10 | 44 | 29 | 118 | 113 | 2.2 | 154 | 167 | 212 | 90 | 27 | 70 | 16.0x6.0 | 6311 | 7602055TVP |
| 80 | 80 | 65 | 62 | M65x2.0 | 60 | 10 | 49 | 33 | 132 | 126 | 2.7 | 171 | 184 | 234 | 100 | 30 | 80 | 18.0x7.0 | 6313 | 7602065TVP |
| 100 | 100 | 75 | 72 | M75x2.0 | 70 | 10 | 53 | 37 | 140 | 134 | 2.7 | 195 | 208 | 258 | 120 | 30 | 90 | 20.0x7.5 | 6315 | 7602075TVP |

* We reserve the right to modify and improve data value without prior notice.

* Different diameters and leads are available upon request.



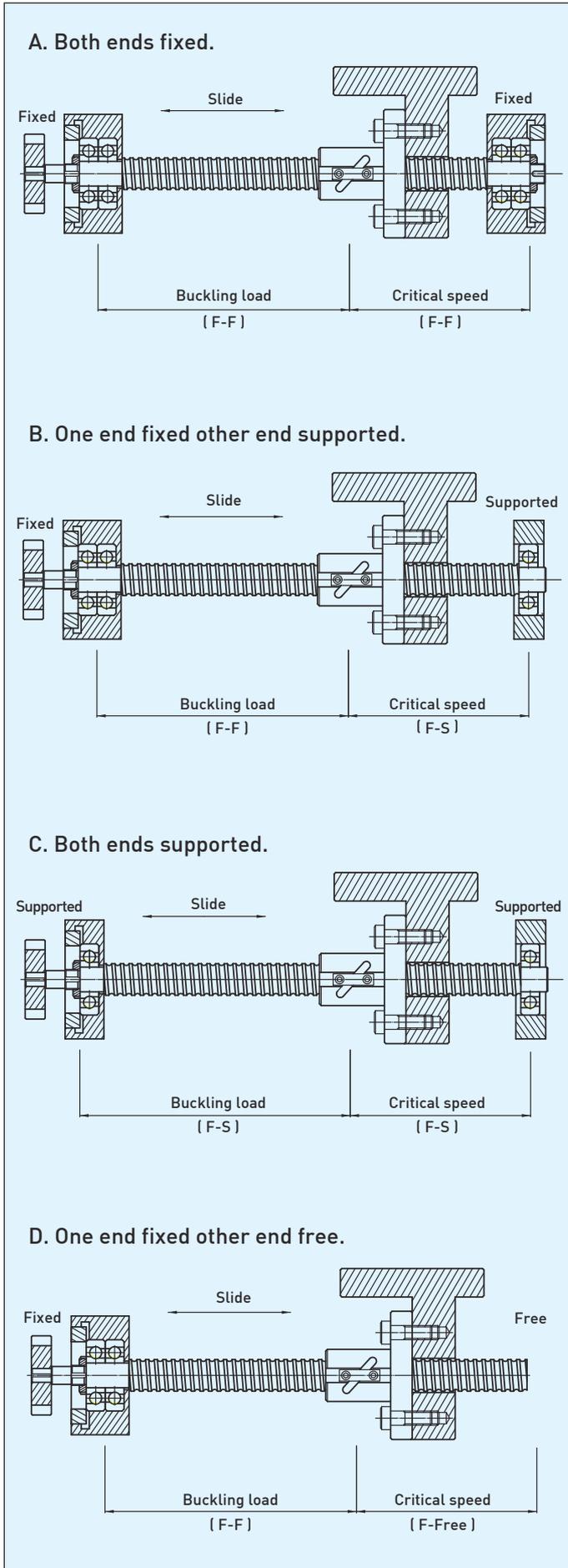


Fig 3.8 Recommended mounting methods for the ballscrew end journals

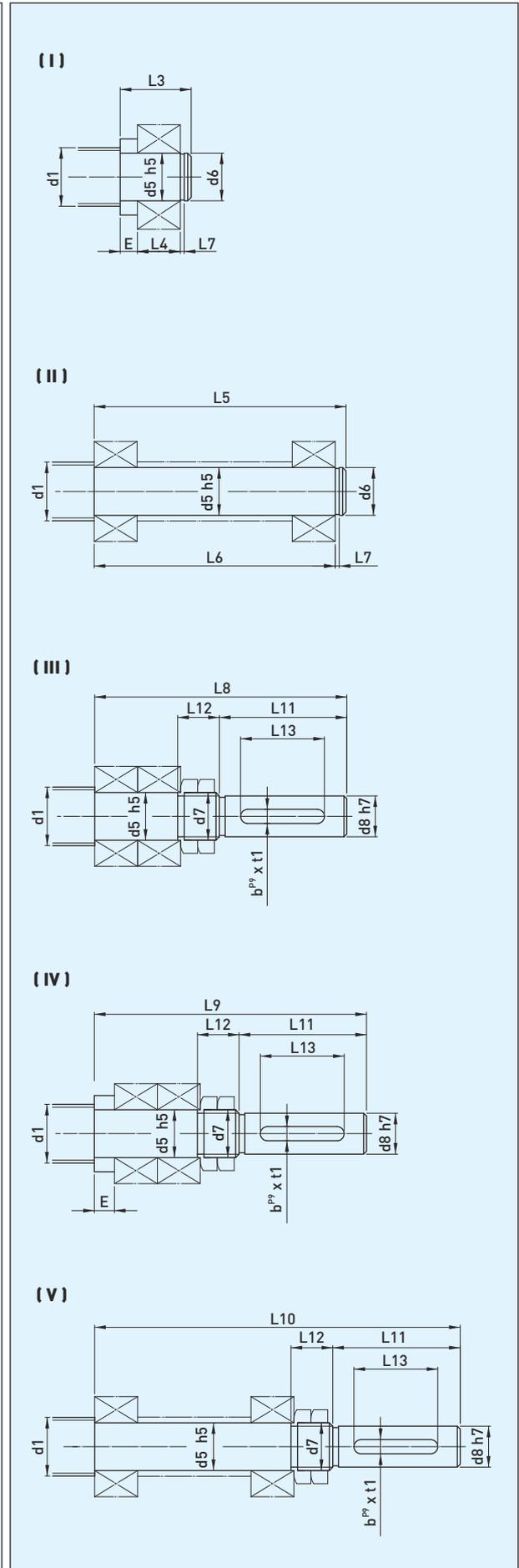


Fig 3.9 Configurations of spindle ends

4. Design and Selection of HIWIN Ballscrews

4.1 Fundamental Concepts for Selection & Installation

(1) A ballscrew must be thoroughly cleaned in white spirit and oil to protect against corrosion. Trichloroethylene is an acceptable degreasing agent, ensuring the ball track free from dirt and damage (paraffin is not satisfactory). Great care must be taken to ensure that the ball track is not struck by a sharp edged component or tool, and metallic debris does not enter the ball nut (Fig. 4.1).

(2) Select a suitable grade ballscrew for the application (ref. Table 4.5). Install with corresponding mounting disciplines. That is, precision ground ballscrews for CNC machine tools demand accurate alignment and precision bearing arrangement, where the rolled ballscrews for less precision applications, such as packaging machinery, require less precise support bearing arrangement.

It is especially important to eliminate misalignment between the bearing housing center and the ballnut center, which would result in unbalanced loads (Fig. 4.3). Unbalanced loads include radial loads and moment loads (Fig. 4.3a). These can cause malfunction and reduce service life (Fig.4.3b).

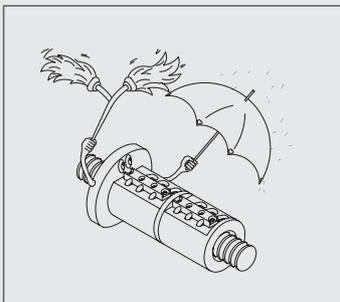


Fig 4.1 Carefully clean and protect

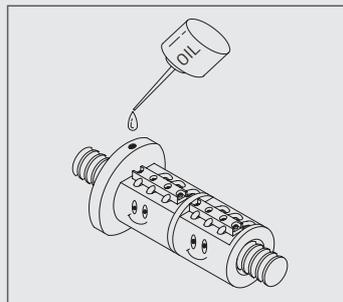


Fig 4.2 Oil lubrication method.

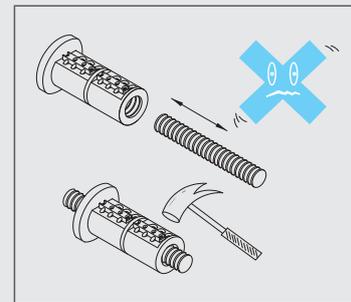


Fig 4.3 Carefully protect the nut

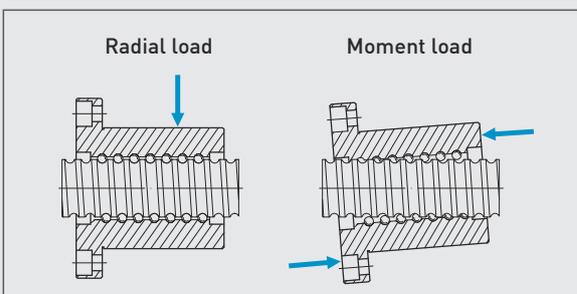


Fig 4.3(a) Unbalance load caused by misalignment of the support bearings and nut brackets, inaccurate alignment of the guide surface, inaccurate angle or alignment of the nut mounting surface

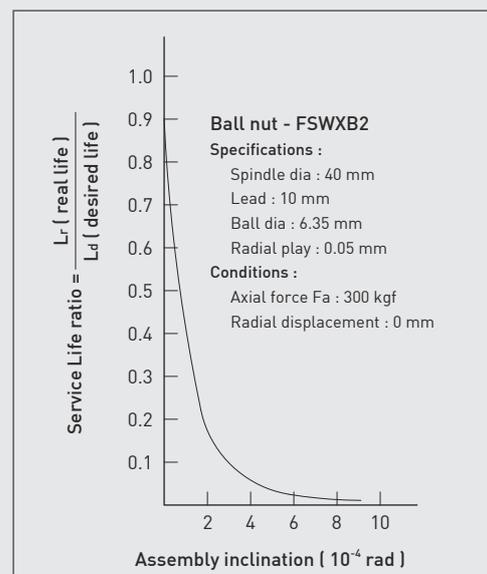
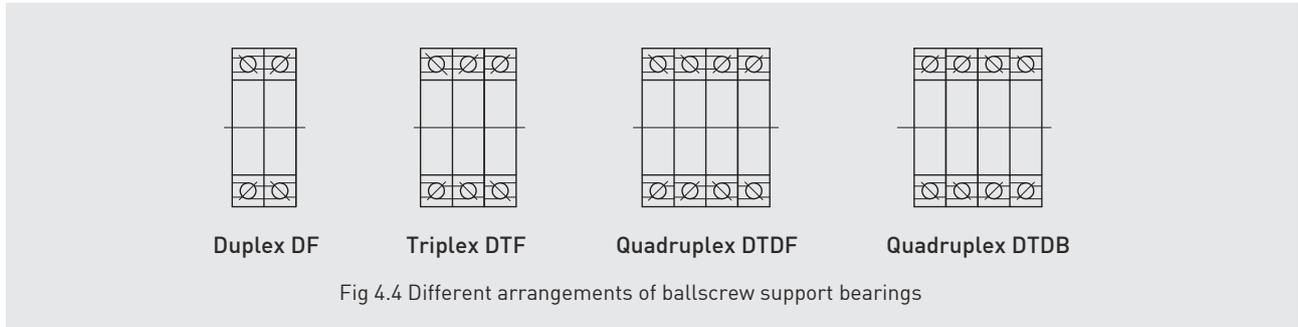
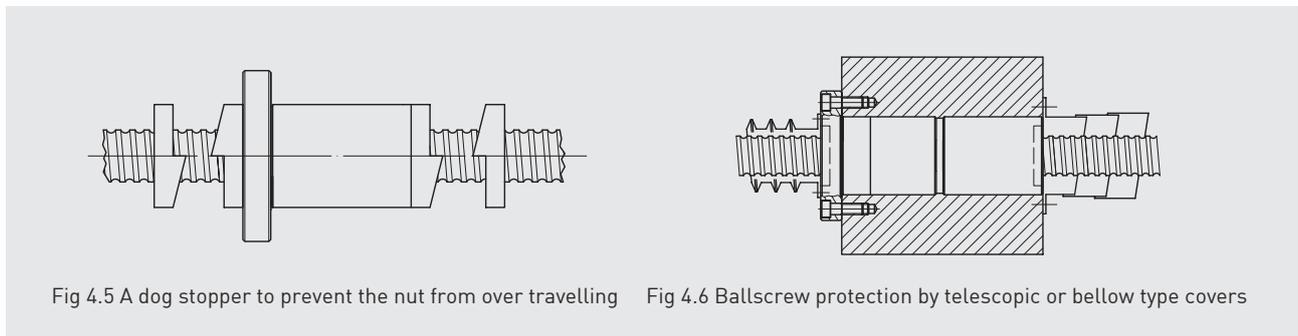


Fig 4.3(b) The effect on service life of a radial load caused by misalignment

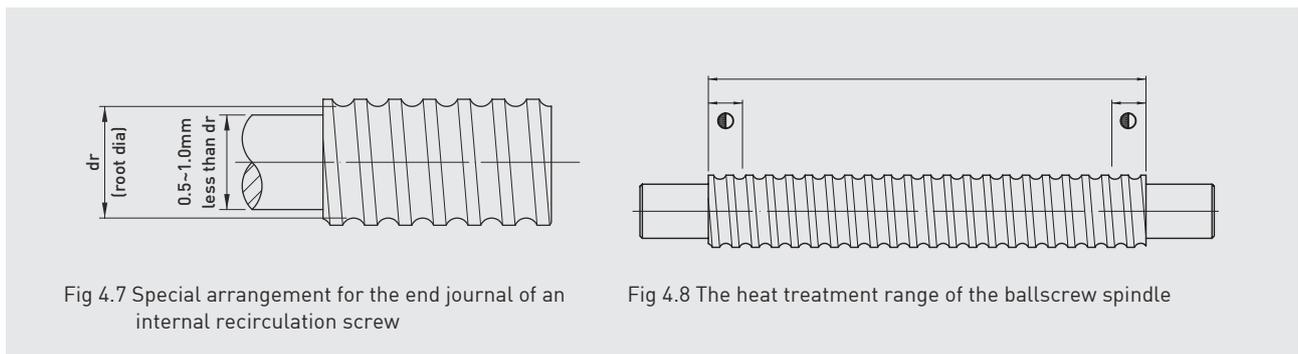
- (3) To achieve the ballscrews' maximum life, the use of antifriction bearing oil is recommended. Oil with graphite and MoS₂ additives must not be used. The oil should be maintained over the balls and the balltracks.
- (4) Oil mist baths or drip feeds are acceptable. However, direct application to the ball nut is recommended (Fig. 4.3).
- (5) Select a suitable support bearing arrangement for the screw spindle. Angular contact ball bearings (angle=60°) are recommended for CNC machinery, because of higher axial load capacity and ability to provide a clearance-free or preloaded assembly (Fig. 4.4).



- (6) A dog stopper should be installed at the end to prevent the nut from over-travelling which results in damage to ballscrew assembly (Fig 4.5).
- (7) In environments contaminated by dust or metallic debris, ballscrews should be protected using telescopic or bellow-type covers. The service life of a ballscrew will be reduced to about one-tenth normal condition if debris or chips enter the nut. The bellow type covers may need to have a threaded hole in the flange to fix the cover. Please contact engineers when special modifications are needed (Fig 4.6).



- (8) If you select an internal recirculation type or an endcap recirculation type ballscrew, one end of the ball thread must be cut through to the end surface. The adjacent diameter on the end journal must be 0.5 ~ 1.0 mm less than the root diameter of the balltracks (Fig 4.7).
- (9) After heat treating the ballscrew spindle, both ends of the balltracks adjacent to the journal have about 2 to 3 leads left soft, for the purpose of machining. These regions are shown in (Fig. 4.8) with the mark "●" on HIWIN drawings. Please contact engineers if special requirements are needed in these regions.



- (10) Excessive preload increases the friction torque and generates heat which reduces the life expectancy. But insufficient preload reduces stiffness and increases the possibility of lost motion. It is recommended that the maximum preload used for CNC machine tools should not exceed 8% of the basic dynamic load C.
- (11) When the nut needs to be disassembled from/assembled to the screw spindle, a tube with an outer dia. 0.2 to 0.4 mm less than the root diameter (ref. M37) of the balltracks should be used to release/connect the nut to/from the screw spindle via one end of the screw spindle shown in Fig. 4.9.
- (12) As shown in Fig 4.10, the support bearing must have a chamfer to allow it to seat properly and maintain proper alignment. HIWIN suggests the DIN 509 chamfer as the standard construction for this design (Fig. 4.11).

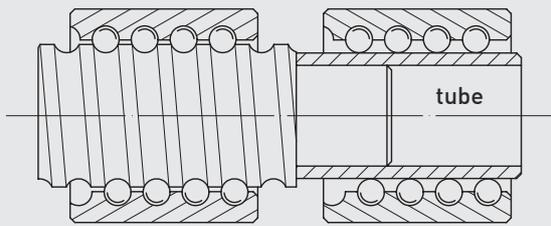


Fig 4.9 The method of separating the nut from the screw spindle

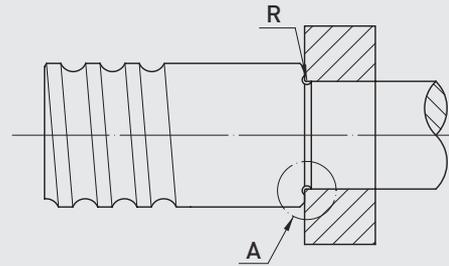


Fig 4.10 Chamfer for seating the face of bearing end

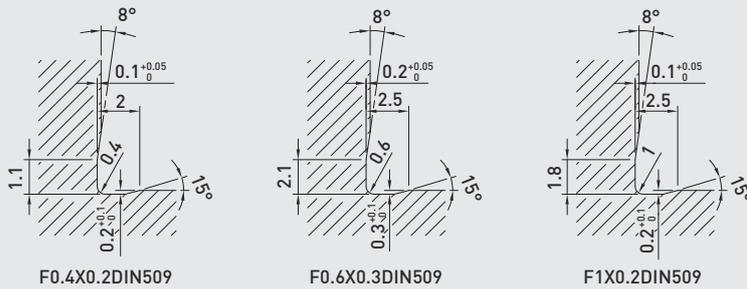


Fig 4.11 Suggested chamfer dimension per DIN 509 for the "A" dimension in Fig 4.10

4.2 Ballscrews Selection Procedure

The selection procedure for ballscrews is shown in (Table 4.1) From the known design operation condition, (A) select the appropriate parameter of ballscrew, (B) follow the selection procedure step by step via the reference formula, and (C) find the best ballscrew parameters which can be met for the design requirements.

Table 4.1 Ballscrew selection procedure

| Step | Design operation condition (A) | Ballscrew parameter (B) | Reference formula(C) |
|---------|---|--|--|
| Step 1 | Positioning accuracy | Lead accuracy | Table 4.2 |
| Step 2 | (1) Max. speed of DC motor (Nmax) (2) Rapid feed rate (Vmax) | Ballscrew lead | $\ell \geq \frac{V_{\max}}{N_{\max}}$ |
| Step 3 | Total travel distance | Total thread length | Total length = thread length+journal end length Thread length = stroke+nut length+100 mm (unused thread) |
| Step 4 | (1) Load condition (%) (2) Speed condition (%) | Mean axial load Mean speed | M7~M10 |
| Step 5 | Mean axial force ($\leq 1/5 C$ is the best) | Preload | M1 |
| Step 6 | (1) Service life expectancy (2) Mean axial load (3) Mean speed | Basic dynamic load | M13~M14 |
| Step 7 | (1) Basic dynamic load (2) Ballscrew lead (3) Critical speed (4) Speed limited by Dm-N value | Screw diameter and nut type (select some range) | M31~M33 and dimension table |
| Step 8 | (1) Ballscrew diameter (2) Nut type (3) Preload (4) Dynamic load | Stiffness (check the best one via lost motion value) | M34~M40 |
| Step 9 | (1) Surrounding temperature (2) Ballscrew length | Thermal displacement and target value of cumulative lead (T) | M41 and 4.6 temperature rising effect |
| Step 10 | (1) Stiffness of screw spindle (2) Thermal displacement | Pretension force | M45 |
| Step 11 | (1) Max. table speed (2) Max. rising time (3) Ballscrew specification | Motor drive torque and motor specification | M19~M28 |

4.3 Accuracy Grade of HIWIN Ballscrews

Precision ground ballscrews are used in applications requiring high positioning accuracy and repeatability, smooth movement and long service life. Ordinary rolled ballscrews are used for application grade less accurate but still requiring high efficiency and long service life. Precision grade rolled ballscrews have an accuracy between that of the ordinary grade rolled ballscrews and the higher grade precision ground ballscrews. They can be used to replace certain precision ground ballscrews with the same grade in many applications.

HIWIN makes precision grade rolled ballscrew up to C6 grade. Geometric tolerances are different from those of precision ground screws (See Chapter 6). Since the outside diameter of the screw spindle is not ground, the set-up procedure for assembling precision rolled ballscrews into the machine is different from that of ground ones. Chapter 7 contains the entire description of rolled ballscrews.

(1) Accuracy grade

There are numerous applications for ballscrews from high precision grade ballscrews, used in precision measurement and aerospace equipment, to transport grade ballscrews used in packaging equipment. The quality and accuracy classifications are described as follows: lead deviation, surface roughness, geometrical tolerance, backlash, drag torque variation, heat generation and noise level.

HIWIN precision ground ballscrews are classified into 7 classes. In general, HIWIN precision grade ballscrews are defined by the so called “ \mathcal{V}_{300p} ” value see Fig 4.12 and rolled grade ballscrews are defined differently as shown in Chapter 7.

Fig. 4.12 is the lead measuring chart according to the accuracy grade of the ballscrews. The same chart by the DIN system is illustrated in Fig. 4.13. From this diagram, the accuracy grade can be determined by selecting the suitable tolerance in Table 4.2. Fig. 4.14 shows HIWIN’s measurement result according to the DIN standard. Table 4.2 shows the accuracy grade of precision grade ballscrews in HIWIN’s specification. The relative international standard is shown in Table 4.3.

The positioning accuracy of machine tools is selected by e_p value with the \mathcal{V}_{300p} variation. The recommended accuracy grade for machine applications is shown in Table 4.5. This is the reference chart for selecting the suitable ballscrews in different application fields.

(2) Axial play (Backlash)

If zero axial play ballscrews (no backlash) are needed, preload should be added and the preload drag torque is specified for testing purpose. The standard axial play of HIWIN ballscrews is shown in Table 4.4. For CNC machine tools, lost motion can occur in zero-backlash ballscrews through incorrect stiffness. Please consult our engineers when determining stiffness and backlash requirements.

(3) Geometrical tolerance

It is crucial to select the ballscrew of the correct grade to meet machinery requirements. Table 4.6 and Fig 4.15 are helpful for you to determine the tolerance factors, which are based on certain required accuracy grades.

Table 4.2 HIWIN accuracy grade of precision ballscrew

Unit: 0.001mm

| Accuracy Grade | | C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | |
|----------------------|-------|-------|-----------------|-----------------|-----------------|-------|-----------------|-----------------|-----------------|-------|-----------------|-----------------|-----------------|-------|-----------------|
| \mathcal{V}_{2pp} | | 3 | | 4 | | 4 | | 6 | | 8 | | 8 | | 8 | |
| \mathcal{V}_{300p} | | 3.5 | | 5 | | 6 | | 8 | | 12 | | 18 | | 23 | |
| Thread length | | Item | | | | | | | | | | | | | |
| | | e_p | | \mathcal{V}_u | | e_p | | \mathcal{V}_u | | e_p | | \mathcal{V}_u | | e_p | |
| above | below | e_p | \mathcal{V}_u | e_p | \mathcal{V}_u | e_p | \mathcal{V}_u | e_p | \mathcal{V}_u | e_p | \mathcal{V}_u | e_p | \mathcal{V}_u | e_p | \mathcal{V}_u |
| - | 315 | 4 | 3.5 | 6 | 5 | 6 | 6 | 12 | 8 | 12 | 12 | 23 | 18 | 23 | 23 |
| 315 | 400 | 5 | 3.5 | 7 | 5 | 7 | 6 | 13 | 10 | 13 | 12 | 25 | 20 | 25 | 25 |
| 400 | 500 | 6 | 4 | 8 | 5 | 8 | 7 | 15 | 10 | 15 | 13 | 27 | 20 | 27 | 26 |
| 500 | 630 | 6 | 4 | 9 | 6 | 9 | 7 | 16 | 12 | 16 | 14 | 30 | 23 | 30 | 29 |
| 630 | 800 | 7 | 5 | 10 | 7 | 10 | 8 | 18 | 13 | 18 | 16 | 35 | 25 | 35 | 31 |
| 800 | 1000 | 8 | 6 | 11 | 8 | 11 | 9 | 21 | 15 | 21 | 17 | 40 | 27 | 40 | 35 |
| 1000 | 1250 | 9 | 6 | 13 | 9 | 13 | 10 | 24 | 16 | 24 | 19 | 46 | 30 | 46 | 39 |
| 1250 | 1600 | 11 | 7 | 15 | 10 | 15 | 11 | 29 | 18 | 29 | 22 | 54 | 35 | 54 | 44 |
| 1600 | 2000 | | | 18 | 11 | 18 | 13 | 35 | 21 | 35 | 25 | 65 | 40 | 65 | 51 |
| 2000 | 2500 | | | 22 | 13 | 22 | 15 | 41 | 24 | 41 | 29 | 77 | 46 | 77 | 59 |
| 2500 | 3150 | | | 26 | 15 | 26 | 17 | 50 | 29 | 50 | 34 | 93 | 54 | 93 | 69 |
| 3150 | 4000 | | | 30 | 18 | 32 | 21 | 60 | 35 | 62 | 41 | 115 | 65 | 115 | 82 |
| 4000 | 5000 | | | | | | | 72 | 41 | 76 | 49 | 140 | 77 | 140 | 99 |
| 5000 | 6300 | | | | | | | 90 | 50 | 100 | 60 | 170 | 93 | 170 | 119 |
| 6300 | 8000 | | | | | | | 110 | 60 | 125 | 75 | 210 | 115 | 210 | 130 |
| 8000 | 10000 | | | | | | | | | | | 260 | 140 | 260 | 145 |
| 10000 | 12000 | | | | | | | | | | | 320 | 170 | 320 | 180 |

Table 4.3 International standard of accuracy grade for ballscrews

Unit: 0.001mm

| Grade | | Ground | | | | | | | | | |
|----------------------|----------|--------|----|----|----|----|----|----|----|-----|-----|
| | | C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C10 |
| \mathcal{V}_{300p} | ISO, DIN | | 6 | | 12 | | 23 | | 52 | | 210 |
| | JIS | 3.5 | 5 | | 8 | | 18 | | 50 | | 210 |
| | HIWIN | 3.5 | 5 | 6 | 8 | 12 | 18 | 23 | 50 | 100 | 210 |

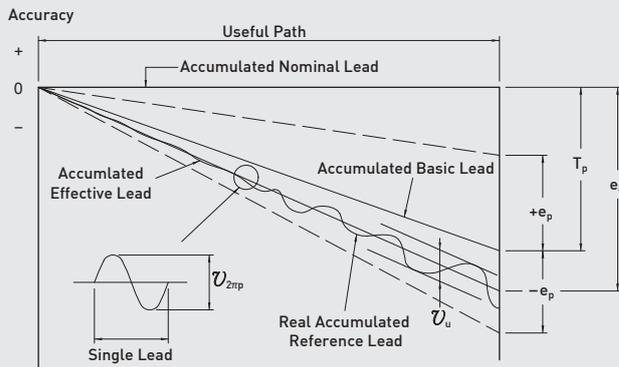
Table 4.4 Standard combination of grade and axial play

Unit: 0.001mm

| Grade | C0 | C1 | C2 | C3 | C4 | C5 | C6 |
|------------|----|----|----|----|----|----|----|
| Axial Play | 5 | 5 | 5 | 10 | 15 | 20 | 25 |

Table 4.5 Recommended accuracy grade for machine applications

| Application grade | | AXIS | Accuracy grade | | | | | | | | | |
|-----------------------|--|------|----------------|---|---|---|---|---|---|---|---|----|
| | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 |
| CNC Machinery Tools | Lathes | X | • | • | • | • | • | | | | | |
| | | Z | | | | • | • | • | | | | |
| | Milling machines Boring machines | X | | • | • | • | • | • | | | | |
| | | Y | | • | • | • | • | • | | | | |
| | | Z | | | • | • | • | • | | | | |
| | Machine Center | X | | • | • | • | • | | | | | |
| | | Y | | • | • | • | • | | | | | |
| | | Z | | | • | • | • | | | | | |
| | Jig borers | X | • | • | | | | | | | | |
| | | Y | • | • | | | | | | | | |
| | | Z | • | • | | | | | | | | |
| | Drilling machines | X | | | | • | • | • | | | | |
| | | Y | | | | • | • | • | | | | |
| | | Z | | | | | • | • | • | | | |
| | Grinders | X | • | • | • | | | | | | | |
| | | Y | | • | • | • | | | | | | |
| | EDM | X | | • | • | • | | | | | | |
| | | Y | | • | • | • | | | | | | |
| | | Z | | | • | • | • | • | | | | |
| | Wire cut EDM | X | | • | • | • | | | | | | |
| Y | | | • | • | • | | | | | | | |
| U | | | • | • | • | • | | | | | | |
| V | | | • | • | • | • | | | | | | |
| Laser Cutting Machine | X | | | • | • | • | | | | | | |
| | Y | | | • | • | • | | | | | | |
| | Z | | | • | • | • | | | | | | |
| General Machinery | Punching Press | X | | | | • | • | • | | | | |
| | | Y | | | | • | • | • | | | | |
| | Single Purpose Machines | | | • | • | • | • | • | • | | | |
| | Wood working Machines | | | | | | | | • | • | • | |
| | Industrial Robot (Precision) | | | • | • | • | • | | | | | |
| | Industrial Robot (General) | | | | | | | • | • | • | • | |
| | Coordinate Measuring Machine | | • | • | • | | | | | | | |
| | Non-CNC Machine | | | | | • | • | • | | | | |
| | Transport Equipment | | | | | | • | • | • | • | • | |
| | X-Y Table | | | • | • | • | • | • | | | | |
| | Linear Actuator | | | | | | | • | • | • | • | |
| | Aircraft Landing Gear | | | | | | | • | • | • | • | |
| | Airfoil Control | | | | | | | • | • | • | • | |
| | Gate Valve | | | | | | | | • | • | • | |
| | Power steering | | | | | | | | • | • | • | |
| | Glass Grinder | | | | • | • | • | • | • | | | |
| | Surface Grinder | | | | | | • | • | | | | |
| | Induction Hardening Machine | | | | | | | | • | • | • | |
| | Electromachine | | | • | • | • | • | • | • | | | |
| | All-electric injection molding machine | | | | | | | | • | • | • | |



T_p : Target point of accumulated lead.
This value is determined by customers' different application requirements.

e_p : Total reference lead deviation.
Maximum deviation for accumulated reference lead line over the full length.

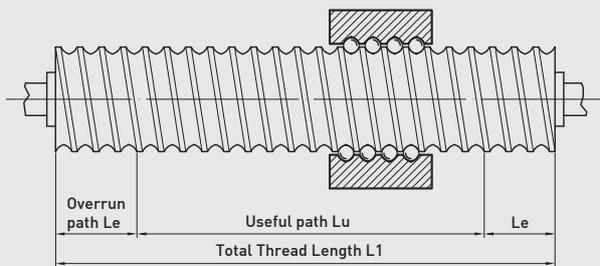
$v_{2\pi p}$: Single lead variation.

e_a : Real accumulated reference lead measured by laser system.

v_u : Total relative lead deviation.
Maximum deviation of the real accumulated lead from the real accumulated reference lead in the corresponding range.

v_{300p} : Lead deviation over path of 300mm.
The above deviation in random 300 mm within thread length.

Fig 4.12 HIWIN lead measuring curve of precision ballscrew



e_{oa} : Average lead deviation over useful path L_u .
A straight line representing the tendency of the cumulative actual lead.
This is obtained by the least square method and measured by the laser system. The value is added by path compensation over the useful path and the mean travel deviation.

C : Path compensation over useful path L_u .
Selection parameter: This value is determined by customer and maker as it depends on different application requirements.

e_p : Mean travel deviation.

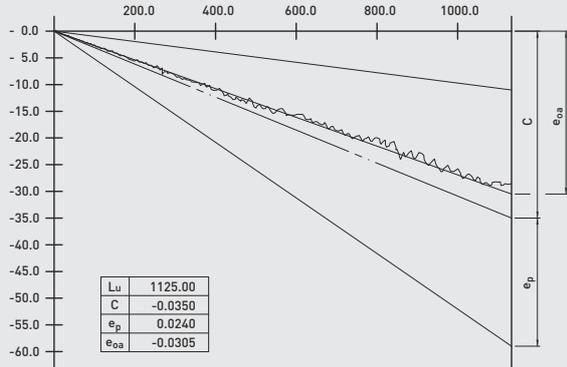
v_{up} : Lead variation over useful path L_u .

v_{300p} : Lead variation over path of 300 mm.

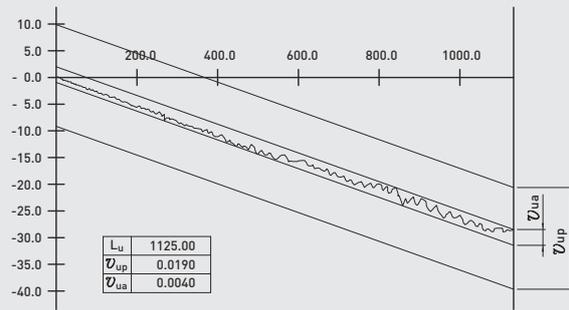
$v_{2\pi p}$: Lead variation over 1 rotation.

Fig 4.13 DIN lead measuring curve of precision ballscrew

AVERAGE LEAD DEVIATION OVER USEFUL PATH LU



LEAD VARIATION OVER USEFUL PATH LU



• $e_{oa}(E_a)$:

Lead deviation over useful thread length relative to the nominal deviation.

(This measurement is made according to DIN standard 69051-3-1).

$$C(T) - e_p[E_p] \leq e_{oa}(E_a) \leq C(T) + e_p[E_p]$$

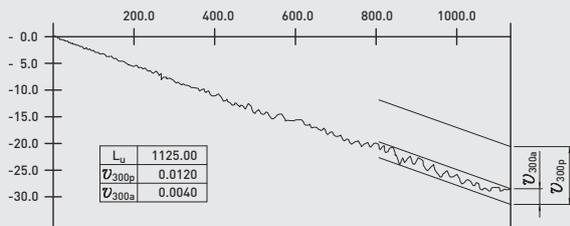
• $v_{ua}(e_a)$:

Total relative lead variation over useful thread length.

(This measurement is made according to DIN standard 69051-3-2).

$$v_{ua}(e_a) \leq v_{up}(e_p)$$

LEAD VARIATION OVER PATH OF 300MM



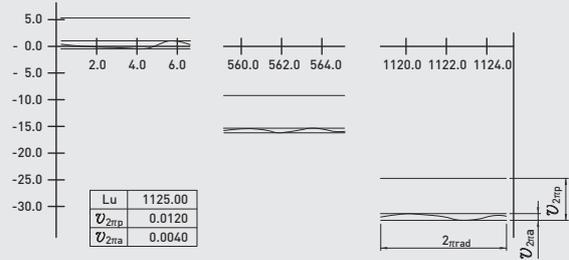
• $v_{300a}(e_{300a})$:

Relative lead variation in random 300mm length within thread length.

(This measurement is made according to DIN standard 69051-3-3).

$$v_{300a}(e_{300a}) \leq v_{300p}(e_{300p})$$

LEAD VARIATION OVER 1 ROTATION



• $v_{2\pi a}(e_{2\pi a})$:

Single lead variation over $2p$.

(This measurement is made according to DIN standard 69051-3-4).

$$v_{2\pi a}(e_{2\pi a}) \leq v_{2\pi p}(e_{2\pi p})$$

Fig 4.14 Lead accuracy measuring chart from dynamic laser measurement equipment according to DIN 69051 standard

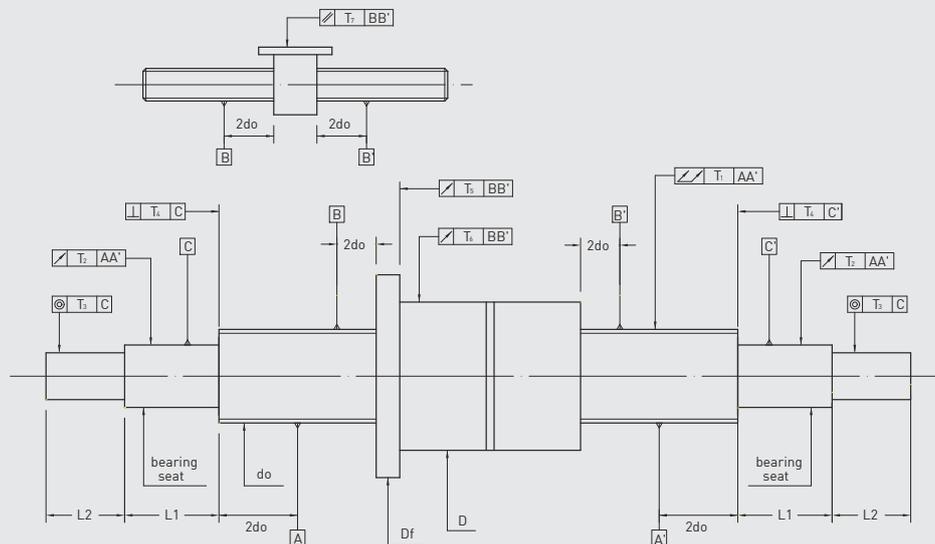
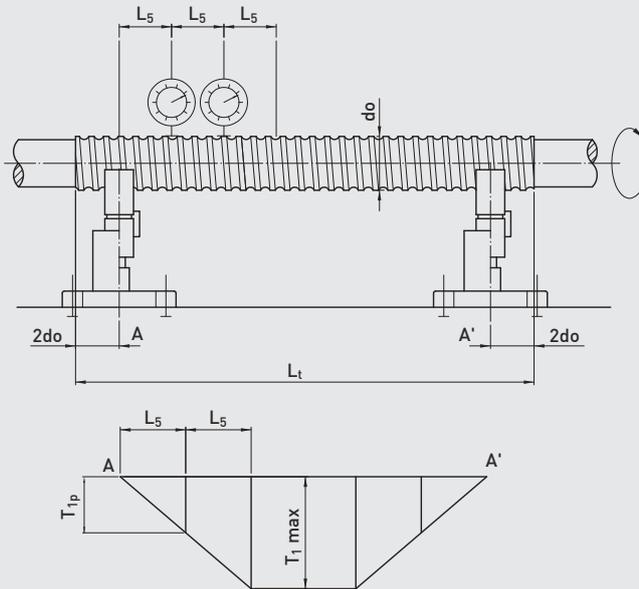


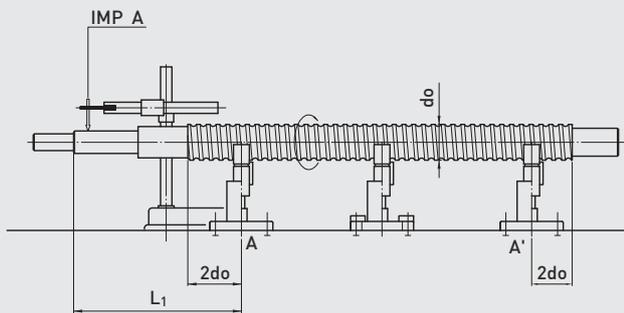
Fig 4.15 Geometrical tolerance of HIWIN precision ground ballscrew

Table 4.6 Tolerance table and measurement method for HIWIN precision ballscrews



T1: True running deviation of external diameter relative to AA' (This measurement is made according to DIN 69051 and JIS B1192)

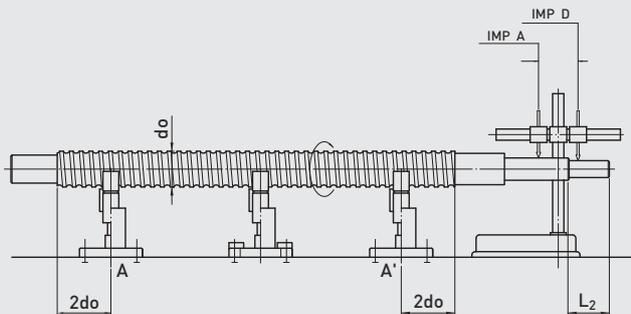
| Nominal Diameter do (mm) | | reference length | T _{1p} [μm] For HIWIN tolerance class | | | | | | | |
|----------------------------|-------|--|---|-----|-----|-----|-----|-----|-----|----|
| above | up to | L ₅ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6 | 12 | 80 | | | | | | | | |
| 12 | 25 | 160 | | | | | | | | |
| 25 | 50 | 315 | 20 | 20 | 20 | 23 | 25 | 28 | 32 | 40 |
| 50 | 100 | 630 | | | | | | | | |
| 100 | 200 | 1250 | | | | | | | | |
| Lt/do | | T _{1max} [μm] (for L _t ≥ 4L ₅) For HIWIN tolerance class | | | | | | | | |
| above | up to | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| | 40 | 40 | 40 | 40 | 45 | 50 | 60 | 64 | 80 | |
| 40 | 60 | 60 | 60 | 60 | 70 | 75 | 85 | 96 | 120 | |
| 60 | 80 | 100 | 100 | 100 | 115 | 125 | 140 | 160 | 200 | |
| 80 | 100 | 160 | 160 | 160 | 180 | 200 | 220 | 256 | 320 | |



T2: Run out deviation of bearing relative to AA' (This measurement is made according to DIN 69051 and JIS B1192)

| Nominal Diameter do (mm) | | reference length | T _{2p} [μm] (for L ₁ ≤ L _r) For HIWIN tolerance class | | | | | | | |
|----------------------------|-------|------------------|---|----|----|----|----|----|----|----|
| above | up to | L _r | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6 | 20 | 80 | 6 | 8 | 10 | 11 | 12 | 16 | 20 | 40 |
| 20 | 50 | 125 | 8 | 10 | 12 | 14 | 16 | 20 | 25 | 50 |
| 50 | 125 | 200 | 10 | 12 | 16 | 18 | 20 | 26 | 32 | 63 |
| 125 | 200 | 315 | - | - | - | 20 | 25 | 32 | 40 | 80 |

$$\text{if } L_1 > L_r, \text{ then } t_{2a} \leq T_{2p} \frac{L_1}{L_r}$$

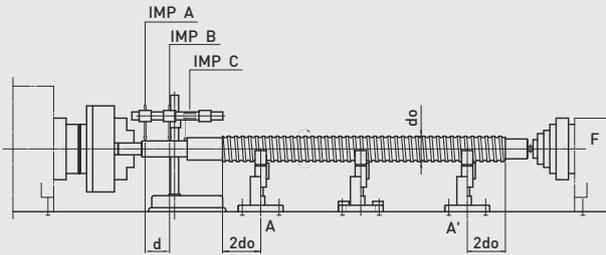


T3: Coaxial deviation relative to AA' (This measurement is made according to DIN 69051 and JIS B1192)

| Nominal Diameter do (mm) | | reference length | T _{3p} [μm] (for L ₂ ≤ L _r) For HIWIN tolerance class | | | | | | | |
|----------------------------|-------|------------------|---|---|---|----|----|----|----|----|
| above | up to | L _r | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6 | 20 | 80 | 4 | 5 | 5 | 6 | 6 | 7 | 8 | 12 |
| 20 | 50 | 125 | 5 | 6 | 6 | 7 | 8 | 9 | 10 | 16 |
| 50 | 125 | 200 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 20 |
| 125 | 200 | 315 | - | - | - | 10 | 12 | 14 | 16 | 25 |

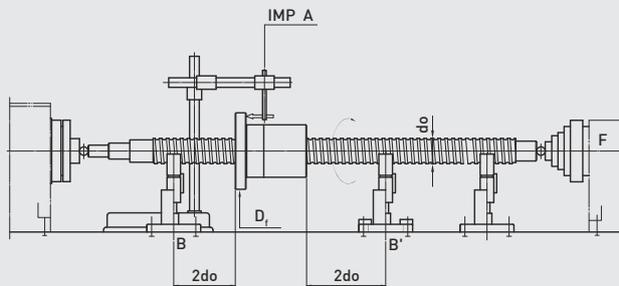
$$\text{if } L_2 > L_r, \text{ then } t_{3a} \leq T_{3p} \frac{L_2}{L_r}$$

Table 4.6 Tolerance table and measurement method for HIWIN precision ballscrews



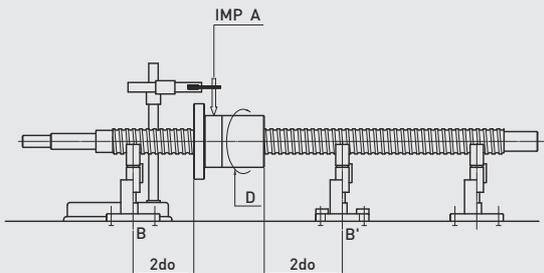
T4 : Run-out deviation of bearing end shoulder relative to AA' (This measurement is made according to DIN 69051 and JIS B1192)

| Nominal Diameter do (mm) | | T _{4P} [μm] For HIWIN tolerance class | | | | | | | |
|----------------------------|-------|---|---|---|---|---|---|---|----|
| above | up to | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6 | 63 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 |
| 63 | 125 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 8 |
| 125 | 200 | - | - | - | 6 | 6 | 8 | 8 | 10 |



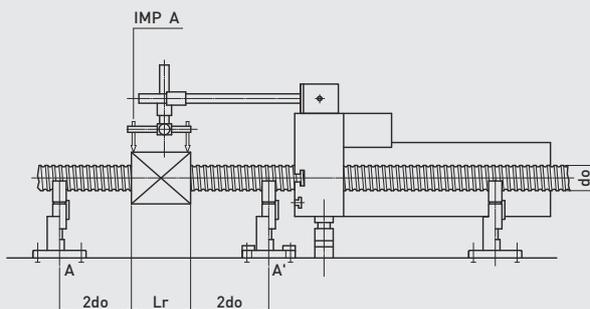
T5 : Face running deviation of locating face (only for nut) relative to BB' (This measurement is made according to DIN 69051 and JIS B1192)

| Nut Flange Diameter D ₁ (mm) | | T _{5P} [μm] For HIWIN tolerance class | | | | | | | |
|---|-------|---|----|----|----|----|----|----|----|
| above | up to | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - | 20 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 14 |
| 20 | 32 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 14 |
| 32 | 50 | 6 | 7 | 8 | 8 | 10 | 11 | 15 | 18 |
| 50 | 80 | 7 | 8 | 9 | 10 | 12 | 13 | 16 | 18 |
| 80 | 125 | 7 | 9 | 10 | 12 | 14 | 15 | 18 | 20 |
| 125 | 160 | 8 | 10 | 11 | 13 | 15 | 17 | 19 | 20 |
| 160 | 200 | - | 11 | 12 | 14 | 16 | 18 | 22 | 25 |
| 200 | 250 | - | 12 | 14 | 15 | 18 | 20 | 25 | 30 |



T6 : Run-out deviation of external diameter (only for nut) relative to BB' (This measurement is made according to DIN 69051 and JIS B1192)

| Nut Diameter Diameter D (mm) | | T _{6P} [μm] For HIWIN tolerance class | | | | | | | |
|--------------------------------|-------|---|----|----|----|----|----|----|----|
| above | up to | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - | 20 | 5 | 6 | 7 | 9 | 10 | 12 | 16 | 20 |
| 20 | 32 | 6 | 7 | 8 | 10 | 11 | 12 | 16 | 20 |
| 32 | 50 | 7 | 8 | 10 | 12 | 14 | 15 | 20 | 25 |
| 50 | 80 | 8 | 10 | 12 | 15 | 17 | 19 | 25 | 30 |
| 80 | 125 | 9 | 12 | 16 | 20 | 24 | 22 | 25 | 40 |
| 125 | 160 | 10 | 13 | 17 | 22 | 25 | 28 | 32 | 40 |
| 160 | 200 | - | 16 | 20 | 22 | 25 | 28 | 32 | 40 |
| 200 | 250 | - | 17 | 20 | 22 | 25 | 28 | 32 | 40 |



T7 : Deviation of parallelism (only for nut) relative to BB' (This measurement is made according to DIN 69051 and JIS B1192)

| Mounting basic length (mm) L _r | | T _{7P} [μm] / 100mm For HIWIN tolerance class | | | | | | | |
|---|-------|---|----|----|----|----|----|----|----|
| above | up to | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| - | 50 | 5 | 6 | 7 | 8 | 9 | 10 | 14 | 17 |
| 50 | 100 | 7 | 8 | 9 | 10 | 12 | 13 | 15 | 17 |
| 100 | 200 | - | 10 | 11 | 13 | 15 | 17 | 24 | 30 |

4.4 Preload Methods

The specially designed Gothic ball track can make the ball contact angle around 45° . The axial force F_a which comes from an outside drive force or inside preload force, causes two kinds of backlash. One is the normal backlash, S_a caused by the manufacturing clearance between ball track and ball. The other is the deflection backlash, $\Delta\ell$ caused by the normal force F_n which is perpendicular to the contact point.

The clearance backlash can be eliminated by the use of an preload internal force P . This preload can be obtained via a double nut, an offset pitch single nut, or by adjusting the ball size for preloaded single nuts.

The deflection backlash is caused by the preload internal force and the external loading force and is related to that of the effect of lost motion.

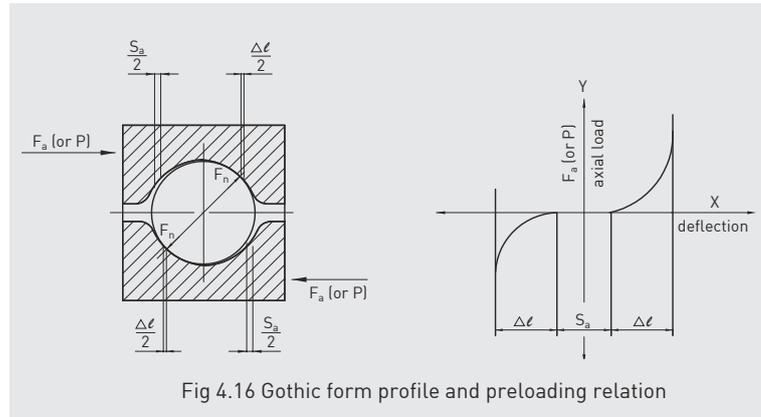


Fig 4.16 Gothic form profile and preloading relation

(1) Double nut preloading

Preload is obtained by inserting a spacer between the 2 nuts (Fig. 4.17). “Tension preload” is created by inserting an oversize spacer and effectively pushing the nuts apart. “Compression pre-load” is created by inserting an undersize spacer and correspondingly pulling nuts together. Tension preload is primarily used for precision ballscrews. However, compression preload type ballscrews are also available upon your request. If pretension is necessary to increase stiffness, please contact us for the amount of pretension to be used in the ballscrew journal ends. (0.02mm to 0.03mm per meter is recommended, but the T value should be selected according to the compensation purpose).

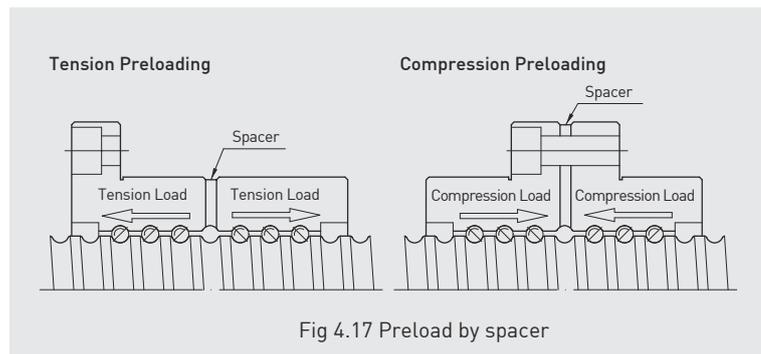


Fig 4.17 Preload by spacer

(2) Single nut preloading

There are two ways of preloading a single nut. One is called “the oversized-ball preloading method”. The method is to insert balls slightly larger than the ball groove space (oversized balls) to allow balls to contact at four points (Fig. 4.18).

The other way is called “The offset pitch preloading method” as shown in Fig. 4.19. The nut is ground to have a δ value offset on the center pitch. This method is used to replace the traditional double nut preloading method and has the benefit of a compact single nut with high stiffness via small preload force. However, it should not be used in heavy duty preloading. The best preload force is below 5% of dynamic load (C).

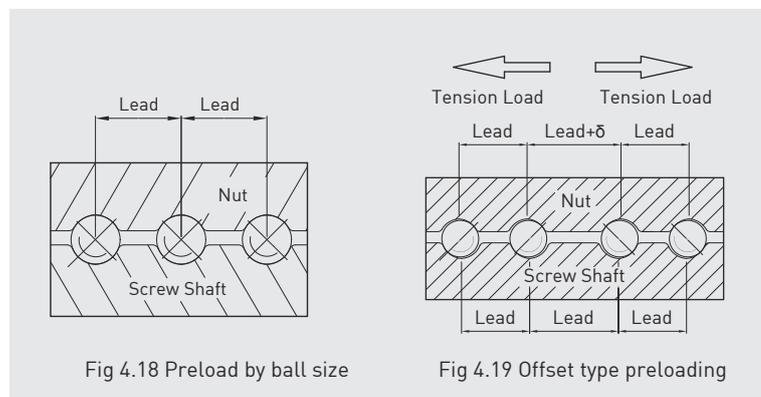


Fig 4.18 Preload by ball size

Fig 4.19 Offset type preloading

(3) Preload calculation

$$P = \frac{F_{bm}}{2.8} \dots\dots\dots \text{M1}$$

P : preload force (kgf)
 F_{bm} : Mean operating load(kgf)
 (Ref.M8~M10)

$$T_d = \frac{K_p \times P \times \ell}{2\pi} \dots\dots\dots \text{M2}$$

Preload drag torque (Fig. 4.20)
 T_d : preload drag torque (kgf-mm)
 P : preload (kgf)
 ℓ : lead (mm)
 K_p : preload torque coefficient **
 K_p : $\frac{1}{\eta_1} - \eta_2$ (is between 0.1 and 0.3)
 η₁, η₂ are the mechanical efficiencies of the ballscrew.

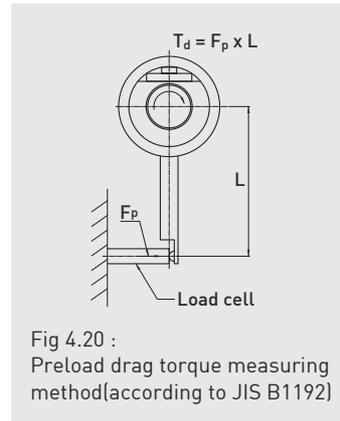


Fig 4.20 :
Preload drag torque measuring method[according to JIS B1192]

(1) For common transmission (to convert rotary motion to linear motion)

$$\eta_1 = \frac{\tan(\alpha)}{\tan(\alpha + \beta)} = \frac{1 - \mu \tan \alpha}{1 + \mu / \tan \alpha} \dots\dots\dots \text{M3}$$

(2) For reverse transmission (to convert linear rotary motion to rotary motion)

$$\eta_2 = \frac{\tan(\alpha - \beta)}{\tan(\alpha)} = \frac{1 - \mu / \tan \alpha}{1 + \mu \tan \alpha} \dots\dots\dots \text{M4}$$

$$\alpha = \tan^{-1} \frac{\ell}{\pi D_m} \dots\dots\dots \text{M5}$$

$$\beta = \tan^{-1} \mu \dots\dots\dots \text{M6}$$

α : lead angle (degrees)
 D_m : pitch circle diameter of screw shaft (mm)
 ℓ : lead (mm)
 β : friction angle (0.17°~0.57°)
 μ : friction coefficient (0.003~0.01)

$$** K_p = \frac{0.05}{\sqrt{\tan \alpha}}$$

(4) Uniformity of preload drag torque

(1) Measuring method

Preload creates drag torque between the nut and screw. It is measured by rotating the screw spindle at constant speed while restraining the nut with a special fixture as shown in Fig. 4.20. The load cell reading force Fp is used to calculate the preload drag torque of the ballscrew.

HIWIN has developed a computerized drag torque measuring machine which can accurately monitor the drag torque during screw rotation. Therefore, the drag torque can be adjusted to meet customer requirements (Fig. 2.5). The measurement standard for preload drag torque is shown in Fig. 4.21 and Table 4.7.

(2) Measuring conditions

1. Without wiper.
2. The rotating speed, 100 rpm.
3. The dynamic viscosity of lubricant, 61.2 ~74.8 cSt (mm/s) 40°C, that is, ISO VG 68 or JIS K2001.
4. The return tube up.

(3) The measurement result is illustrated by the standard drag torque chart. Its nomenclature is shown in Fig. 4.21.

(4) The allowable preload drag torque variation as a function of accuracy grade is shown in Table 4.7.

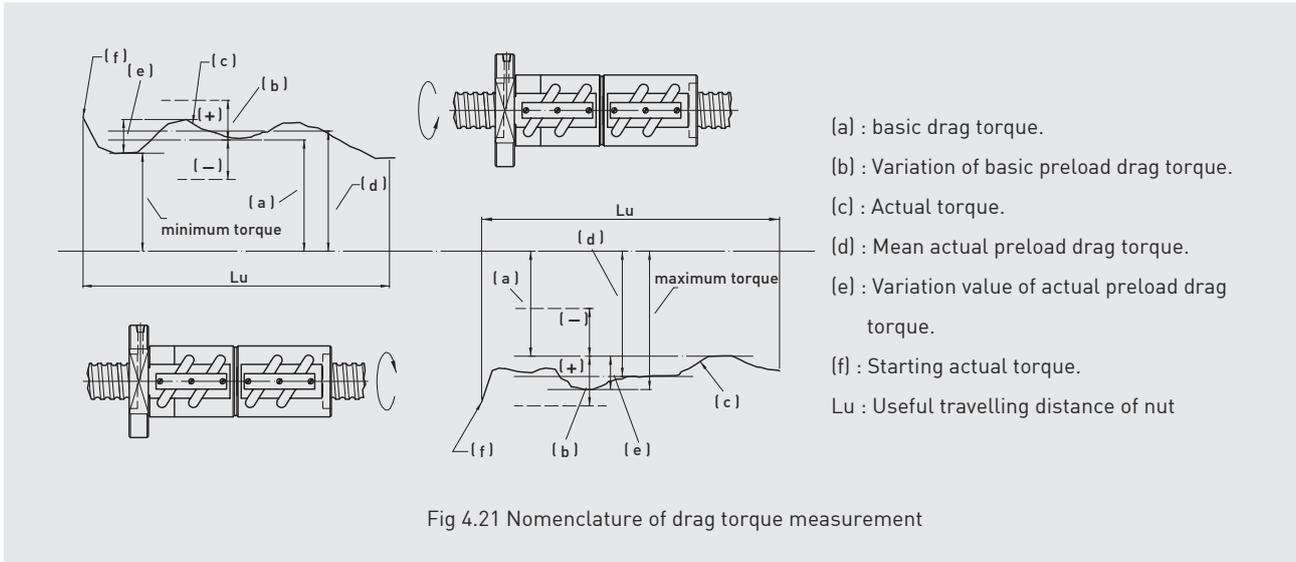


Fig 4.21 Nomenclature of drag torque measurement

Table 4.7 : Variation range for preload drag torque (According to JIS B1192)

Unit: ± %

| Basic Dragtorque (kgf - cm) | | Useful stroke length of thread (mm) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|-------|-------------------------------------|----|----|----|----|----|----|----|-------------------------|----|----|----|----|----|----|----|----------------|---|---|----|----|----|----|----|--|--|--|--|
| | | 4000 mm maximum | | | | | | | | | | | | | | | | over 4000 mm | | | | | | | | | | | |
| | | Slender ratio ≤ 40 | | | | | | | | 40 < Slender ratio < 60 | | | | | | | | | | | | | | | | | | | |
| | | Accuracy grade | | | | | | | | Accuracy grade | | | | | | | | Accuracy grade | | | | | | | | | | | |
| Above | Up To | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | |
| 2 | 4 | 30 | 35 | 40 | 40 | 45 | 50 | 60 | - | 40 | 40 | 50 | 50 | 60 | 60 | 70 | - | - | - | - | - | - | - | - | - | | | | |
| 4 | 6 | 25 | 30 | 35 | 35 | 40 | 40 | 50 | - | 35 | 35 | 40 | 40 | 45 | 45 | 60 | - | - | - | - | - | - | - | - | - | | | | |
| 6 | 10 | 20 | 25 | 30 | 30 | 35 | 35 | 40 | 40 | 30 | 30 | 35 | 35 | 40 | 40 | 45 | 45 | - | - | - | 40 | 43 | 45 | 50 | 50 | | | | |
| 10 | 25 | 15 | 20 | 25 | 25 | 30 | 30 | 35 | 35 | 25 | 25 | 30 | 30 | 35 | 35 | 40 | 40 | - | - | - | 35 | 38 | 40 | 45 | 45 | | | | |
| 25 | 63 | 10 | 15 | 20 | 20 | 25 | 25 | 30 | 30 | 20 | 20 | 25 | 25 | 30 | 30 | 35 | 35 | - | - | - | 30 | 33 | 35 | 40 | 40 | | | | |
| 63 | 100 | - | 15 | 15 | 15 | 20 | 20 | 25 | 30 | - | - | 20 | 20 | 25 | 25 | 30 | 35 | - | - | - | 25 | 23 | 30 | 35 | 35 | | | | |

- Note : 1. Slender ratio=Thread length of spindle/ Nominal spindle O.D.(mm)
 2. Refer to the designing section of the manual to determine the basic preload drag torque.
 3. Table 4.9 shows the conversion table for Nm.
 4. For more information, please contact our engineering department.

4.5 Calculation Formulas

Service life

- The average number of rpm, n_{av}

$$n_{av} = n_1 \times \frac{t_1}{100} + n_2 \times \frac{t_2}{100} + n_3 \times \frac{t_3}{100} + \dots$$

M7

n_{av} : average speed (rpm)

n : speed (rpm)

$\frac{t_1}{100}$: % of time at speed n_1 etc.

- The average operating load F_{bm}
(1) With variable load and constant speed

$$F_{bm} = \sqrt[3]{F_{b1}^3 \times \frac{t_1}{100} \times f_{p1}^3 + F_{b2}^3 \times \frac{t_2}{100} \times f_{p2}^3 + F_{b3}^3 \times \frac{t_3}{100} \times f_{p3}^3} \dots\dots\dots \text{M8}$$

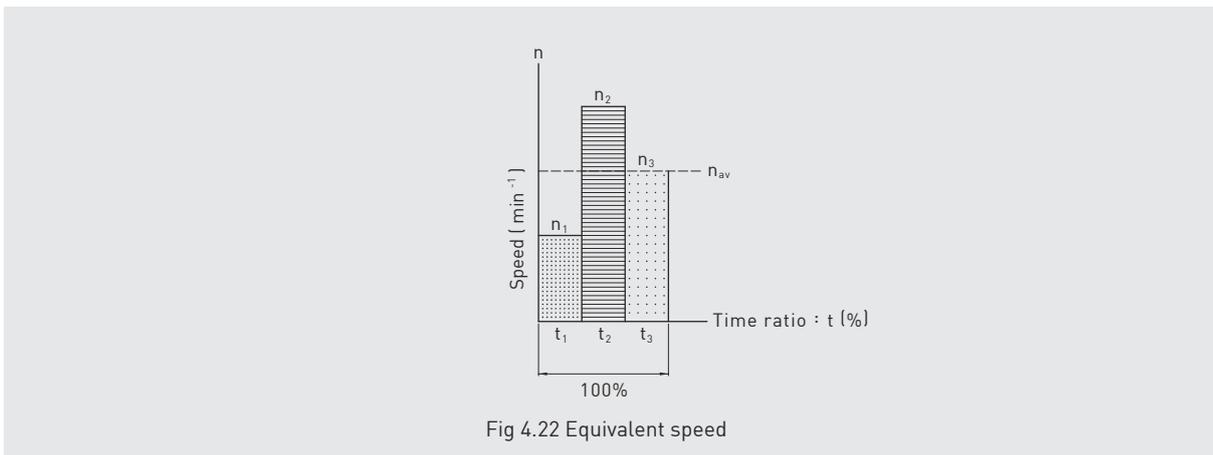
F_{bm} : average operating load (kgf); F_b : working axial load
 f_p : operation condition factor
 f_p : 1.1 ~ 1.2 when running without impact
 1.3 ~ 1.8 when running in the normal condition
 2.0 ~ 3.0 when running with heavy impact and vibration

- (2) With variable load and variable speed

$$F_{bm} = \sqrt[3]{F_{b1}^3 \times \frac{n_1}{n_{av}} \times \frac{t_1}{100} \times f_{p1}^3 + F_{b2}^3 \times \frac{n_2}{n_{av}} \times \frac{t_2}{100} \times f_{p2}^3 + F_{b3}^3 \times \frac{n_3}{n_{av}} \times \frac{t_3}{100} \times f_{p3}^3} \dots\dots\dots \text{M9}$$

- (3) With linear variable load and constant speed

$$F_{bm} \doteq \frac{F_{b \min} \times f_{p1} + 2 \times F_{b \max} \times f_{p2}}{3} \dots\dots\dots \text{M10}$$



Example 4.5 - 1

A HIWIN ballscrew is subjected to the following operating conditions. Calculate the average running speed and operating load.

Operating Condition :

For smooth running without impact $f_p = 1.1$

| Condition | Axial load (kgf) | Revolution (rpm) | Loading time ratio (%) |
|-----------|------------------|------------------|------------------------|
| | (Fb) | (n) | (t) |
| 1 | 100 | 1000 | 45 |
| 2 | 400 | 50 | 35 |
| 3 | 800 | 100 | 20 |

Calculation

$$n_{av} = 1000 \times \frac{45}{100} + 50 \times \frac{35}{100} + 100 \times \frac{20}{100} = 487.5 \text{rpm (ref.M7)}$$

$$F_{bm} = \sqrt[3]{100^3 \times \frac{1000}{487.5} \times \frac{45}{100} \times 1.1^3 + 400^3 \times \frac{50}{487.5} \times \frac{35}{100} \times 1.1^3 + 800^3 \times \frac{100}{487.5} \times \frac{20}{100} \times 1.1^3} = 318.5 \text{ kgf}$$

The resultant axial force, F_a

For a single nut without preload

$$F_a = F_{bm} \quad \dots\dots\dots \text{M11}$$

For a single nut with preload P

$$F_a \leq F_{bm} + P \quad \dots\dots\dots \text{M12}$$

Expected service life

For single nut

- Service life represented in revolutions :

$$L = \left(\frac{C}{F_a} \right)^3 \times 10^6 \quad \dots\dots\dots \text{M13}$$

L : Service life in running revolution (revolutions)

C : dynamic load rating (kgf) (10^6 rev)

For symmetrical preload double nut arrangement

- (a) Service life represented in revolutions :

$$F_{bm}(1) = P \left(1 + \frac{F_{bm}}{3P} \right)^{3/2} \quad L(1) = \left(\frac{C}{F_{bm}(1)} \right)^3 \times 10^6$$

$$F_{bm}(2) = F_{bm}(1) - F_{bm} \quad L(2) = \left(\frac{C}{F_{bm}(2)} \right)^3 \times 10^6$$

$$L = [L(1)^{-10/9} + L(2)^{-10/9}]^{-9/10} \quad \dots\dots\dots \text{M14}$$

L = Service life in running revolution (revolutions)

P : Preload force (kgf)

- (b) conversion from revolutions to hours :

$$L_h = \frac{L}{n_{av} \times 60} \quad \dots\dots\dots \text{M15}$$

L_h : Service life in hours (hours)

n_{av} : Average speed (rpm, Ref. M7)

- (c) Conversion from travel distance to hours:

$$L_h = \left(\frac{L_d \times 10^6}{\ell} \right) \times \frac{1}{n_{av} \times 60} \quad \dots\dots\dots \text{M16}$$

L_h : Running life (in hours)

L_d : Running life (in distance, Km)

ℓ : Ballscrew lead (mm per rev)

n_{av} : Average running speed (rpm)

(d) the modified service life for different reliability factors is calculated by

$$L_m = L \times f_r \quad \dots\dots\dots \text{M17}$$

$$L_{hm} = L_h \times f_r \quad \dots\dots\dots \text{M18}$$

with the reliability factor fr [Table 4.8]

Table 4.8 Reliability factor for service life

| Reliability % | f_r |
|---------------|-------|
| 90 | 1 |
| 95 | 0.63 |
| 96 | 0.53 |
| 97 | 0.44 |
| 98 | 0.33 |
| 99 | 0.21 |

Example 4.5 - 2

By the example 4.5-1, if the design service life of the ballscrew is 3500 hours, lead = 10mm, single nut with zero backlash, find the nominal diameter of the HIWIN ballscrew.

Calculation

$$P = \frac{F_{bm}}{2.8} = \frac{318.5}{2.8} = 114 \text{ kgf} \quad (\text{Assume zero backlash when } F_{bm} = 318.5 \text{ kgf})$$

$$F_a = F_{bm} + p = 318.5 + 114 = 432.5 \text{ kgf} \quad (\text{Ref formula M1})$$

$$L = L_h \times n_{av} \times 60 = 3500 \times 487.5 \times 60 = 1.02375 \times 10^8 \quad (\text{revolutions})$$

$$C' = F_a \left(\frac{L}{10^6} \right)^{1/3} = 432.5 \times \left(\frac{1.02375 \times 10^8}{10^6} \right)^{1/3} = 2023 \text{ kgf} \quad C' \leq \text{rating}$$

So, from the dimensions table of HIWIN ballscrews, select FSV type nut with spindle nominal diameters equals 32mm and C1 circuits which can satisfy this application.

Example 4.5 - 3

If the ballscrew nominal diameter=50mm, lead=8mm, and service life L=7x10⁶ revolutions, find the permissible load on the screw spindle.

Calculation

From the dimensions table of HIWIN ballscrew, the FSV type ballscrew with nominal diameter=50 mm, lead=8 mm and B3 type return tube has the dynamic load rating C=5674.

$$F_a = C \div \left(\frac{L}{10^6} \right)^{1/3} = 5674 \div \left(\frac{7 \times 10^6}{10^6} \right)^{1/3} = 2966 \text{ kgf}$$

Drive torque and drive power for the motor

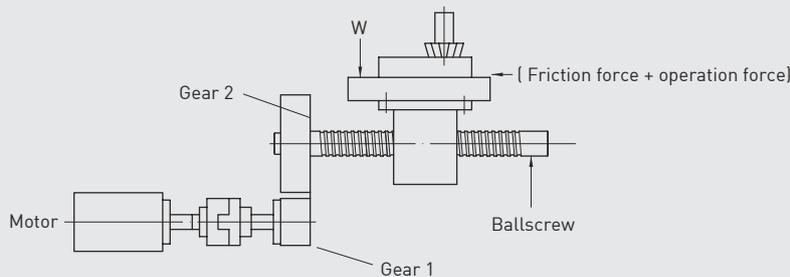


Fig 4.23 Load operation by ballscrew

Fig. 4.23 shows the terms for a feed system operated by ballscrew. The formula for motor drive torque is given below :

(a) Common transmission (to convert rotary motion to linear motion)

$$T_a = \frac{F_b \times \ell}{2\pi\eta_1} \dots\dots\dots \text{M19}$$

T_a = Drive torque for common transmission (kgf-mm)

F_b = Axial load (kgf)

$F_b = F_{bm} + \mu \times W$ (for horizontal motion)

ℓ = Lead (mm)

η_1 = Mechanical efficiency (0.9~0.95, Ref. M3)

W = Table weight + Work piece weight (kgf)

μ = Friction coefficient of table guide way

(b) Reverse transmission (to convert linear motion to rotary motion)

$$T_c = \frac{F_b \times \ell \times \eta_2}{2\pi} \dots\dots\dots \text{M20}$$

η_2 = Mechanical efficiency (0.9~0.95, Ref. M4)

T_c = Torque for reverse transmission (kgf-mm)

(c) Motor drive torque

For normal operation :

$$T_M = (T_a + T_b + T_d) \times \frac{N_1}{N_2} \dots\dots\dots \text{M21}$$

T_M = Motor drive torque (kgf-mm)

T_b = Friction torque of supporting bearing (kgf-mm)

T_d = Preload drag torque (kgf-mm, Ref. M2)

N_1 = Number of teeth for driver gear

N_2 = Number of teeth for driven gear

For acceleration operation :

$$T'a = J\alpha \dots\dots\dots \text{M22}$$

$T'a$: Motor drive torque during acceleration (kgf)

J : System inertia (kgf-mm-sec²)

α : Angular acceleration (rad/sec²)

$$\alpha = \frac{2\pi N_{dif}}{60t_a} \dots\dots\dots \text{M23}$$

$N_{dif} = \text{rpm}_{\text{stage2}} - \text{rpm}_{\text{stage1}}$

t_a = acceleration rising time (sec)

$$J = J_M + J_{G1} + J_{G2} \left(\frac{N_1}{N_2} \right)^2 + \frac{1}{2g} W_s \left(\frac{D_N}{2} \right)^2 \left(\frac{N_1}{N_2} \right)^2 + \frac{W}{g} \left(\frac{\ell}{2\pi} \right)^2 \left(\frac{N_1}{N_2} \right)^2 \dots\dots\dots \text{M24}$$

= Motor inertia + Equivalent gear inertia + Ballscrew inertia + Load inertia (Fig.4.23)

W_s : Ballscrew weight (kgf)

D_N : Ballscrew nominal diameter (mm)

g : Gravity coefficient (9800 mm/sec²)

J_M : Inertia of motor (kgf-mm-sec²)

J_{G1} : Inertia of driver gear (kgf-mm-sec²)

J_{G2} : Inertia of driver gear (kgf-mm-sec²)

Total operating torque :

$$T_{Ma} = T_M + T'_a \quad \dots\dots\dots \text{M25}$$

T_{Ma} = Total operating torque (kgf)

The inertia of a disc is calculated as following :
For disc with concentric O.D.

$$J = \frac{1}{2g} \pi \rho_d R^2 L \quad \dots\dots\dots \text{M26}$$

- J : Disc inertia (kgf • mm • sec²)
- ρ_d : Disc specific weight (7.8×10^{-6} kgf/mm³) for steel
- R : Disc radius (mm)
- L : Disc length (mm)
- g : Gravity coefficient (9800 mm/sec²)

(d) Drive power

$$P_d = \frac{T_{pmax} \times N_{max}}{974} \quad \dots\dots\dots \text{M27}$$

- P_d : Maximum drive power (watt) safety
- T_{pmax} : Maximum drive torque (safety factor $\times T_{ma}$, kgf-mm)
- N_{max} : Maximum rotation speed (rpm)

(e) Check the acceleration time

$$t_a = \frac{J}{T_{MI} - T_L} \times \frac{2\pi N_{max}}{60} \cdot f \quad \dots\dots\dots \text{M28}$$

- t_a = Acceleration rising time
- J = Total inertia moment
- $T_{MI} = 2 \times T_{mr}$
- T_{Mr} = Motor rated torque
- T_L = Drive torque at rated feed
- f = Safety factor = 1.5

Table 4.9 : Shows the conversion relationship of different measurement units for the motor torque or preload drag torque.

Table 4.9 Conversion table for motor torque

| kgf - cm | kgf - mm | Nm | kpm (kgf - m) | OZ - in | ft - lbf |
|--------------------------|------------------------|--------------------------|--------------------------|-----------------------|--------------------------|
| 1 | 10 | 9.8×10^{-2} | 10^{-2} | 13.8874 | 7.23301×10^{-2} |
| 0.1 | 1 | 9.8×10^{-3} | 1.0×10^{-3} | 1.38874 | 7.23301×10^{-3} |
| 10.19716 | 1.019716×10^2 | 1 | 0.1019716 | 1.41612×10^2 | 0.737562 |
| 10^2 | 10^3 | 9.80665 | 1 | 1.38874×10^3 | 7.23301 |
| 7.20077×10^{-2} | 0.720077 | 7.06155×10^{-3} | 7.20077×10^{-4} | 1 | 5.20833×10^3 |
| 13.82548 | 1.382548×10^2 | 1.35582 | 0.1382548 | 1.92×10^2 | 1 |

Example 4.5 - 4

Consider the machining process driven by the motor and ballscrew as Fig. 4.24.

Table weight $W_1 = 200$ kgf

Work weight $W_2 = 100$ kgf

Friction coefficient of slider $\mu = 0.02$

Operating condition : Smooth running without impact

| Axial feed force (kgf) | Revolution (rpm) | Loading time ratio (%) |
|------------------------|------------------|------------------------|
| 100 | 500 | 20 |
| 300 | 100 | 50 |
| 500 | 50 | 30 |

Acceleration speed : 100 rad/sec²

Motor Condition : Motor diameter : 50 mm, Motor length : 200 mm,

Gear condition : Driver gear diameter G1 : 80 mm, Thickness : 20 mm, Teeth : 30
Driven gear diameter G2 : 240 mm, Thickness : 20 mm, Teeth : 90

Ballscrew condition :

Nominal diameter : 50 mm, Pitch : 10 mm

Length : 1200 mm, Weight : 18 kgf

No backlash when axial feed force = 300 kgf

Bearing torque $T_b = 10$ kgf-mm

Mechanical efficiency $\eta_l = 0.80$

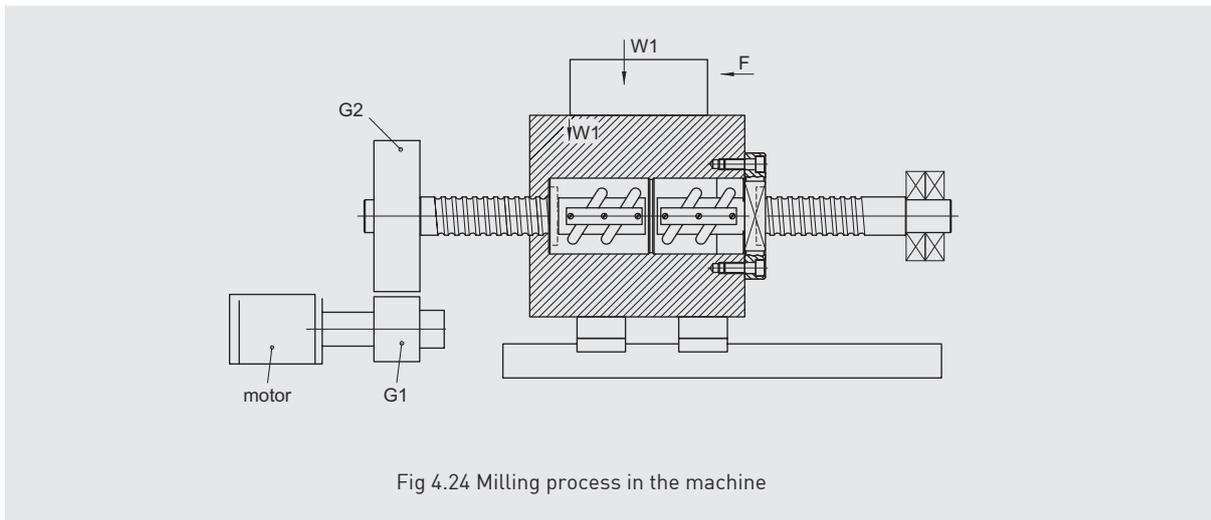


Fig 4.24 Milling process in the machine

Calculation

(1) Motor drive torque in normal rating condition :

$$n_{av} = 500 \times \frac{20}{100} + 100 \times \frac{20}{100} + 50 \times \frac{20}{100} = 165 \text{ rpm} \quad (\text{Ref. M7})$$

$$F_1 = 100, F_2 = 300, F_3 = 500$$

$$F_{bm} = \sqrt[3]{100^3 \times 1 \times \frac{20}{100} \times \frac{500}{165} + 300^3 \times 1 \times \frac{50}{100} \times \frac{100}{165} + 500^3 \times 1 \times \frac{30}{100} \times \frac{50}{165}} = 272 \text{ kgf} \quad (\text{Ref. M9})$$

$$P = \frac{300}{2.8} \approx 110 \text{ kgf} \quad (\text{axial feed force} = 300 \text{ kgf}, \text{Ref. M1})$$

$$F_b = F_{bm} + \mu W = 270 + (200 + 100) \times 0.02 = 278 \text{ kgf}$$

$$T_a = \frac{F_b \times \ell}{2\pi\eta_l} = \frac{278 \times 10}{2\pi \times 0.80} = 553 \text{ kgf} \cdot \text{mm} \quad (\text{Ref. M19})$$

$$T_d = 0.2 \times \frac{P \times \ell}{2\pi} = \frac{0.2 \times 110 \times 10}{2\pi} = 35 \text{ kgf} \cdot \text{mm} \quad (\text{Ref. M2})$$

$$T_M = (T_a + T_b + T_d) \times \frac{N_1}{N_2} = (535 + 10 + 35) \times \frac{30}{90} = 199 \text{ kgf} \cdot \text{mm} \quad (\text{Ref. M21})$$

(2) Motor torque in acceleration operation :

(I) Inertia of motor

$$J_M = \frac{1}{2 \times 9800} \times \pi \times 7.8 \times 10^{-6} \times (25)^4 \times 200 = 0.1 \text{ kgf} \cdot \text{mm} \cdot \text{sec}^2$$

(II) Inertia of gear

$$J_{\text{Gear(eq)}} = J_{G1} + J_{G2} \times \left(\frac{N_1}{N_2} \right)^2$$

$$J_{G1} = \frac{1}{2 \times 9800} \times \pi \times 7.8 \times 10^{-6} \times \left(\frac{80}{2} \right)^4 \times 20 = 0.064 \text{ kgf} \cdot \text{mm} \cdot \text{sec}^2$$

$$J_{G2} = \frac{1}{2 \times 9800} \times \pi \times 7.8 \times 10^{-6} \times \left(\frac{240}{2} \right)^4 \times 20 = 5.18 \text{ kgf} \cdot \text{mm} \cdot \text{sec}^2$$

$$J_{\text{Gear(eq)}} = 0.064 + 5.18 \times \left(\frac{30}{90} \right)^2 = 0.640 \text{ kgf} \cdot \text{mm} \cdot \text{sec}^2$$

(III) Inertia of ballscrew

$$J_{\text{ballscrew}} = \frac{1}{2 \times 9800} \times 18 \times \left(\frac{50}{2} \right)^2 \left(\frac{30}{90} \right)^2 = 0.064 \text{ kgf} \cdot \text{mm} \cdot \text{sec}^2$$

(IV) Inertia of load

$$J_{\text{load}} = \frac{300}{9800} \times \left(\frac{10}{2 \times \pi} \right)^2 \times \left(\frac{30}{90} \right)^2 = 0.009 \text{ kgf} \cdot \text{mm} \cdot \text{sec}^2$$

(V) Total inertia

$$J = 0.1 + 0.64 + 0.064 + 0.009 = 0.813 \text{ kgf} \cdot \text{mm} \cdot \text{sec}^2$$

(3) Total motor torque:

$$T'_a = J \cdot \alpha = 0.813 \times 100 = 81.3 \text{ kgf} \cdot \text{mm}$$

$$T_{Ma} = T_M + T'_a = 199 + 81.3 = 280 \text{ kgf} \cdot \text{mm}$$

(4) Drive power:

$$T_{p \max} = 2 \times 280 = 560 \text{ kgf} \cdot \text{mm} \text{ (safety factor} = 2)$$

$$P_d = \frac{560 \times 1500}{974} = 862 \text{ W} = 1.16 \text{ Hp}$$

(5) Selection motor:

Select the DC motor rated torque : $T_{Mr} > 1.5T_M$, and maximum motor torque : $T_{Max} > 1.5T_{pmax}$

Thus the DC servo motor with following specification can be chosen.

Rated output : 950 w

Rated torque : 30 kgf-cm (300 kgf • mm)

Rated rotational speed : 2000 rpm

Maximum torque : 65 kgf x cm (650 kgf • mm)

Moment of inertia of motor : 0.20 kgf • mm • sec²

(6) Check the acceleration time:

$$T_L = \left(\frac{F_d \times \ell}{2\pi\eta_1} + T_b + T_d \right) \times \frac{N_1}{N_2} = \left(\frac{100 \times 10}{2\pi \times 0.8} + 10 + 35 \right) \times \frac{30}{90} = 81.3 \text{ kgf} \cdot \text{mm}$$

$$t_a \geq \left(\frac{0.879}{300 \times 2 - 81.3} \right) \times \frac{2\pi \times 2000}{60} \times 1.5 = 0.53 \text{ sec}$$

Buckling load

The ballscrew shaft when subjected to an axial compressive force may undergo a visibly large deflection. The axial force is called the buckling load.

$$F_k = 40720 \left(\frac{N_f d_r^4}{L_i^2} \right) \dots\dots\dots \text{M29}$$

$$F_p = 0.5 F_k \dots\dots\dots \text{M30}$$

| | | |
|---|------------------------|----------------|
| F_k = Permissible load (kgf) | fixed - fixed | $N_f = 1.0$ |
| F_p : Maximum permissible load (kgf) | fixed - supported | $N_f = 0.5$ |
| d_r : Root diameter of screw shaft (mm) | supported - supported | $N_f = 0.25$ |
| L_i : distance between support bearing (mm) | fixed - free | $N_f = 0.0625$ |
| N_f : Factor for different mounting types | ◆1kgf = 9.8N; 1daN=10N | |

The buckling load diagram for different spindle diameter and support method is shown in Fig 4.25.

Critical speed

The critical speed is said to exist when the rotational frequency of a shaft equals the first natural frequency of the shaft. This will cause the ball screw to bend under the stress of vibration coupled with the centrifugal forces due to the rotation and cause the shaft to vibrate violently. Therefore, the rotational speed of the ball screw should be set to below the value indicated by critical speed.

$$N_c = 2.71 \times 10^8 \times \frac{M_f d_r}{L_i^2} \dots\dots\dots \text{M31}$$

$$N_p = 0.8 N_c \dots\dots\dots \text{M32}$$

| | | |
|---|-----------------------|---------------|
| N_c = critical speed (rpm) | fixed - fixed | $M_f = 1$ |
| N_p = Maximum permissible speed (rpm) | fixed - supported | $M_f = 0.689$ |
| d_r : Root diameter of screw shaft (mm) | supported - supported | $M_f = 0.441$ |
| L_i : distance between support bearing (mm) | fixed - free | $M_f = 0.157$ |
| M_f : Factor for different mounting types | | |

The critical speed for different spindle and support method is shown in (Fig 4.26).

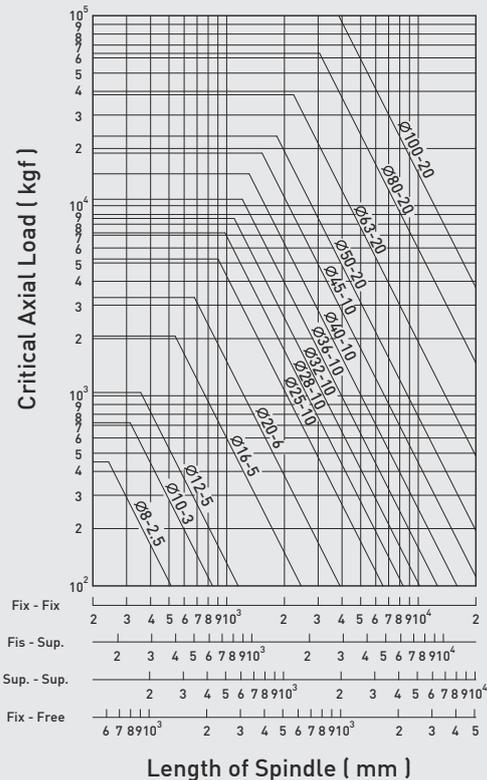


Fig 4.25 Shows the buckling load for different screw spindle diameter and length

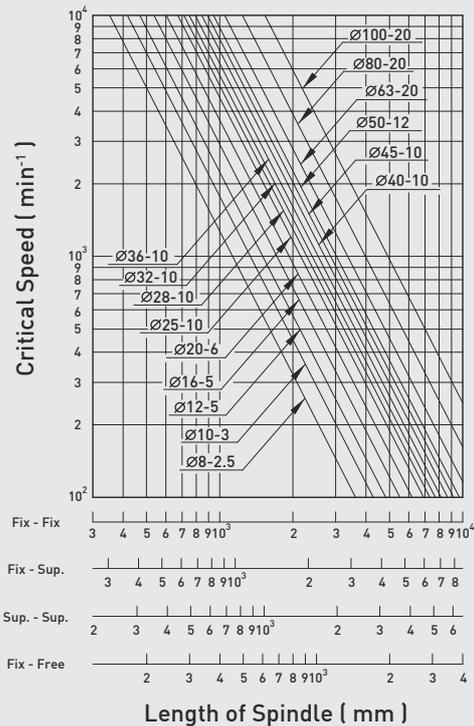


Fig 4.26 shows the critical speed for different screw spindle diameter and length

Supporting Conditions for Calculation of Buckling Load and Critical Speed

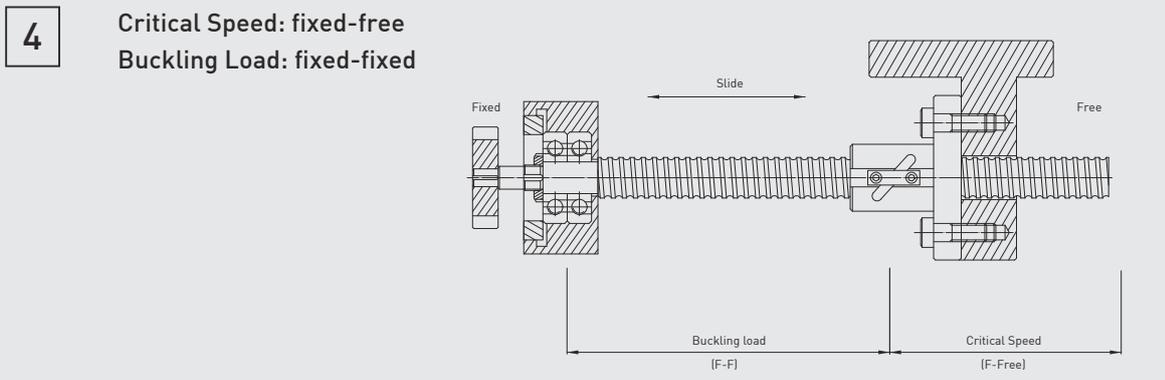
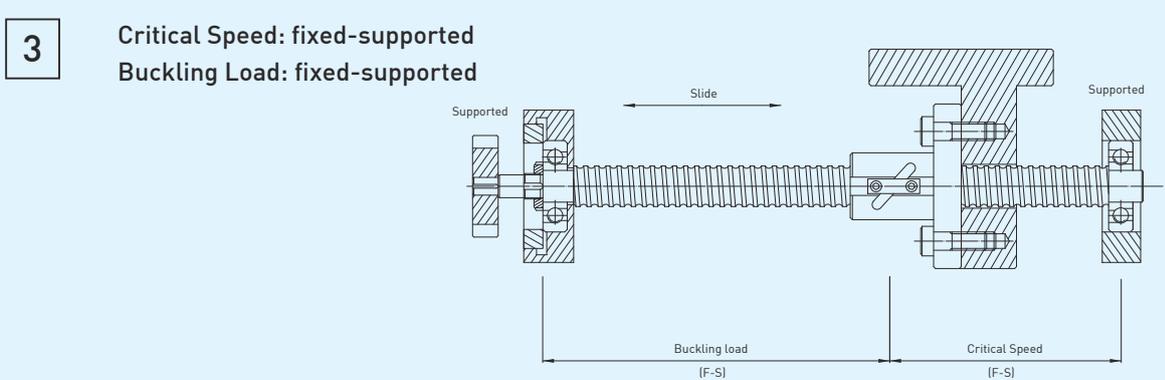
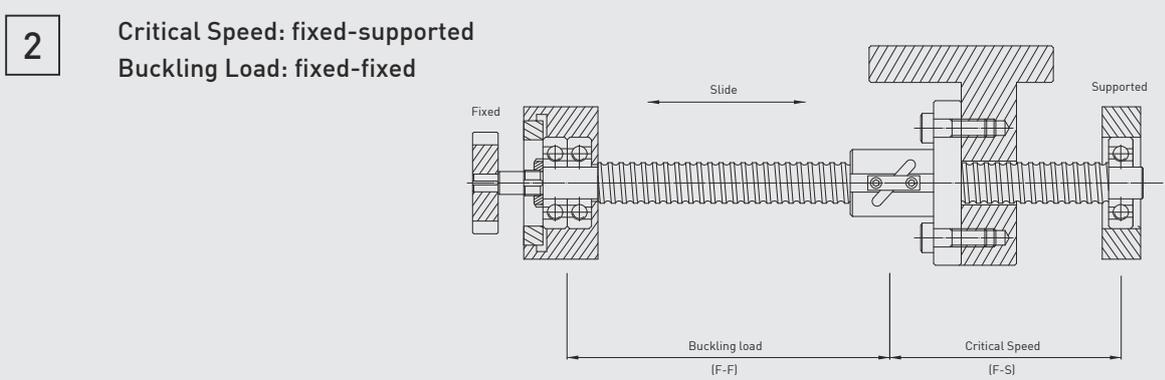
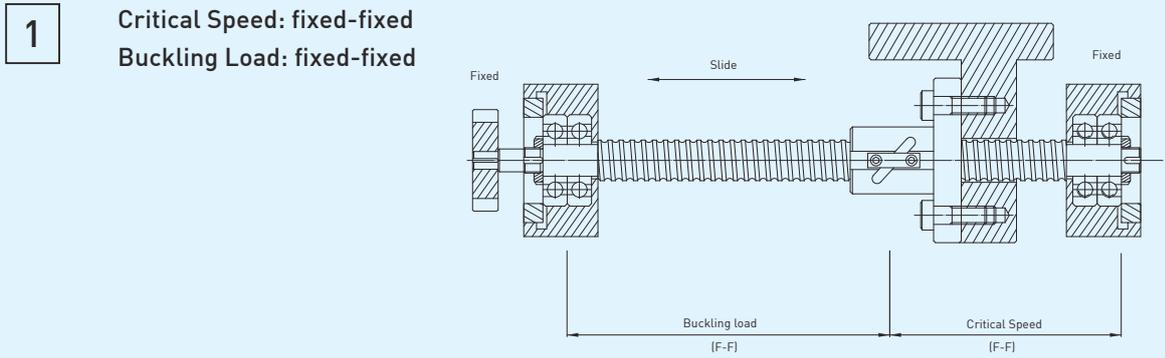


Fig 4.27 Supporting conditions for screw shaft ball nut

D_m-N value for ballscrew surface speed

D_m-N value has a strong influence over ballscrew noise, working temperature and service life of return system.

For HIWIN ballscrew,

$$D_m \times N \leq 70,000 \quad \text{M33}$$

D_m : Pitch circle diameter (mm)

N : Maximum speed (rpm)

Ballscrew structure enhancement designed by HIWIN when D_m-N value ranges from 70,000 to 180,000 . If D_m-N value above 180,000 , please consult our company.

Stiffness

Stiffness is an indication of the rigidity of a machine. The stiffness of the ballscrew is determined by nut-spindle rigidity via axial load, balltrack contact rigidity and screw spindle rigidity. When assembling the ballscrew in the machine, the stiffness of support bearing, mounting condition of nut with machine table etc. should also be considered. Fig 4.28 shows the relation of total stiffness of the machine feed system.

From testing, the stiffness of nut-spindle relation and ball and balltrack relation can be combined into the stiffness of nut, K_n , and listed in dimension table of different nut type. The stiffness of the ballscrew is shown as :

$$\frac{1}{K_{bs}} = \frac{1}{K_s} + \frac{1}{K_n} \quad \text{M34}$$

K_{bs} : Total stiffness of ballscrew (kgf/μm)

The stiffness of the screw spindle is shown as :

$$K_s = 67.4 \frac{d_r^2}{L_1} \quad (\text{Fixed-Fixed}) \quad \text{M35}$$

$$K_s = 16.8 \frac{d_r^2}{L_1} \quad (\text{Fixed-Free}) \quad \text{M36}$$

The stiffness chart is shown in Fig 4.29

$$d_r : \text{Root diameter of screw spindle (mm)} \cong D_m - D_b \quad \text{M37}$$

D_b : Diameter of ball (mm)

K_s : Screw spindle stiffness (kgf/μm)

K_n : Nut stiffness (kgf/μm)

The stiffness of the nut is tested using an axial force equal to the highest possible preload of 10% dynamic load (C) and is shown in the dimension table of each nut. When the preload is less than this value, the stiffness of the nut is calculated by extrapolation method as :

$$K_n = 0.8 \times K \left(\frac{P}{0.1C} \right)^{1/3} \quad \text{M38}$$

K_n : Stiffness of nut

K : Stiffness in the dimension table

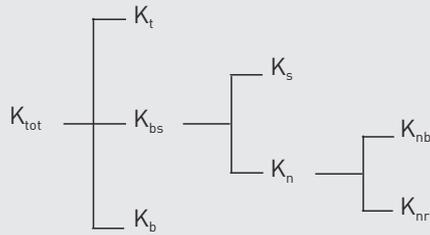
P : Preload

C : Dynamic load on dimension table

Single nut with backlash is calculated when the external axial force is equal to 0.28 C, thus :

$$K_n = 0.8 \times K \left(\frac{F_b}{2.8 \times 0.1C} \right)^{1/3} \quad \text{M39}$$

The axial stiffness of the whole feed system includes the stiffness of support bearings and nut mounting table. The designer should consider the total stiffness carefully.



- K_{tot} : Total stiffness of machine feed system
- K_t : Table mounting stiffness
- K_b : Support bearing stiffness
- K_{bs} : Ballscrew stiffness
- K_s : Ballscrew spindle stiffness
- K_n : Ballscrew nut stiffness
- K_{nb} : Ball and balltrack stiffness
- K_{nr} : Nut-spindle stiffness by radial load

Fig 4.28 Stiffness distribution for ballscrew feed system

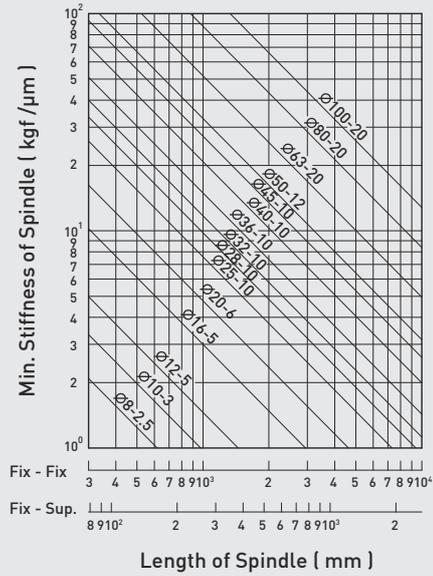


Fig 4.29 Stiffness chart for ballscrew spindle

Thermal expansion

$$\Delta L = 11.6 \times 10^{-6} \times \Delta T \times L_s$$

M40

ΔL : Thermal expansion of screw spindle (mm)

ΔT : (°C) Temperature rise at screw spindle

L_s : Total length of screw spindle (mm)

The T value should be chosen to compensate for the temperature rise of the ballscrew.

HIWIN recommends a T value of -0.02 ~ -0.03 per meter for CNC machine tools.

Basic dynamic axial load rating C (theoretical)

The dynamic load is the load at which 90% of the ballscrews will achieve the service life of 1×10^6 rev (C). The reliability factor can be adjusted by Table 4.8. The dynamic load is shown on the dimension table of each nut type.

Basic static axial load rating Co (theoretical)

The static load is the load which will cause the balltrack to have a plastic deformation exceeding 0.0001x ball diameter. To calculate the maximum static load of a ballscrew, the static safety factor S_f of the application condition should be considered.

$$S_f \times F_a(\max) < C_o$$

M41

S_f : Static factor = 2.5 max

C_o : Static load from the dimension table of the nut type

$F_a(\max)$: Maximum static axial load

Example 4.5 - 5

| | |
|--|---|
| Ballscrew specification: 1R40-10B2-FSW-1000-1200-0.012 | Lead $l = 10$ mm |
| Pitch circle diameter $D_m = 41.4$ mm | Turns = 2.5x2 |
| Ball diameter : 6.35 mm | Lead angle $\alpha = 4.4^\circ$ |
| Root diameter $d_r = 34.91$ mm | Friction angle $\beta = 0.286^\circ$ |
| Column load : fixed - supported | Preload $P = 250$ kgf |
| Critical speed : fixed - supported | Mean axial force $F_b = 700$ kgf |
| Stiffness of bearing $K_b = 105$ kgf/ μ m | $N_f = 0.5$; $L_t = 1000$ mm ; $M_f = 0.692$ |

Calculation

(1) Buckling load F_p

$$F_k = 40720 \times \frac{N_f d_r^4}{L_t^2} = 40720 \times \frac{0.5 \times 34.91^4}{1000^2} = 30240 \text{ kgf (Ref. M29)}$$

$$F_p = 0.5 \times F_k = 0.5 \times 30240 = 15120 \text{ kgf}$$

(2) Critical speed N_p

$$N_c = 2.71 \times 10^8 \times \frac{0.689 \times 34.90}{1000^2} = 6516 \text{ rpm}$$

$$N_p = 0.8 \times N_c = 0.8 \times 6516 = 5213 \text{ rpm}$$

(3) Mechanical efficiency η (theoretical)

(I) Common transmission

$$\eta_1 = \frac{\tan \alpha}{\tan(\alpha + \beta)} = \frac{\tan(4.396^\circ)}{\tan(4.396^\circ + 0.286^\circ)} = 0.938 \text{ (Ref. M3)}$$

(II) Reverse transmission

$$\eta_2 = \frac{\tan(\alpha + \beta)}{\tan \alpha} = \frac{\tan(4.396^\circ + 0.286^\circ)}{\tan(4.396^\circ)} = 0.934 \text{ (Ref. M4)}$$

(4) Stiffness K

$$K_s = 16.8 \frac{d_r^2}{L_1} = 16.8 \times \frac{34.91^2}{1000} = 20.5 \text{ kgf}/\mu\text{m} \quad p = 250 < 0.1C (=537)$$

$$\therefore K_n = 0.8 \times \left(\frac{P}{0.1C} \right)^{1/3} = 0.8 \times 74 \times \left(\frac{250}{0.1 \times 5370} \right)^{1/3} = 46 \text{ kgf}/\mu\text{m}$$

$$\frac{1}{K} = \frac{1}{K_s} + \frac{1}{K_n} = \frac{1}{20.5} + \frac{1}{46} \quad K = 14.18 \text{ kgf}/\mu\text{m}$$

(5) Lost motion during axial force $F_b = 700$ kgf

$$\frac{1}{K_t} = \frac{1}{K} + \frac{1}{K_b} = \frac{1}{14} + \frac{1}{105} \quad K_t = 12.35 \text{ kgf}/\mu\text{m}$$

$$\delta / 2 = \frac{F}{K} = \frac{700}{12.4} = 56 \mu\text{m} = 0.056 \text{ mm} \quad (\text{each way}) \quad \text{Total lost motion } \delta = 2 \times 0.056 = 0.112 \text{ mm}$$

If the preload increases to $2 \times 250 = 500$ kgf then $K_n = 58$ kgf/ μ m and $K = 15.1$ kgf/ μ m. Total stiffness $K_t = 13.2$ kgf/ μ m and total lost motion $\delta = 0.106$ mm. The difference is only 6μ m (5% change). comparing with 250 kgf, preloaded nut, but the temperature rise caused by 500 kgf preload is heavy. The spindle stiffness is sometimes more important than the nut stiffness. The best way to increase the stiffness of the system is not in the heavy preloading of the ballscrew nut. If the support method changes to fixed-fixed, then $K_s = 82$ kgf/ μ m and K_t becomes 23 kgf/ μ m. The total lost motion $d = 0.061$ mm. The difference is 51μ m (45%).

Manufacturing range

The maximum length to which a ballscrew can be manufactured depends on spindle diameter and accuracy grade (Table 4.10). Since high accuracy ballscrews require a high degree of straightness to the screw spindle, the higher the slender ratio (length/diameter), the more difficult to manufacture and the less the spindle stiffness.

HIWIN recommends the maximum lengths shown in Table 4.10.

If a longer length is required, please contact with HIWIN engineer.

Table 4.10 General manufacturing range of HIWIN screw spindle vs. diameter and accuracy grade

Unit : mm

| Total Length Grade \ O.D. | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 28 | 32 | 36 | 40 | 45 | 50 | 55 | 63 | 70 | 80 | 100 |
|---------------------------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| C0 | 110 | 170 | 300 | 400 | 600 | 700 | 1000 | 1000 | 1200 | 1300 | 1500 | 1600 | 1800 | 2000 | 2000 | 2000 | 2000 | 2000 |
| C1 | 110 | 170 | 400 | 500 | 720 | 950 | 1300 | 1500 | 1800 | 1800 | 2300 | 2500 | 3100 | 3500 | 4000 | 4000 | 4000 | 4000 |
| C2 | 140 | 200 | 500 | 630 | 900 | 1300 | 1700 | 1800 | 2200 | 2200 | 2900 | 3200 | 4000 | 5000 | 5200 | 5500 | 6300 | 6300 |
| C3 | 170 | 250 | 500 | 630 | 1000 | 1400 | 1800 | 2000 | 2500 | 3200 | 3500 | 4000 | 4500 | 5000 | 6000 | 7100 | 10000 | 10000 |
| C4 | 170 | 250 | 500 | 630 | 1000 | 1400 | 1800 | 2000 | 2500 | 3200 | 3500 | 4000 | 4500 | 5000 | 6000 | 7100 | 10000 | 10000 |
| C5 | 170 | 250 | 500 | 630 | 1410 | 1700 | 2400 | 2500 | 3000 | 3200 | 3800 | 4000 | 5000 | 5500 | 6900 | 7100 | 10000 | 10000 |
| C6 | 400 | 800 | 1000 | 1200 | 1500 | 1800 | 2500 | 3000 | 3000 | 4000 | 4000 | 4000 | 5600 | 5600 | 6900 | 7100 | 10000 | 10000 |
| C7 | 400 | 800 | 1000 | 1200 | 3000 | 3000 | 4000 | 4000 | 4500 | 4500 | 5600 | 5600 | 5600 | 5600 | 6900 | 7100 | 10000 | 10000 |

■ Please consult with HIWIN in this area

Heat treatment

HIWIN's homogenous heat treatment technique gives the ballscrew maximum life capability. Table 4.11 shows the hardness value of hardness in each component of HIWIN ballscrews. The surface hardness of the ballscrew affects both dynamic and static load value. The dynamic and static values shown in the dimension table are the values for a surface hardness equal to HRC 60. If the surface hardness is lower than this value, the following formula will give you the calibration result.

$$C'o = Co \times f_{Ho} \quad f_{Ho} = \left(\frac{\text{Real Hardness (HRC)}}{60} \right)^3 \leq 1 \quad \dots\dots\dots \text{M42}$$

$$C' = C \times f_H \quad f_H = \left(\frac{\text{Real Hardness (HRC)}}{60} \right)^2 \leq 1 \quad \dots\dots\dots \text{M43}$$

Where f_H and f_{Ho} are the hardness factor.

- $C'o$: Calibrated static load
- Co : Static load
- C' : Calibrated dynamic load
- C : Dynamic load

Table 4.11 Hardness of each component of HIWIN ballscrew

| Item | Treat Method | Hardness (HRC) |
|---------|---------------------------------------|----------------|
| Spindle | Carburizing or Induction Hardening | 58 - 62 |
| Nut | Carburizing | 58 - 62 |
| Ball | | 62 - 66 |

4.6 Temperature Increase Effect on Ballscrews

The temperature increase of a ballscrew during the working period will influence the accuracy of the machine feed system, especially in a machine designed for high speed and high accuracy.

The following factors have the effect of raising the temperature in a ballscrew.

- (1) Preload (2) Lubrication (3) Pretension

Fig 4.30 shows the relation of working speed, preload and temperature rise. Fig 4.31 shows the relation of nut temperature rise to preload friction torque. From Fig 4.30, Fig 4.31 and example 4.5-5, doubling the preload of the nut will increase the temperature about 5 degrees, but the stiffness increase only by about 5% (few μm).

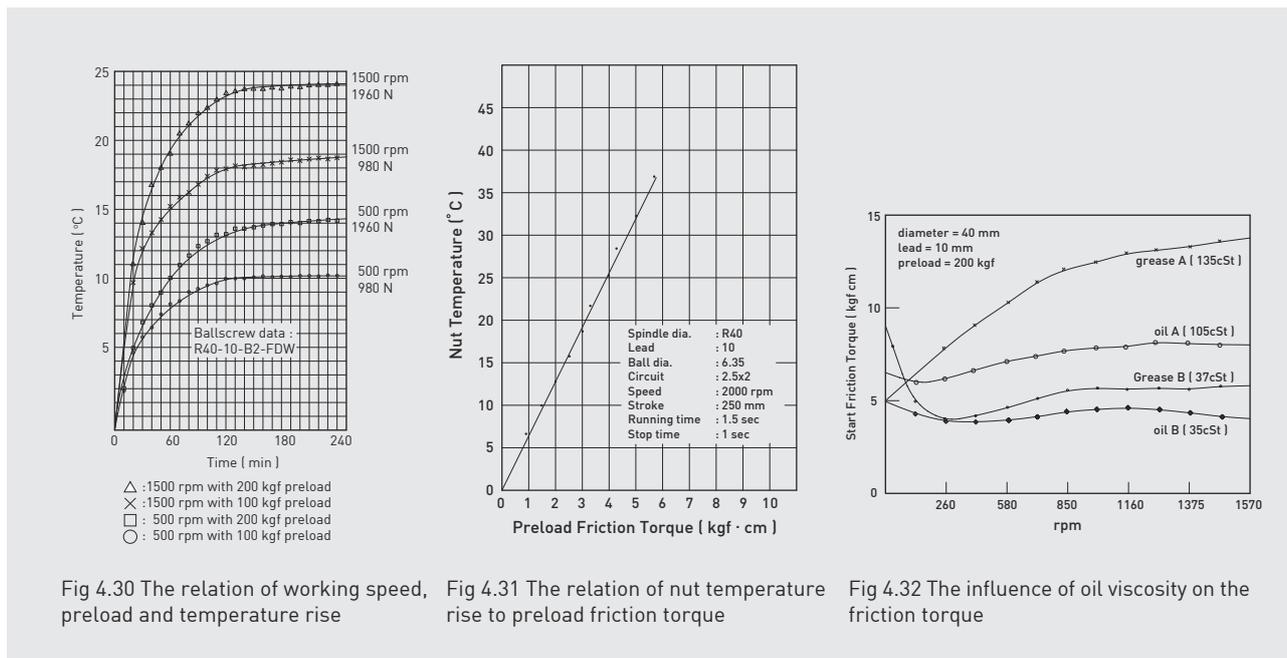


Fig 4.30 The relation of working speed, preload and temperature rise

Fig 4.31 The relation of nut temperature rise to preload friction torque

Fig 4.32 The influence of oil viscosity on the friction torque

(1) Preload effect

To avoid any lost motion in the machine feed system, increasing the rigidity of the ballscrew nut is important. However, to increase the rigidity of the ballscrew nut, it is necessary to preload the nut to a certain level.

Preloading the nut will increase the friction torque of the screw, making it more sensitive to an increase in temperature during working period.

HIWIN recommends using a preload of 8% of the dynamic load for medium and heavy preload, 6% ~ 8% for medium preload, 4% ~ 6% for light and medium and below 4% for light preload.

The heaviest preload should not exceed 10% of the dynamic load for best service life and a low temperature rise effect.

(2) Lubrication effect

The selection of lubricant will directly influence the temperature rise of the ballscrew.

HIWIN ballscrews require appropriate lubrication either by greasing or oiling. Antifriction bearing oil is recommended for ballscrew oil lubrication. Lithium soap based grease is recommended for ballscrew greasing. The basic oil viscosity requirement depends on the speed, working temperature and load condition of the application. (Fig 4.32) shows the relation of oil viscosity, working speed and rise in temperature.

When the working speed is higher and the working load is lower, a low viscosity oil is better. When the working speed is lower and the working load is heavy, a high viscosity oil is preferred.

Generally speaking, oil with a viscosity of 32 ~ 68 cSt at 40°C (ISO VG 32-68) is recommended for high speed lubrication (DIN 51519) and viscosity above 90 cSt at 40°C (ISO VG 90) is recommended for low speed lubrication.

In high speed and heavy load applications the use of a forced coolant is necessary to lessen the temperature. The forced lubrication of coolant can be done by a hollow ballscrew.

Fig 4.33 shows a typical application for hollow ballscrew in machine tools. The inspection and replenishing of the ballscrew lubricant is listed in Table 4.12.

(3) Pretension effect

When the temperature rises in the ballscrew, the effect of thermal stress will elongate the screw spindle. It can make the spindle length unstable.

The elongating relationship can be calculated according to M40. This elongation can be compensated via the pretension force. For the purpose of pretension, there is a negative T value indicated in the design drawing to compensate the pretension value.

Since a large pretension force will cause the burn down of the supporting bearing, HIWIN recommends using pretension when the temperature rise is below 5°C. Also, if the diameter of the screw spindle is greater than 50 mm, it is not suitable for pretension. A large spindle diameter requires a high pretension force, causing burn down of the supporting bearing.

HIWIN recommends a T compensation value of about 3°, (about -0.02~0.03 for each 1000 mm screw spindle).

Since different applications require different T values, please contact HIWIN engineer.

The pretension force is calculated as :

$$P_f = K_s \times \Delta L$$

K_s : Stiffness of screw spindle (kgf/ μ m)

P_f : Pretension force (kgf)

ΔL : Pretension value (μ m)

Table 4.12 : Inspection and replenishment of Lubricant

| Lubrication Method | Inspection & Replenishment Guide |
|--------------------|---|
| Oil | <ul style="list-style-type: none"> • Check the oil level and clean once a week. • When contamination happens, replacing the oil is recommended. • Lubrication suggestion : Lubrication amount to apply onto Ballscrew per 15 minutes $\frac{\text{Ballscrew outer diameter(mm)}}{56-60}$ c.c. |
| Grease | <ul style="list-style-type: none"> • Inspect for contamination of chips every 2 or 3 months. • If contamination happens, remove old grease and replace with new grease. • Injection amount is about half of internal space within nut every 2 months or 100 km stroke. |

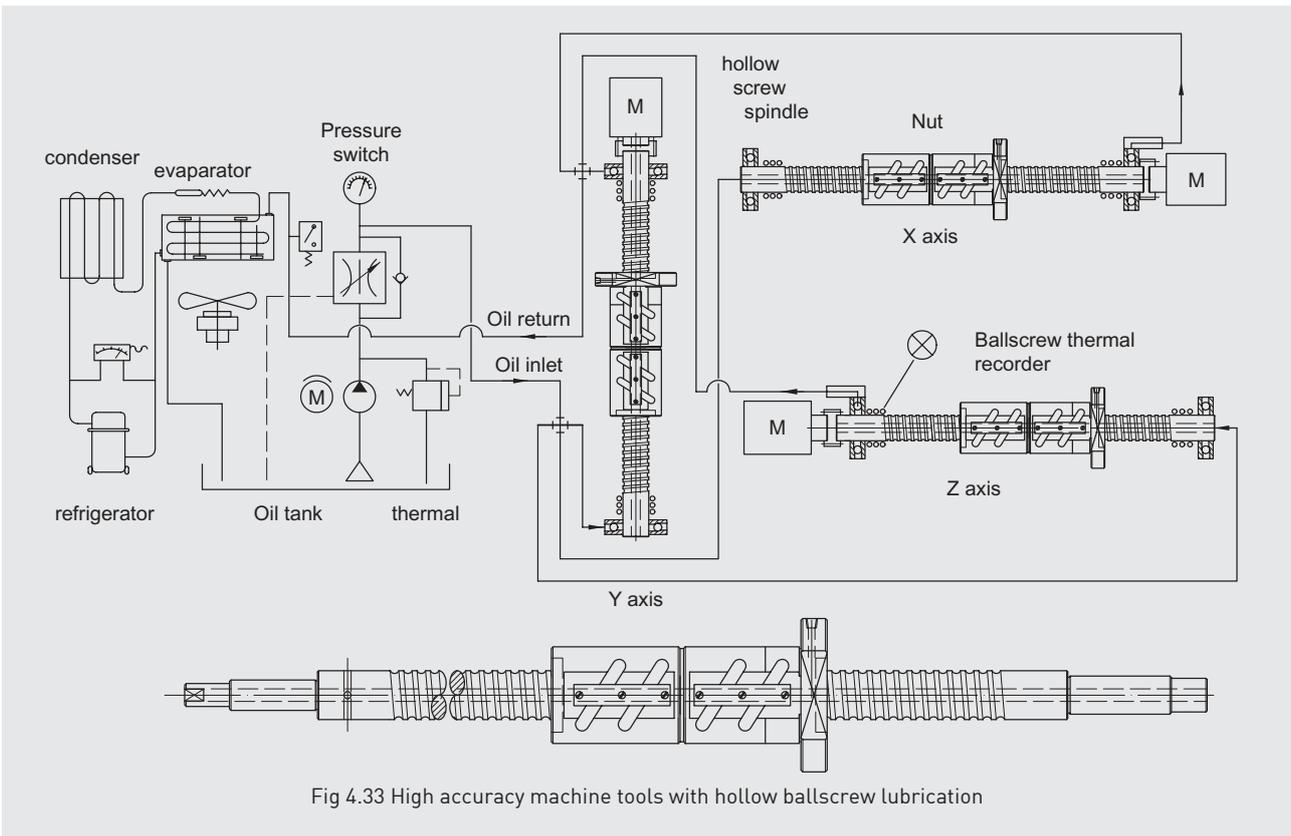


Fig 4.33 High accuracy machine tools with hollow ballscrew lubrication

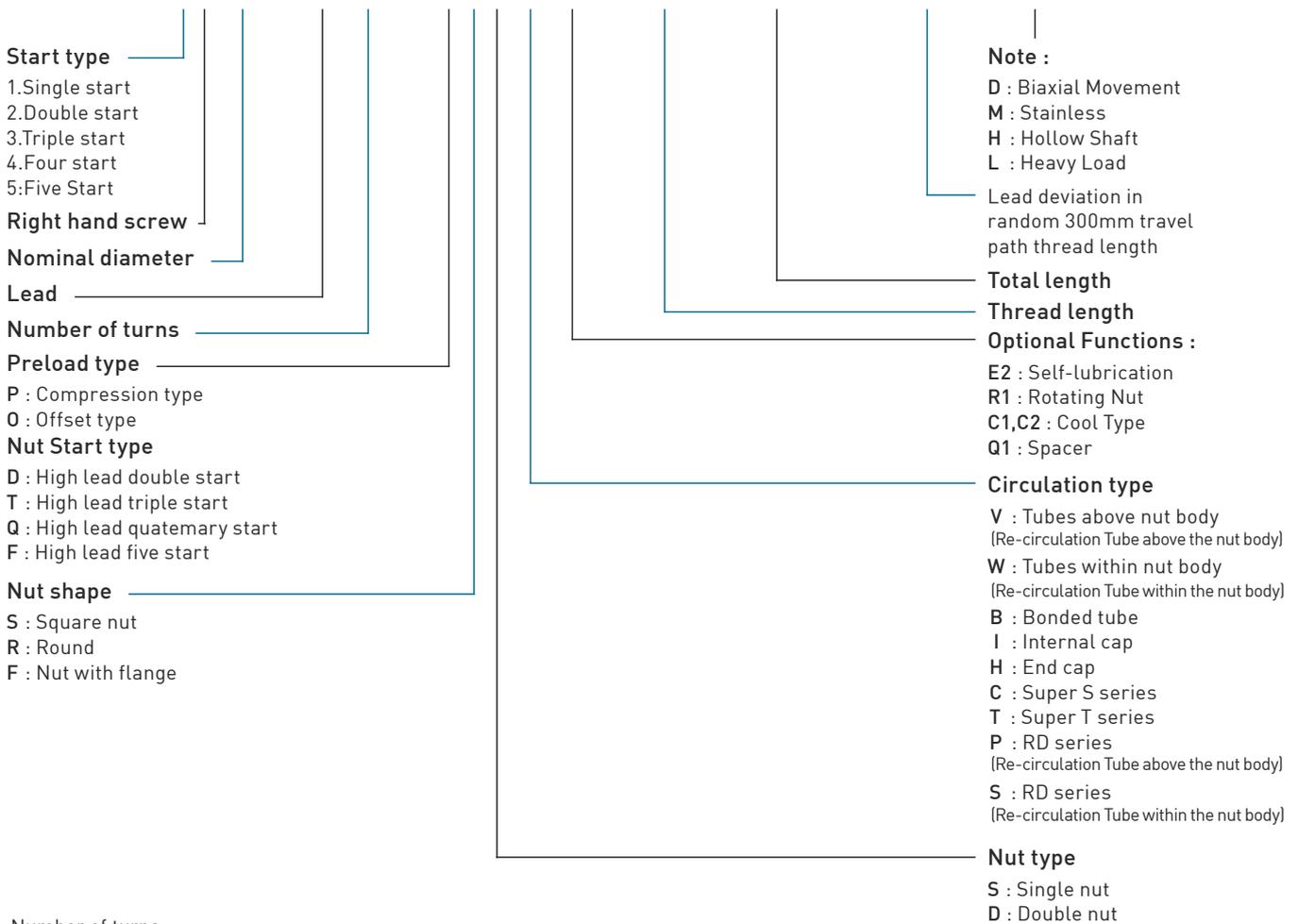
5. Specification Illustration

HIWIN manufactures ballscrews according to customers' blueprints or specifications. Please read the following information for an understanding of ballscrew design.

1. Nominal diameter.
2. Thread lead.
3. Thread length, total length.
4. End journal configuration.
5. Nut configuration
6. Accuracy grade (lead deviation, geometrical tolerance).
7. Working speed.
8. Maximum static load, working load, preload drag torque.
9. Nut safety requirements.
10. Lubrication hole position.

HIWIN Ballscrew Nomenclature

1R40 - 10B2 - PFDWE2 - 800 - 1000 - 0.0035 - M



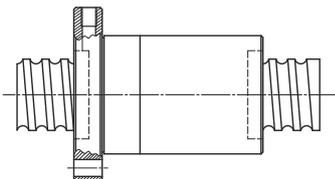
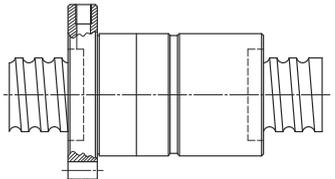
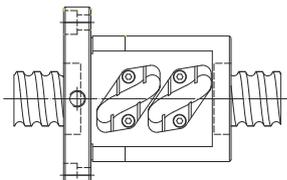
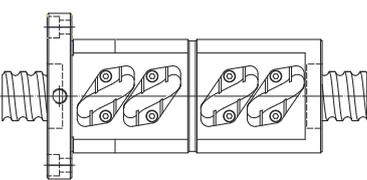
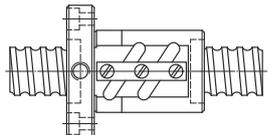
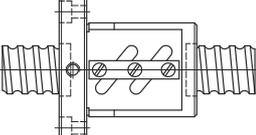
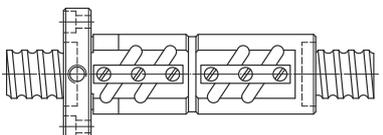
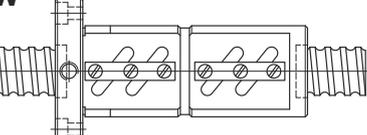
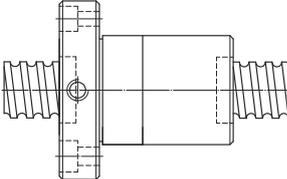
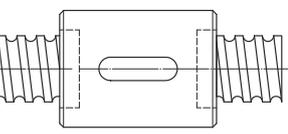
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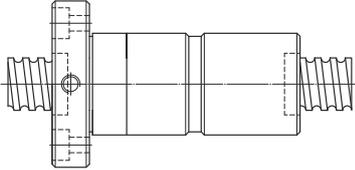
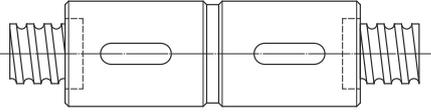
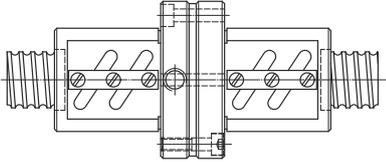
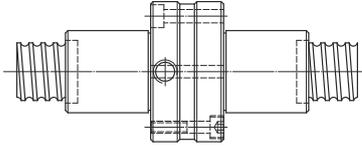
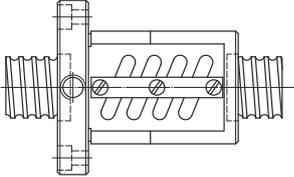
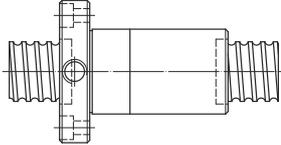
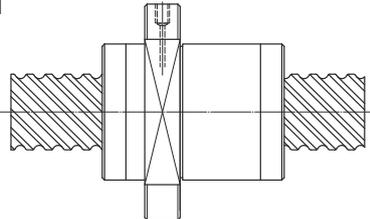
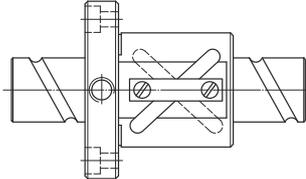
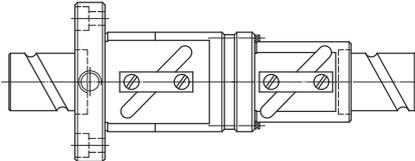
| | | | | | |
|-------------------------|--------|------------|------------|--------|---------------------------|
| A : 1.5, B: 2.5, C: 3.5 | T3 : 3 | S1 : 1.8x1 | U1 : 2.8x1 | K2 : 2 | X : 2.8, Y : 3.8, Z : 4.8 |
| A2 : 1.5x2 | T4 : 4 | S2 : 1.8x2 | U2 : 2.8x2 | K3 : 3 | X2 : 2.8x2 |
| B2 : 2.5x2 | T5 : 5 | S4 : 1.8x4 | V2 : 0.8x2 | K4 : 4 | Y2 : 3.8x2 |
| C1 : 3.5x1 | T6 : 6 | | | | Z2 : 4.8x2 |

- Note :
1. Different diameters and leads are available upon request.
 2. Right hand thread is standard, left hand thread is available upon request.
 3. Longer lengths are available upon request.
 4. Stainless steel is available upon request, please contact HIWIN engineer.
 5. Complete ballscrew Inquiry on page 197-198 and please contact HIWIN engineer.
 6. If you need to order DIN 69051 type, please mark "DIN".

6. Precision Ground Ballscrews

6.1 Ground Ballscrew Series

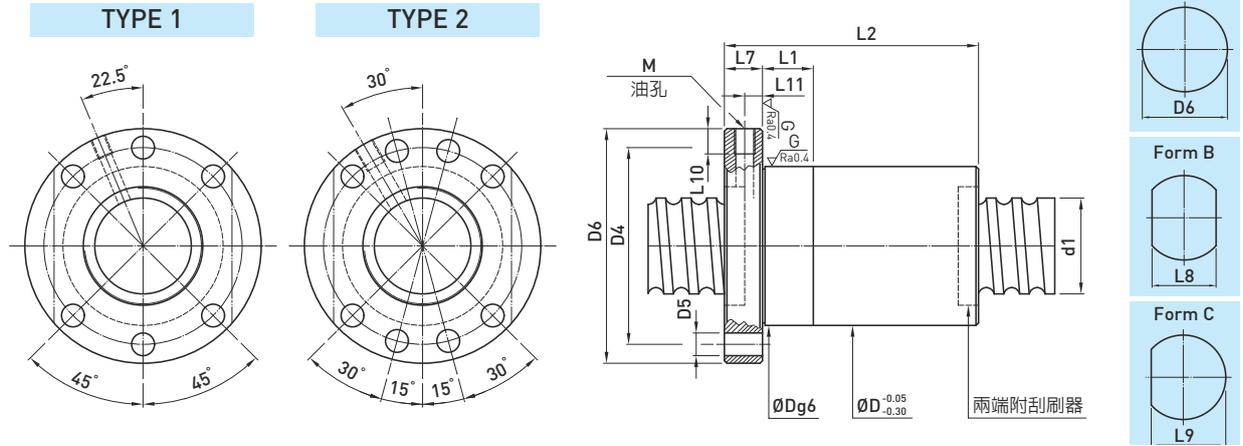
| page | Super S | | page |
|---------------|---|---|---------------|
| 42 ∩ 43 | <p>FSC</p>  <p>(F)Flange end, (S)single nut, (C)Super S</p> | <p>FDC</p>  <p>(F)Flange end, (D)double nut, (C)Super S</p> | 44 ∩ 45 |
| page | Super T | | page |
| 46 ∩ 49 | <p>FST</p>  <p>(F)Flange end, (S)single nut, (T)Super T</p> | <p>FDT</p>  <p>(F)Flange end, (D)double nut, (T)Super T</p> | 50 ∩ 53 |
| page | General Type | | page |
| 54 ∩ 56 | <p>FSV</p>  <p>(F)Flange end, (S)single nut, (V)tube above the nut diameter</p> | <p>FSW</p>  <p>(F)Flange end, (S)single nut, (W)tube within the nut diameter</p> | 57 ∩ 59 |
| 60 ∩ 62 | <p>FDV</p>  <p>(F)Flange end, (D)double nut, (V)tube above the nut diameter</p> | <p>FDW</p>  <p>(F)Flange end, (D)double nut, (W)tube within the nut diameter</p> | 63 ∩ 65 |
| 66 ∩ 68 | <p>FSI</p>  <p>(F)Flange end, (S)single nut, (I)internal recirculation cap</p> | <p>RSI</p>  <p>(R)Round, (S)single nut, (I)internal recirculation cap</p> | 69 ∩ 70 |

| page | General Type | | page |
|---------------|---|---|---------------|
| 71 ∩ 72 | <p>FDI</p>  <p>(F)Flange end, (D)double nut, (I)internal recirculation cap</p> | <p>RDI</p>  <p>(R)Round, (D)double nut, (I)internal recirculation cap</p> | 73 ∩ 74 |
| 75 ∩ 76 | <p>PFDW -Type 1</p>  <p>(PF)Flange to flange, (D)double nut, (W)tube within the nut diameter</p> | <p>PFDI</p>  <p>(PF)Flange to flange, (D)double nut, (I)internal recirculation cap</p> | 79 ∩ 80 |
| 81 ∩ 83 | <p>OFSW</p>  <p>(O)Offset pitch preload, (F)flange end, (S)single nut, (W)tube within the nut diameter</p> | <p>OFSI</p>  <p>(O)Offset pitch preload, (F)flange end, (S)single nut, (I)internal recirculation cap</p> | 84 |
| page | High Lead Type | | page |
| 85 | <p>FSH</p>  <p>Large lead, (F)flange mounted, (S)single nut, (H)end cap</p> | <p>DFSV</p>  <p>(D)Double start, (F)flange end, (S)single nut, (V)tube above the nut diameter</p> | 86 |
| 77 ∩ 78 | <p>PFDW-Type 2</p>  <p>Large lead, (PF)flange end, compression preload, (D)double nut, (W)tube within nut diameter</p> | | 77 ∩ 78 |

*Different designs require drawing approval. Please contact HIWIN engineers for types not listed above.

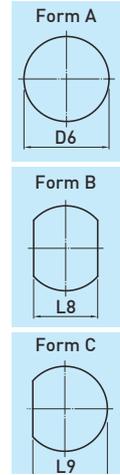
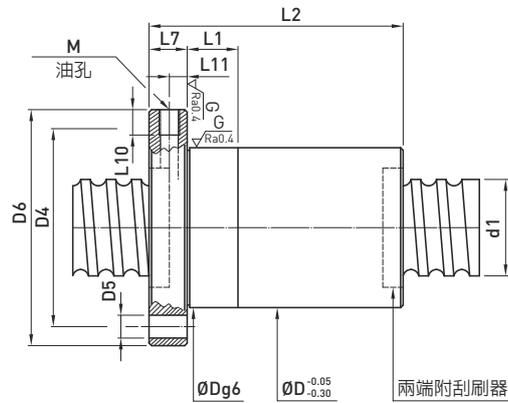
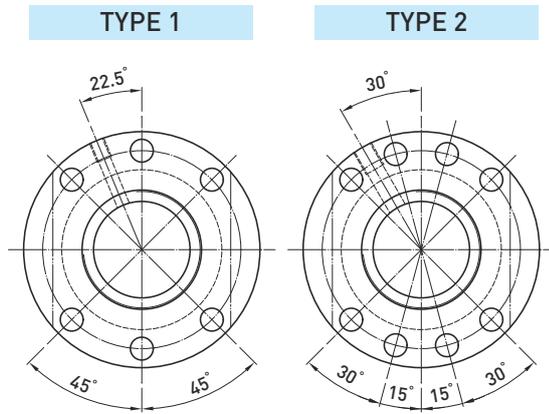
6.2 Dimensions for Precision Ground Ballscrews

FSC Type ◀ Standard Product



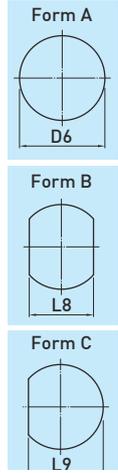
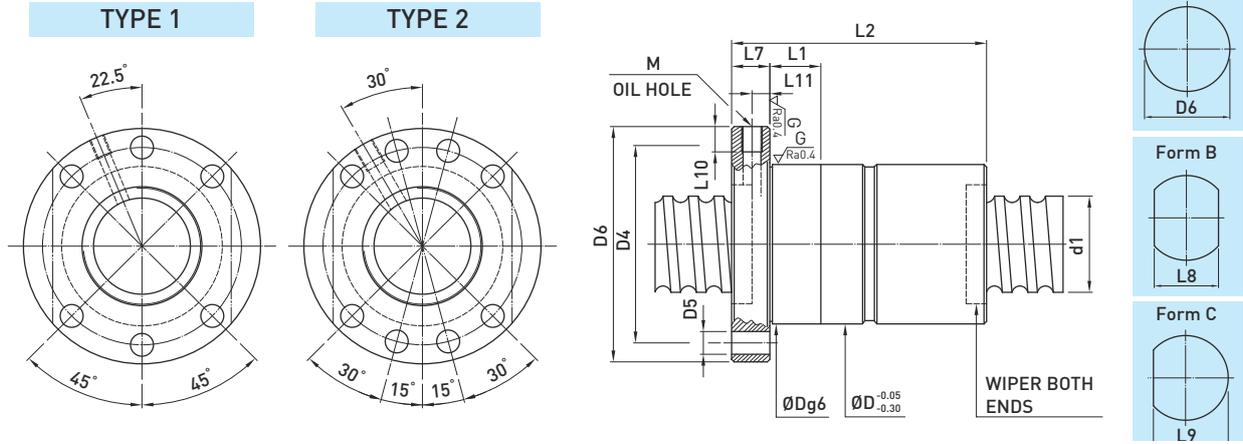
| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Oil Hole | | | Double starts | Incomplete Thread | | | | |
|-----------|--------------|------|------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|----|-----|--------|------------|------------|------------|----|----|---------------|-------------------|----|---|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L1 | L2 | TYPE | Form A(D6) | Form B(L8) | Form C(L9) | L7 | D4 | | | D5 | M | L10 | L11 |
| 14-10K3 | 14 | 10 | 14.6 | 10.724 | 3.175 | 3 | 24 | 920 | 1790 | 28 | 10 | 46 | 1 | 48 | 40 | 44 | 10 | 38 | 5.5 | M5×0.8P | 6 | 5 | | |
| 15-10K3 | 15 | 10 | 16 | 12.869 | 3 | 3 | 26 | 930 | 1970 | 28 | 10 | 45 | 1 | 48 | 40 | 44 | 10 | 38 | 5.5 | M5×0.8P | 6 | 5 | | |
| 15-16K2 | 15 | 16 | 16 | 12.869 | 3 | 2 | 16 | 610 | 1230 | 28 | 10 | 45 | 1 | 48 | 40 | 44 | 10 | 38 | 5.5 | M5×0.8P | 6 | 5 | | |
| 15-10K3 | 15 | 10 | 15.6 | 12.324 | 3.175 | 3 | 25 | 960 | 1930 | 34 | 10 | 44 | 1 | 57 | 43 | 50 | 10 | 45 | 5.5 | M5×0.8P | 6 | 5 | | |
| 15-20K2 | 15 | 20 | 15.6 | 12.324 | 3.175 | 2 | 15 | 630 | 1256 | 34 | 10 | 50 | 1 | 57 | 43 | 50 | 10 | 45 | 5.5 | M5×0.8P | 6 | 5 | | |
| 16-16K2 | 16 | 16 | 16.4 | 13.124 | 3.175 | 2 | 17 | 680 | 1385 | 34 | 10 | 47 | 1 | 57 | 43 | 50 | 10 | 45 | 5.5 | M5×0.8P | 6 | 5 | | |
| 20-10K4 | 20 | 10 | 21 | 17.868 | 3 | 4 | 43 | 1390 | 3560 | 34 | 10 | 55 | 1 | 57 | 43 | 50 | 10 | 45 | 5.5 | M5×0.8P | 6 | 5 | | |
| 20-5K4 | 20 | 5 | 20.6 | 17.324 | 3.175 | 4 | 42 | 1490 | 3640 | 36 | 10 | 40 | 1 | 58 | 44 | 51 | 10 | 47 | 6.6 | M6×1P | 8 | 5 | | |
| 20-10K3 | 20 | 10 | 20.6 | 17.324 | 3.175 | 3 | 32 | 1130 | 2660 | 36 | 10 | 47 | 1 | 58 | 44 | 51 | 10 | 47 | 6.6 | M6×1P | 8 | 5 | | |
| 20-20K2 | 20 | 20 | 20.6 | 17.324 | 3.175 | 2 | 21 | 760 | 1730 | 36 | 10 | 57 | 1 | 58 | 44 | 51 | 10 | 47 | 6.6 | M6×1P | 8 | 5 | | |
| 20-6K5 | 20 | 6 | 20.8 | 16.744 | 3.969 | 5 | 58 | 2420 | 5660 | 42 | 10 | 49 | 1 | 64 | 50 | 57 | 10 | 53 | 6.6 | M6×1P | 8 | 5 | | |
| 20-8K5 | 20 | 8 | 21 | 16.132 | 4.763 | 5 | 58 | 2960 | 6505 | 45 | 10 | 64 | 1 | 65 | 51 | 58 | 10 | 54 | 6.6 | M6×1P | 8 | 5 | | |
| 25-5K4 | 25 | 5 | 25.6 | 22.324 | 3.175 | 4 | 49 | 1650 | 4612 | 40 | 10 | 43 | 1 | 62 | 48 | 55 | 10 | 51 | 6.6 | M6×1P | 8 | 5 | | |
| 25-10K3 | 25 | 10 | 25.6 | 22.324 | 3.175 | 3 | 38 | 1260 | 3370 | 40 | 10 | 50 | 1 | 62 | 48 | 55 | 10 | 51 | 6.6 | M6×1P | 8 | 5 | | |
| 25-15K5 | 25 | 15 | 25.6 | 22.324 | 3.175 | 5 | 63 | 1980 | 5730 | 40 | 10 | 90 | 1 | 62 | 48 | 55 | 10 | 51 | 6.6 | M6×1P | 8 | 5 | | |
| 25-20K3 | 25 | 20 | 25.6 | 22.324 | 3.175 | 3 | 39 | 1260 | 3436 | 40 | 10 | 80 | 1 | 62 | 48 | 55 | 10 | 51 | 6.6 | M6×1P | 8 | 5 | | |
| 25-25K2 | 25 | 25 | 25.6 | 22.324 | 3.175 | 2 | 25 | 840 | 2170 | 40 | 10 | 69 | 1 | 62 | 48 | 55 | 10 | 51 | 6.6 | M6×1P | 8 | 5 | | |
| 25-6K5 | 25 | 6 | 25.8 | 21.744 | 3.969 | 5 | 68 | 2720 | 7192 | 45 | 10 | 50 | 1 | 65 | 51 | 58 | 10 | 54 | 6.6 | M6×1P | 8 | 5 | | |
| 25-8K5 | 25 | 8 | 25.8 | 21.744 | 3.969 | 5 | 70 | 2710 | 7170 | 48 | 10 | 62 | 1 | 68 | 54 | 61 | 10 | 57 | 6.6 | M6×1P | 8 | 5 | | |
| 25-10K4 | 25 | 10 | 25.8 | 21.744 | 3.969 | 4 | 56 | 2210 | 5660 | 45 | 10 | 60 | 1 | 65 | 51 | 58 | 10 | 54 | 6.6 | M6×1P | 8 | 5 | | |
| 25-12K4 | 25 | 12 | 25.8 | 21.744 | 3.969 | 4 | 56 | 2200 | 5640 | 45 | 10 | 67 | 1 | 65 | 51 | 58 | 10 | 54 | 6.6 | M6×1P | 8 | 5 | | |
| 25-16K3 | 25 | 16 | 25.8 | 21.744 | 3.969 | 3 | 42 | 1670 | 4127 | 45 | 10 | 71 | 1 | 65 | 51 | 58 | 10 | 54 | 6.6 | M6×1P | 8 | 5 | | |
| 25-20K3 | 25 | 20 | 25.8 | 21.744 | 3.969 | 3 | 43 | 1710 | 4290 | 45 | 10 | 80 | 1 | 65 | 51 | 58 | 10 | 54 | 6.6 | M6×1P | 8 | 5 | | |
| 25-8K5 | 25 | 8 | 26 | 21.132 | 4.763 | 5 | 72 | 3480 | 8683 | 50 | 10 | 64 | 1 | 70 | 56 | 64 | 10 | 60 | 6.6 | M6×1P | 8 | 5 | | |
| 28-6K5 | 28 | 6 | 28.8 | 24.744 | 3.969 | 5 | 74 | 2840 | 7966 | 50 | 10 | 49 | 1 | 80 | 62 | 71 | 12 | 65 | 6.6 | M6×1P | 8 | 6 | | |
| 28-8K5 | 28 | 8 | 29 | 24.132 | 4.763 | 5 | 79 | 3690 | 9780 | 50 | 10 | 62 | 1 | 80 | 62 | 71 | 12 | 65 | 6.6 | M6×1P | 8 | 6 | | |
| 28-10K5 | 28 | 10 | 29 | 24.132 | 4.763 | 5 | 80 | 3680 | 9760 | 52 | 10 | 72 | 1 | 80 | 62 | 71 | 12 | 65 | 6.6 | M6×1P | 8 | 6 | | |
| 28-16K4 | 28 | 16 | 29 | 24.132 | 4.763 | 4 | 64 | 2970 | 7661 | 50 | 10 | 92 | 1 | 80 | 62 | 71 | 12 | 65 | 6.6 | M6×1P | 8 | 6 | | |
| 32-5K4 | 32 | 5 | 32.6 | 29.324 | 3.175 | 4 | 57 | 1840 | 5960 | 48 | 10 | 38 | 1 | 70 | 54 | 62 | 12 | 59 | 6.6 | M6×1P | 8 | 6 | | |
| 32-5.08K4 | 32 | 5.08 | 32.6 | 29.324 | 3.175 | 4 | 57 | 1840 | 5940 | 48 | 10 | 39 | 1 | 70 | 54 | 62 | 12 | 59 | 6.6 | M6×1P | 8 | 6 | | |
| 32-6K5 | 32 | 6 | 32.8 | 28.744 | 3.969 | 5 | 83 | 3090 | 9480 | 56 | 10 | 48 | 1 | 86 | 65 | 75.5 | 12 | 71 | 6.6 | M6×1P | 8 | 6 | | |
| 32-8K5 | 32 | 8 | 32.8 | 28.744 | 3.969 | 5 | 85 | 3080 | 9430 | 53 | 10 | 59 | 1 | 83 | 62 | 72.5 | 12 | 68 | 6.6 | M6×1P | 8 | 6 | | |
| 32-8K5 | 32 | 8 | 32.8 | 28.744 | 3.969 | 5 | 84 | 3080 | 9460 | 50 | 10 | 59 | 1 | 80 | 62 | 71 | 12 | 65 | 9 | M6×1P | 8 | 6 | | |
| 32-10K5 | 32 | 10 | 32.8 | 28.744 | 3.969 | 5 | 85 | 3080 | 9450 | 50 | 10 | 73 | 1 | 80 | 62 | 71 | 12 | 65 | 9 | M6×1P | 8 | 6 | | |
| 32-15K4 | 32 | 15 | 32.8 | 28.744 | 3.969 | 4 | 69 | 2500 | 7440 | 50 | 10 | 90 | 1 | 80 | 62 | 71 | 12 | 65 | 9 | M6×1P | 8 | 6 | | |
| 32-20K3 | 32 | 20 | 32.8 | 28.744 | 3.969 | 3 | 52 | 1900 | 5430 | 50 | 20 | 87 | 1 | 80 | 62 | 71 | 12 | 65 | 9 | M6×1P | 8 | 6 | | |
| 32-32K2 | 32 | 32 | 32.8 | 28.744 | 3.969 | 2 | 34 | 1280 | 3530 | 50 | 20 | 87 | 1 | 80 | 62 | 71 | 12 | 65 | 9 | M6×1P | 8 | 6 | | |
| 32-40K2 | 32 | 40 | 32.8 | 28.744 | 3.969 | 2 | 32 | 1240 | 3440 | 50 | 20 | 94 | 1 | 80 | 62 | 71 | 12 | 65 | 9 | M6×1P | 8 | 6 | | |
| 32-8K5 | 32 | 8 | 33 | 28.132 | 4.763 | 5 | 84 | 3860 | 10914 | 55 | 10 | 64 | 1 | 86 | 65 | 75.5 | 14 | 71 | 9 | M6×1P | 8 | 7 | | |
| 32-10K5 | 32 | 10 | 33 | 28.132 | 4.763 | 5 | 86 | 3850 | 10890 | 56 | 10 | 79 | 1 | 86 | 65 | 75.5 | 14 | 71 | 9 | M6×1P | 8 | 7 | | |
| 32-12K5 | 32 | 12 | 33 | 28.132 | 4.763 | 5 | 87 | 3840 | 10870 | 56 | 20 | 88 | 1 | 86 | 65 | 75.5 | 14 | 71 | 9 | M6×1P | 8 | 7 | | |
| 32-20K4 | 32 | 20 | 33 | 28.132 | 4.763 | 4 | 72 | 3190 | 8914 | 54 | 20 | 106 | 1 | 86 | 65 | 75.5 | 14 | 71 | 9 | M6×1P | 8 | 7 | | |
| 32-25K3 | 32 | 25 | 33 | 28.132 | 4.763 | 3 | 53 | 2420 | 6500 | 54 | 20 | 97 | 1 | 86 | 65 | 75.5 | 14 | 71 | 9 | M6×1P | 8 | 7 | | |
| 32-32K2 | 32 | 32 | 33 | 28.132 | 4.763 | 2 | 34 | 1620 | 4100 | 54 | 20 | 88 | 1 | 86 | 65 | 75.5 | 14 | 71 | 9 | M6×1P | 8 | 7 | | |
| 32-10K5 | 32 | 10 | 33.4 | 26.91 | 6.35 | 5 | 90 | 5640 | 14480 | 62 | 10 | 77 | 1 | 92 | 74 | 83 | 14 | 77 | 9 | M6×1P | 8 | 7 | | |
| 32-12K5 | 32 | 12 | 33.4 | 26.91 | 6.35 | 5 | 90 | 5620 | 14450 | 62 | 20 | 87 | 1 | 92 | 74 | 83 | 14 | 77 | 9 | M6×1P | 8 | 7 | | |
| 32-16K4 | 32 | 16 | 33.4 | 26.91 | 6.35 | 4 | 73 | 4570 | 11390 | 62 | 20 | 92 | 1 | 92 | 74 | 83 | 14 | 77 | 9 | M6×1P | 8 | 7 | | |
| 32-20K4 | 32 | 20 | 33.4 | 26.91 | 6.35 | 4 | 70 | 4240 | 10854 | 57 | 20 | 107 | 1 | 87 | 66 | 78 | 14 | 72 | 9 | M6×1P | 8 | 7 | | |
| 36-6K5 | 36 | 6 | 36.8 | 32.744 | 3.969 | 5 | 88 | 3240 | 10632 | 56 | 10 | 51 | 2 | 86 | 65 | 77 | 14 | 71 | 9 | M6×1P | 8 | 7 | | |
| 36-10K5 | 36 | 10 | 37.4 | 30.91 | 6.35 | 5 | 98 | 6010 | 16440 | 66 | 20 | 80 | 2 | 96 | 73 | 84.5 | 14 | 81 | 9 | M8×1P | 10 | 7 | | |
| 36-12K5 | 36 | 12 | 37.4 | 30.91 | 6.35 | 5 | 99 | 5990 | 16420 | 66 | 20 | 87 | 2 | 96 | 73 | 84.5 | 14 | 81 | 9 | M8×1P | 10 | 7 | | |
| 36-16K5 | 36 | 16 | 37.4 | 30.91 | 6.35 | 5 | 100 | 5960 | 16350 | 66 | 20 | 109 | 2 | 96 | 73 | 84.5 | 14 | 81 | 9 | M8×1P | 10 | 7 | | |
| 36-20K4 | 36 | 20 | 37.4 | 30.91 | 6.35 | 4 | 80 | 4840 | 12880 | 65 | 20 | 108 | 2 | 95 | 72 | 83.5 | 14 | 80 | 9 | M8×1P | 10 | 7 | | |
| 36-20K4 | 36 | 20 | 37.4 | 30.91 | 6.35 | 4 | 79 | 4840 | 12880 | 61 | 20 | 108 | 2 | 91 | 68 | 79.5 | 14 | 76 | 9 | M8×1P | 10 | 7 | | |
| 36-36K2 | 36 | 36 | 37.4 | 30.91 | 6.35 | 2 | 39 | 2540 | 6240 | 61 | 20 | 95 | 2 | 91 | 68 | 79.5 | 14 | 76 | 9 | M8×1P | 10 | 7 | | |
| 38-8K5 | 38 | 8 | 39 | 34.132 | 4.763 | 5 | 96 | 4190 | 13110 | 61 | 20 | 64 | 2 | 91 | 68 | 79.5 | 14 | 76 | 9 | M8×1P | 10 | 7 | | |
| 38-10K4 | 38 | 10 | 39.4 | 32.91 | 6.35 | 4 | 81 | 5050 | 13790 | 63 | 20 | 70 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | |
| 38-15K4 | 38 | 15 | 39.4 | 32.91 | 6.35 | 4 | 83 | 5020 | 13740 | 63 | 20 | 88 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | |
| 38-16K5 | 38 | 16 | 39.4 | 32.91 | 6.35 | 5 | 104 | 6140 | 17340 | 63 | 20 | 108 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | |
| 38-20K4 | 38 | 20 | 39.4 | 32.91 | 6.35 | 4 | 83 | 4990 | 13660 | 63 | 25 | 108 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | |
| 38-25K4 | 38 | 25 | 39.4 | 32.91 | 6.35 | 4 | 83 | 4940 | 13560 | 63 | 25 | 127 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | |
| 38-40K2 | 38 | 40 | 39.4 | 32.91 | 6.35 | 2 | 40 | 2590 | 6560 | 63 | 25 | 103 | 2 | 93 | 70 | 81.5 | | | | | | | | |

FSC Type ◀ Standard Product



| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | | | Oil Hole | | | Double starts | Incomplete Thread | | |
|---------|--------------|------|------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|----|-----|--------|------------|------------|------------|----|----------|------|-------|---------------|-------------------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L1 | L2 | TYPE | Form A(D6) | Form B(L8) | Form C(L9) | L7 | D4 | D5 | M | | | L10 | L11 |
| 40-5K5 | 40 | 5 | 40.6 | 37.324 | 3.175 | 5 | 85 | 2470 | 9490 | 63 | 20 | 45 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | |
| 40-6K5 | 40 | 6 | 40.8 | 36.744 | 3.969 | 5 | 95 | 3370 | 11780 | 63 | 20 | 52 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | |
| 40-8K5 | 40 | 8 | 41.1 | 36.132 | 4.763 | 5 | 101 | 4360 | 14200 | 63 | 20 | 68 | 2 | 93 | 70 | 81.5 | 14 | 78 | 9 | M8×1P | 10 | 7 | | ● |
| 40-10K5 | 40 | 10 | 41 | 36.132 | 4.763 | 5 | 102 | 4350 | 14180 | 61 | 20 | 80 | 2 | 91 | 68 | 79.5 | 14 | 76 | 9 | M8×1P | 10 | 7 | | ● |
| 40-20K4 | 40 | 20 | 41 | 36.132 | 4.763 | 4 | 84 | 3520 | 11130 | 61 | 20 | 110 | 2 | 91 | 68 | 79.5 | 14 | 76 | 9 | M8×1P | 10 | 7 | | ● |
| 40-16K5 | 40 | 16 | 41.2 | 35.522 | 5.556 | 5 | 107 | 5170 | 15510 | 68 | 20 | 108 | 2 | 98 | 75 | 86.5 | 14 | 83 | 9 | M8×1P | 10 | 7 | | ● |
| 40-10K5 | 40 | 10 | 41.4 | 34.91 | 6.35 | 5 | 106 | 6340 | 18400 | 70 | 20 | 83 | 2 | 100 | 75 | 87.5 | 14 | 85 | 9 | M8×1P | 10 | 7 | | ● |
| 40-12K5 | 40 | 12 | 41.4 | 34.91 | 6.35 | 5 | 108 | 6330 | 18380 | 70 | 20 | 86 | 2 | 100 | 75 | 87.5 | 14 | 85 | 9 | M8×1P | 10 | 7 | | ● |
| 40-16K5 | 40 | 16 | 41.4 | 34.91 | 6.35 | 5 | 109 | 6300 | 18320 | 70 | 20 | 108 | 2 | 100 | 75 | 87.5 | 14 | 85 | 9 | M8×1P | 10 | 7 | | ● |
| 40-20K4 | 40 | 20 | 41.4 | 34.91 | 6.35 | 4 | 87 | 5130 | 14440 | 70 | 20 | 110 | 2 | 100 | 75 | 87.5 | 14 | 85 | 9 | M8×1P | 10 | 7 | ● | ● |
| 40-30K3 | 40 | 30 | 41.4 | 34.91 | 6.35 | 3 | 67 | 4000 | 11010 | 70 | 20 | 117 | 2 | 100 | 75 | 87.5 | 14 | 85 | 9 | M8×1P | 10 | 7 | ● | ● |
| 40-25K4 | 40 | 25 | 41.4 | 34.91 | 6.35 | 4 | 86 | 5080 | 14350 | 65 | 25 | 127 | 2 | 95 | 72 | 83.5 | 14 | 80 | 9 | M8×1P | 10 | 7 | ● | ● |
| 40-40K2 | 40 | 40 | 41.4 | 34.91 | 6.35 | 2 | 42 | 2660 | 6940 | 65 | 25 | 101 | 2 | 95 | 72 | 83.5 | 14 | 80 | 9 | M8×1P | 10 | 7 | ● | ● |
| 40-12K5 | 40 | 12 | 41.6 | 34.299 | 7.144 | 5 | 110 | 7430 | 20790 | 75 | 20 | 90 | 2 | 110 | 85 | 97.5 | 14 | 93 | 9 | M8×1P | 10 | 7 | | ● |
| 40-16K5 | 40 | 16 | 41.6 | 34.299 | 7.144 | 5 | 112 | 7400 | 20720 | 75 | 20 | 109 | 2 | 110 | 85 | 97.5 | 14 | 93 | 9 | M8×1P | 10 | 7 | | ● |
| 45-8K5 | 45 | 8 | 46 | 41.132 | 4.763 | 5 | 109 | 4550 | 15860 | 70 | 20 | 66 | 2 | 105 | 80 | 92.5 | 16 | 90 | 11 | M8×1P | 10 | 8 | | ● |
| 45-10K5 | 45 | 10 | 46.4 | 39.91 | 6.35 | 5 | 118 | 6810 | 21320 | 75 | 20 | 78 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | | ● |
| 45-12K5 | 45 | 12 | 46.4 | 39.91 | 6.35 | 5 | 119 | 6800 | 21290 | 75 | 20 | 89 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | | ● |
| 45-16K5 | 45 | 16 | 46.4 | 39.91 | 6.35 | 5 | 121 | 6780 | 21240 | 75 | 20 | 108 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | | ● |
| 45-20K4 | 45 | 20 | 46.4 | 39.91 | 6.35 | 4 | 98 | 5520 | 16760 | 75 | 25 | 108 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | ● | ● |
| 45-25K4 | 45 | 25 | 46.4 | 39.91 | 6.35 | 4 | 98 | 5480 | 16670 | 75 | 25 | 129 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | ● | ● |
| 45-40K3 | 45 | 40 | 46.4 | 39.91 | 6.35 | 3 | 71 | 4100 | 12020 | 75 | 25 | 145 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | ● | ● |
| 45-12K5 | 45 | 12 | 46.6 | 39.299 | 7.144 | 5 | 119 | 7830 | 23290 | 80 | 20 | 88 | 2 | 117 | 92 | 104.5 | 16 | 100 | 11 | M8×1P | 10 | 8 | | ● |
| 45-16K5 | 45 | 16 | 46.6 | 39.299 | 7.144 | 5 | 120 | 7810 | 23230 | 80 | 20 | 119 | 2 | 117 | 92 | 104.5 | 16 | 100 | 11 | M8×1P | 10 | 8 | | ● |
| 45-20K4 | 45 | 20 | 46.6 | 39.299 | 7.144 | 4 | 97 | 6360 | 18330 | 80 | 25 | 113 | 2 | 117 | 92 | 104.5 | 16 | 100 | 11 | M8×1P | 10 | 8 | | ● |
| 50-5K5 | 50 | 5 | 50.6 | 47.324 | 3.175 | 5 | 95 | 2700 | 11940 | 70 | 20 | 45 | 2 | 100 | 75 | 87.5 | 16 | 85 | 11 | M8×1P | 10 | 8 | | ● |
| 50-8K5 | 50 | 8 | 51 | 46.132 | 4.763 | 5 | 116 | 4730 | 17530 | 75 | 20 | 74 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | | ● |
| 50-10K5 | 50 | 10 | 51.4 | 44.91 | 6.35 | 5 | 125 | 7050 | 23300 | 82 | 25 | 80 | 2 | 118 | 92 | 105 | 16 | 100 | 11 | M8×1P | 10 | 8 | | ● |
| 50-12K5 | 50 | 12 | 51.4 | 44.91 | 6.35 | 5 | 127 | 7040 | 23280 | 82 | 25 | 90 | 2 | 118 | 92 | 105 | 16 | 100 | 11 | M8×1P | 10 | 8 | | ● |
| 50-15K5 | 50 | 15 | 51.4 | 44.91 | 6.35 | 5 | 129 | 7030 | 23250 | 82 | 25 | 104 | 2 | 118 | 92 | 105 | 16 | 100 | 11 | M8×1P | 10 | 8 | | ● |
| 50-16K5 | 50 | 16 | 51.4 | 44.91 | 6.35 | 5 | 129 | 7020 | 23230 | 82 | 25 | 109 | 2 | 118 | 92 | 105 | 16 | 100 | 11 | M8×1P | 10 | 8 | | ● |
| 50-20K4 | 50 | 20 | 51.4 | 44.91 | 6.35 | 4 | 104 | 5720 | 18340 | 82 | 25 | 106 | 2 | 118 | 92 | 105 | 16 | 100 | 11 | M8×1P | 10 | 8 | ● | ● |
| 50-25K4 | 50 | 25 | 51.4 | 44.91 | 6.35 | 4 | 104 | 5690 | 18260 | 75 | 25 | 129 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | ● | ● |
| 50-30K4 | 50 | 30 | 51.4 | 44.91 | 6.35 | 4 | 104 | 5650 | 18170 | 75 | 25 | 147 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | ● | ● |
| 50-35K3 | 50 | 35 | 51.4 | 44.91 | 6.35 | 3 | 80 | 4430 | 13840 | 75 | 25 | 133 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | ● | ● |
| 50-40K3 | 50 | 40 | 51.4 | 44.91 | 6.35 | 3 | 79 | 4390 | 13750 | 75 | 25 | 145 | 2 | 110 | 85 | 97.5 | 16 | 93 | 11 | M8×1P | 10 | 8 | ● | ● |
| 50-30K2 | 50 | 30 | 51.6 | 44.299 | 7.144 | 2 | 53 | 3560 | 9960 | 82 | 25 | 92 | 2 | 118 | 92 | 105 | 16 | 100 | 11 | M8×1P | 10 | 8 | ● | ● |
| 50-12K5 | 50 | 12 | 51.8 | 43.688 | 7.938 | 5 | 130 | 9480 | 28776 | 85 | 25 | 97 | 2 | 121 | 95 | 108 | 16 | 103 | 11 | M8×1P | 10 | 8 | | ● |
| 50-16K5 | 50 | 16 | 51.8 | 43.688 | 7.938 | 5 | 132 | 9450 | 28710 | 85 | 25 | 112 | 2 | 121 | 95 | 108 | 16 | 103 | 11 | M8×1P | 10 | 8 | | ● |
| 50-20K5 | 50 | 20 | 51.8 | 43.688 | 7.938 | 5 | 134 | 9420 | 28630 | 85 | 25 | 138 | 2 | 121 | 95 | 108 | 16 | 103 | 11 | M8×1P | 10 | 8 | | ● |
| 50-50K2 | 50 | 50 | 51.8 | 43.688 | 7.938 | 2 | 52 | 3980 | 10860 | 85 | 25 | 124 | 2 | 121 | 95 | 108 | 16 | 103 | 11 | M8×1P | 10 | 8 | | ● |
| 50-20K4 | 50 | 20 | 52.2 | 42.466 | 9.525 | 4 | 113 | 9870 | 27420 | 86 | 25 | 120 | 2 | 121 | 95 | 108 | 16 | 103 | 11 | M8×1P | 10 | 8 | | ● |
| 55-16K5 | 55 | 16 | 56.4 | 49.91 | 6.35 | 5 | 139 | 7420 | 26157 | 82 | 25 | 104 | 2 | 118 | 92 | 105 | 20 | 100 | 13.5 | M8×1P | 10 | 10 | | ● |
| 63-10K5 | 63 | 10 | 64.4 | 57.91 | 6.35 | 5 | 144 | 7720 | 29190 | 95 | 25 | 84 | 2 | 135 | 100 | 117.5 | 20 | 115 | 13.5 | M8×1P | 10 | 10 | | ● |
| 63-12K5 | 63 | 12 | 64.4 | 57.91 | 6.35 | 5 | 147 | 7720 | 29180 | 95 | 25 | 94 | 2 | 135 | 100 | 117.5 | 20 | 115 | 13.5 | M8×1P | 10 | 10 | | ● |
| 63-20K5 | 63 | 20 | 64.4 | 57.91 | 6.35 | 5 | 157 | 7850 | 30020 | 95 | 25 | 132 | 2 | 135 | 100 | 117.5 | 20 | 115 | 13.5 | M8×1P | 10 | 10 | | ● |
| 63-40K2 | 63 | 40 | 64.4 | 57.91 | 6.35 | 2 | 62 | 3310 | 11100 | 95 | 25 | 110 | 2 | 135 | 100 | 117.5 | 20 | 115 | 13.5 | M8×1P | 10 | 10 | ● | ● |
| 63-12K5 | 63 | 12 | 64.8 | 56.688 | 7.938 | 5 | 152 | 10520 | 36440 | 98 | 25 | 94 | 2 | 138 | 103 | 120.5 | 20 | 118 | 13.5 | M8×1P | 10 | 10 | | ● |
| 63-16K4 | 63 | 16 | 65.2 | 55.466 | 9.525 | 4 | 132 | 11010 | 34520 | 107 | 25 | 100 | 2 | 147 | 112 | 129.5 | 20 | 127 | 13.5 | M8×1P | 10 | 10 | | ● |
| 63-20K5 | 63 | 20 | 65.2 | 55.466 | 9.525 | 5 | 168 | 13430 | 43530 | 107 | 25 | 140 | 2 | 147 | 112 | 129.5 | 20 | 127 | 13.5 | M8×1P | 10 | 10 | | ● |
| 63-25K5 | 63 | 25 | 65.2 | 55.466 | 9.525 | 5 | 166 | 13390 | 43420 | 110 | 25 | 165 | 2 | 150 | 115 | 132.5 | 20 | 130 | 13.5 | M8×1P | 10 | 10 | ● | ● |
| 70-16K4 | 70 | 16 | 72.2 | 62.466 | 9.525 | 4 | 141 | 11470 | 38040 | 115 | 25 | 105 | 2 | 155 | 120 | 137.5 | 25 | 135 | 13.5 | M8×1P | 10 | 12.5 | | ● |
| 70-20K4 | 70 | 20 | 72.2 | 62.466 | 9.525 | 4 | 143 | 11450 | 37990 | 115 | 25 | 122 | 2 | 155 | 120 | 137.5 | 25 | 135 | 13.5 | M8×1P | 10 | 12.5 | | ● |
| 80-10K5 | 80 | 10 | 81.4 | 74.91 | 6.35 | 5 | 166 | 8620 | 37980 | 110 | 25 | 80 | 2 | 150 | 115 | 132.5 | 25 | 130 | 13.5 | M8×1P | 10 | 12.5 | | ● |
| 80-12K5 | 80 | 12 | 81.8 | 73.688 | 7.938 | 5 | 177 | 11740 | 47130 | 115 | 25 | 102 | 2 | 155 | 120 | 137.5 | 25 | 135 | 13.5 | M8×1P | 10 | 12.5 | | ● |
| 80-16K4 | 80 | 16 | 82.2 | 72.466 | 9.525 | 4 | 155 | 12410 | 44960 | 125 | 25 | 105 | 2 | 170 | 135 | 152.5 | 25 | 150 | 13.5 | M8×1P | 10 | 12.5 | | ● |
| 80-20K4 | 80 | 20 | 82.2 | 72.466 | 9.525 | 4 | 160 | 12400 | 44910 | 120 | 25 | 122 | 2 | 165 | 130 | 147.5 | 25 | 145 | 13.5 | M8×1P | 10 | 12.5 | | ● |
| 80-25K4 | 80 | 25 | 82.2 | 72.466 | 9.525 | 4 | 159 | 12370 | 44840 | 120 | 25 | 145 | 2 | 165 | 130 | 147.5 | 25 | 145 | 13.5 | M8×1P | 10 | 12.5 | | ● |
| 80-30K4 | 80 | 30 | 82.2 | 72.466 | 9.525 | 4 | 1 | | | | | | | | | | | | | | | | | |

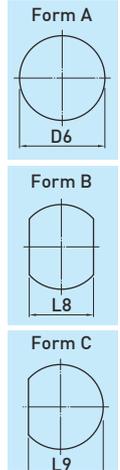
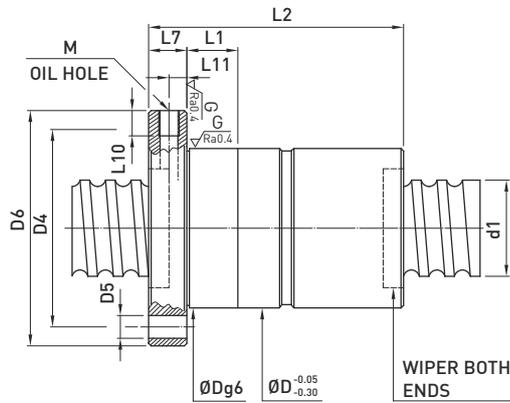
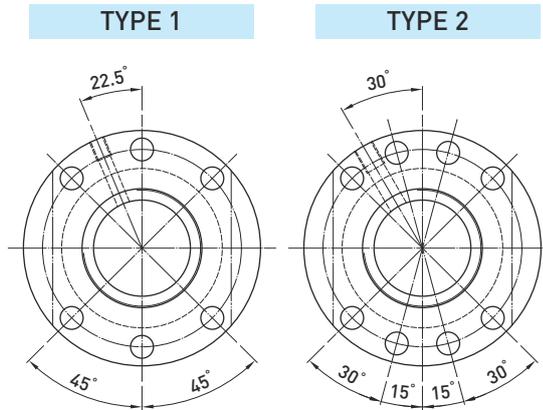
FDC Type ◀ Standard Product



| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Cokgf) | Nut | | | Flange | | | Oil Hole | | | Double starts | Incomplete Thread | |
|-----------|--------------|------|------|--------|-----------|----------|----------------------|---------------------|--------------------|-----|-----|-----|--------|------------|------------|------------|----|----|---------------|-------------------|----|
| | Nominal Dia. | Lead | | | | | | | | D | L1 | L2 | TYPE | Form A(D6) | Form B(L8) | Form C(L9) | L7 | D4 | | | D5 |
| 14-10K3 | 14 | 10 | 14.6 | 10.724 | 3.175 | 3 | 31 | 920 | 1790 | 10 | 96 | | | | | | | | | | |
| 15-10K3 | | 10 | | | | 3 | 34 | 930 | 1970 | 28 | 10 | 94 | | | | | | | | | |
| 15-16K2 | | 16 | 16 | 12.869 | 3 | 2 | 21 | 610 | 1230 | 10 | 94 | | | | | | | | | | |
| 15-10K3 | | 10 | | | | 3 | 33 | 960 | 1930 | 10 | 92 | | | | | | | | | | |
| 15-20K2 | | 20 | 15.6 | 12.324 | 3.175 | 2 | 20 | 630 | 1256 | 10 | 104 | | | | | | | | | | |
| 16-16K2 | | 16 | 16.4 | 13.124 | 3.175 | 2 | 23 | 680 | 1385 | 34 | 10 | 98 | | | | | | | | | |
| 20-10K4 | | 10 | 21 | 17.868 | 3 | 4 | 57 | 1390 | 3560 | 10 | 114 | | | | | | | | | | |
| 20-5K4 | | 5 | | | | 4 | 55 | 1490 | 3640 | 10 | 84 | | | | | | | | | | |
| 20-10K3 | | 10 | 20.6 | 17.324 | 3.175 | 3 | 42 | 1130 | 2660 | 36 | 10 | 98 | | | | | | | | | |
| 20-20K2 | | 20 | | | | 2 | 27 | 760 | 1730 | 10 | 118 | | | | | | | | | | |
| 20-6K5 | | 6 | 20.8 | 16.744 | 3.969 | 5 | 77 | 2420 | 5660 | 42 | 10 | 102 | | | | | | | | | |
| 20-8K5 | | 8 | 21 | 16.132 | 4.763 | 5 | 77 | 2960 | 6505 | 45 | 10 | 132 | | | | | | | | | |
| 25-5K4 | | 5 | | | | 4 | 65 | 1650 | 4612 | 10 | 90 | | | | | | | | | | |
| 25-10K3 | | 10 | | | | 3 | 50 | 1260 | 3370 | 10 | 104 | | | | | | | | | | |
| 25-15K5 | | 15 | 25.6 | 22.324 | 3.175 | 5 | 83 | 1980 | 5730 | 40 | 10 | 184 | | | | | | | | | |
| 25-20K3 | | 20 | | | | 3 | 51 | 1260 | 3436 | 10 | 164 | | | | | | | | | | |
| 25-25K2 | | 25 | | | | 2 | 32 | 840 | 2170 | 10 | 142 | | | | | | | | | | |
| 25-6K5 | | 6 | | | | 5 | 91 | 2720 | 7192 | 45 | 10 | 104 | | | | | | | | | |
| 25-8K5 | | 8 | | | | 5 | 92 | 2710 | 7170 | 48 | 10 | 128 | | | | | | | | | |
| 25-10K4 | | 10 | 25.8 | 21.744 | 3.969 | 4 | 74 | 2210 | 5660 | 10 | 124 | | | | | | | | | | |
| 25-12K4 | | 12 | | | | 4 | 74 | 2200 | 5640 | 45 | 10 | 138 | | | | | | | | | |
| 25-16K3 | | 16 | | | | 3 | 55 | 1670 | 4127 | 10 | 146 | | | | | | | | | | |
| 25-20K3 | | 20 | | | | 3 | 55 | 1710 | 4290 | 10 | 164 | | | | | | | | | | |
| 25-8K5 | | 8 | 26 | 21.132 | 4.763 | 5 | 96 | 3480 | 8683 | 50 | 10 | 132 | | | | | | | | | |
| 28-6K5 | | 6 | 28.8 | 24.744 | 3.969 | 5 | 93 | 2840 | 7966 | 10 | 102 | | | | | | | | | | |
| 28-8K5 | | 8 | | | | 5 | 104 | 3690 | 9780 | 10 | 128 | | | | | | | | | | |
| 28-10K5 | | 10 | 29 | 24.132 | 4.763 | 5 | 105 | 3680 | 9760 | 10 | 148 | | | | | | | | | | |
| 28-16K4 | | 16 | | | | 4 | 84 | 2970 | 7661 | 10 | 188 | | | | | | | | | | |
| 32-5K4 | | 5 | | | | 4 | 77 | 1840 | 5960 | 48 | 10 | 80 | | | | | | | | | |
| 32-5.08K4 | | 5.08 | 32.6 | 29.324 | 3.175 | 4 | 77 | 1840 | 5940 | 10 | 82 | | | | | | | | | | |
| 32-6K5 | | 6 | | | | 5 | 111 | 3090 | 9480 | 56 | 10 | 100 | | | | | | | | | |
| 32-8K5 | | 8 | | | | 5 | 112 | 3080 | 9430 | 53 | 10 | 122 | | | | | | | | | |
| 32-8K5 | | 8 | | | | 5 | 112 | 3080 | 9460 | 10 | 122 | | | | | | | | | | |
| 32-10K5 | | 10 | | | | 5 | 113 | 3080 | 9450 | 10 | 150 | | | | | | | | | | |
| 32-15K4 | | 15 | 32.8 | 28.744 | 3.969 | 4 | 91 | 2500 | 7440 | 10 | 184 | | | | | | | | | | |
| 32-20K3 | | 20 | | | | 3 | 68 | 1900 | 5430 | 50 | 20 | 178 | | | | | | | | | |
| 32-32K2 | | 32 | | | | 2 | 44 | 1280 | 3530 | 20 | 178 | | | | | | | | | | |
| 32-40K2 | | 40 | | | | 2 | 42 | 1240 | 3440 | 20 | 192 | | | | | | | | | | |
| 32-8K5 | | 8 | | | | 5 | 112 | 3860 | 10914 | 55 | 10 | 132 | | | | | | | | | |
| 32-10K5 | | 10 | | | | 5 | 113 | 3850 | 10890 | 56 | 10 | 162 | | | | | | | | | |
| 32-12K5 | | 12 | 33 | 28.132 | 4.763 | 5 | 114 | 3840 | 10870 | 20 | 180 | | | | | | | | | | |
| 32-20K4 | | 20 | | | | 4 | 94 | 3190 | 8914 | 20 | 216 | | | | | | | | | | |
| 32-25K3 | | 25 | | | | 3 | 70 | 2420 | 6500 | 54 | 20 | 198 | | | | | | | | | |
| 32-32K2 | | 32 | | | | 2 | 44 | 1620 | 4100 | 20 | 180 | | | | | | | | | | |
| 32-10K5 | | 10 | | | | 5 | 119 | 5640 | 14480 | 10 | 158 | | | | | | | | | | |
| 32-12K5 | | 12 | | | | 5 | 119 | 5620 | 14450 | 62 | 20 | 178 | | | | | | | | | |
| 32-16K4 | | 16 | 33.4 | 26.91 | 6.35 | 4 | 96 | 4570 | 11390 | 20 | 188 | | | | | | | | | | |
| 32-20K4 | | 20 | | | | 4 | 71 | 4240 | 10854 | 57 | 20 | 218 | | | | | | | | | |
| 36-6K5 | | 6 | 36.8 | 32.744 | 3.969 | 5 | 118 | 3240 | 10632 | 56 | 10 | 106 | | | | | | | | | |
| 36-10K5 | | 10 | | | | 5 | 130 | 6010 | 16440 | 20 | 164 | | | | | | | | | | |
| 36-12K5 | | 12 | | | | 5 | 131 | 5990 | 16420 | 66 | 20 | 178 | | | | | | | | | |
| 36-16K5 | | 16 | | | | 5 | 132 | 5960 | 16350 | 20 | 222 | | | | | | | | | | |
| 36-20K4 | | 20 | 37.4 | 30.91 | 6.35 | 4 | 105 | 4840 | 12880 | 65 | 20 | 220 | | | | | | | | | |
| 36-20K4 | | 20 | | | | 4 | 105 | 4840 | 12880 | 20 | 220 | | | | | | | | | | |
| 36-36K2 | | 36 | | | | 2 | 51 | 2540 | 6240 | 61 | 20 | 194 | | | | | | | | | |
| 38-8K5 | | 8 | 39 | 34.132 | 4.763 | 5 | 127 | 4190 | 13110 | 61 | 20 | 132 | | | | | | | | | |
| 38-10K4 | | 10 | | | | 4 | 107 | 5050 | 13790 | 20 | 144 | | | | | | | | | | |
| 38-15K4 | | 15 | | | | 4 | 109 | 5020 | 13740 | 20 | 180 | | | | | | | | | | |
| 38-16K5 | | 16 | | | | 5 | 137 | 6140 | 17340 | 20 | 220 | | | | | | | | | | |
| 38-20K4 | | 20 | 39.4 | 32.91 | 6.35 | 4 | 110 | 4990 | 13660 | 25 | 220 | | | | | | | | | | |
| 38-25K4 | | 25 | | | | 4 | 109 | 4940 | 13560 | 25 | 258 | | | | | | | | | | |
| 38-40K2 | | 40 | | | | 2 | 53 | 2590 | 6560 | 25 | 210 | | | | | | | | | | |

Note: 1. Rigidity with preload: The axial load is calculated by 10% of dynamic load.
2. Circuits less than K5 also available.

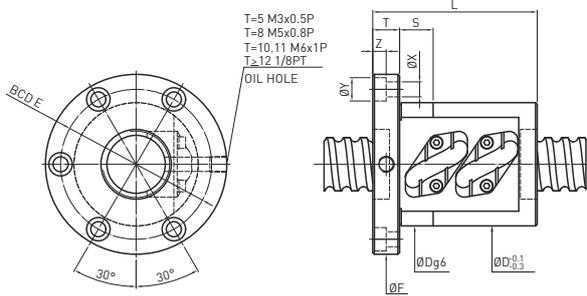
FDC Type ◀ Standard Product



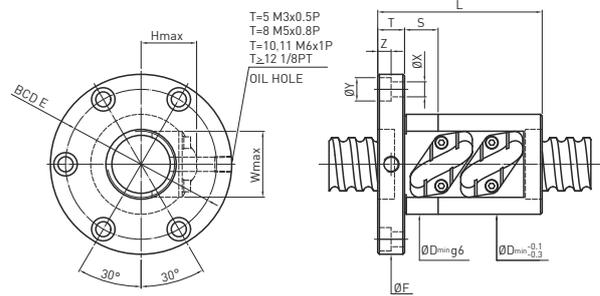
| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | | Oil Hole | | | Double starts | Incomplete Thread | |
|---------|--------------|------|--------|--------|-----------|----------|----------------------|---------------------|---------------------|-------|-----|-----|--------|------------|------------|------------|----------|----|----|---------------|-------------------|---|
| | Nominal Dia. | Lead | | | | | | | | D | L1 | L2 | TYPE | Form A(D6) | Form B(L8) | Form C(L9) | L7 | D4 | D5 | | | M |
| 40-5K5 | 40 | 5 | 40.6 | 37.324 | 3.175 | 5 | 114 | 2470 | 9490 | 20 | 95 | 2 | 93 | 70 | 81.5 | 14 | 85 | 9 | 7 | | | |
| 40-6K5 | | 6 | 40.8 | 36.744 | 3.969 | 5 | 127 | 3370 | 11780 | 63 | 20 | | | | | | | | | 109 | | |
| 40-8K5 | | 8 | | | | 5 | 135 | 4360 | 14200 | | 20 | | | | | | | | | 140 | | |
| 40-10K5 | | 10 | 41 | 36.132 | 4.763 | 5 | 136 | 4350 | 14180 | 61 | 20 | | | | | | | | | 164 | | |
| 40-20K4 | | 20 | | | | 4 | 111 | 3520 | 11130 | | 20 | | | | | | | | | 226 | | |
| 40-16K5 | | 16 | 41.2 | 35.522 | 5.556 | 5 | 141 | 5170 | 15510 | 68 | 20 | | | | | | | | | 220 | | |
| 40-10K5 | | 10 | | | | 5 | 141 | 6340 | 18400 | | 20 | | | | | | | | | 170 | | |
| 40-12K5 | | 12 | | | | 5 | 142 | 6330 | 18380 | | 20 | | | | | | | | | 178 | | |
| 40-16K5 | | 16 | | | | 5 | 143 | 6300 | 18320 | 70 | 20 | | | | | | | | | 221 | | |
| 40-20K4 | | 20 | 41.4 | 34.91 | 6.35 | 4 | 115 | 5130 | 14440 | | 20 | | | | | | | | | 225 | | |
| 40-30K3 | | 30 | | | | 3 | 88 | 4000 | 11010 | | 20 | | | | | | | | | 239 | | |
| 40-25K4 | | 25 | | | | 4 | 114 | 5080 | 14350 | 65 | 25 | | | | | | | | | 259 | | |
| 40-40K2 | 40 | | | | 2 | 56 | 2660 | 6940 | | 25 | 207 | | | | | | | | | | | |
| 40-12K5 | 12 | 41.6 | 34.299 | 7.144 | 5 | 146 | 7430 | 20790 | 75 | 20 | 185 | | | | | | | | | | | |
| 40-16K5 | 16 | | | | 5 | 147 | 7400 | 20720 | | 20 | 223 | | | | | | | | | | | |
| 45-8K5 | 45 | 8 | 46 | 41.132 | 4.763 | 5 | 145 | 4550 | 15860 | 70 | 20 | 137 | | | | | | | | | | |
| 45-10K5 | | 10 | | | | 5 | 156 | 6810 | 21320 | | 20 | 161 | | | | | | | | | | |
| 45-12K5 | | 12 | | | | 5 | 158 | 6800 | 21290 | | 20 | 183 | | | | | | | | | | |
| 45-16K5 | | 16 | 46.4 | 39.91 | 6.35 | 5 | 160 | 6780 | 21240 | | 20 | 221 | | | | | | | | | | |
| 45-20K4 | | 20 | | | | 4 | 129 | 5520 | 16760 | 75 | 25 | 221 | | | | | | | | | | |
| 45-25K4 | | 25 | | | | 4 | 129 | 5480 | 16670 | | 25 | 263 | | | | | | | | | | |
| 45-40K3 | | 40 | | | | 3 | 93 | 4100 | 12020 | | 25 | 295 | | | | | | | | | | |
| 45-12K5 | | 12 | | | | 5 | 157 | 7830 | 23290 | | 20 | 181 | | | | | | | | | | |
| 45-16K5 | | 16 | 46.6 | 39.299 | 7.144 | 5 | 159 | 7810 | 23230 | | 20 | 243 | | | | | | | | | | |
| 45-20K4 | | 20 | | | | 4 | 128 | 6360 | 18330 | 80 | 25 | 230 | | | | | | | | | | |
| 50-5K5 | | 50 | 5 | 50.6 | 47.324 | 3.175 | 5 | 129 | 2700 | 11940 | 70 | 20 | 95 | | | | | | | | | |
| 50-8K5 | | | 8 | 51 | 46.132 | 4.763 | 5 | 154 | 4730 | 17530 | 75 | 20 | 153 | | | | | | | | | |
| 50-10K5 | 10 | | | | | 5 | 166 | 7050 | 23300 | | 25 | 166 | | | | | | | | | | |
| 50-12K5 | 12 | | | | | 5 | 169 | 7040 | 23280 | | 25 | 186 | | | | | | | | | | |
| 50-15K5 | 15 | | | | | 5 | 171 | 7030 | 23250 | 82 | 25 | 214 | | | | | | | | | | |
| 50-16K5 | 16 | | | | | 5 | 171 | 7020 | 23230 | | 25 | 224 | | | | | | | | | | |
| 50-20K4 | 20 | | 51.4 | 44.91 | 6.35 | 4 | 138 | 5720 | 18340 | | 25 | 218 | | | | | | | | | | |
| 50-25K4 | 25 | | | | | 4 | 134 | 5690 | 18260 | | 25 | 263 | | | | | | | | | | |
| 50-30K4 | 30 | | | | | 4 | 136 | 5650 | 18170 | | 25 | 299 | | | | | | | | | | |
| 50-35K3 | 35 | | | | | 3 | 105 | 4430 | 13840 | 75 | 25 | 271 | | | | | | | | | | |
| 50-40K3 | 40 | | | | | 3 | 104 | 4390 | 13750 | | 25 | 295 | | | | | | | | | | |
| 50-30K2 | 30 | | 51.6 | 44.299 | 7.144 | 2 | 70 | 3560 | 9960 | 82 | 25 | 190 | | | | | | | | | | |
| 50-12K5 | 12 | | | | 5 | 173 | 9480 | 28776 | | 25 | 200 | | | | | | | | | | | |
| 50-16K5 | 16 | | | | 5 | 175 | 9450 | 28710 | | 25 | 229 | | | | | | | | | | | |
| 50-20K5 | 20 | 51.8 | 43.688 | 7.938 | 5 | 176 | 9420 | 28630 | | 25 | 281 | | | | | | | | | | | |
| 50-50K2 | 50 | | | | 2 | 69 | 3980 | 10860 | | 25 | 253 | | | | | | | | | | | |
| 50-20K4 | 20 | 52.2 | 42.466 | 9.525 | 4 | 149 | 9870 | 27420 | 86 | 25 | 245 | | | | | | | | | | | |
| 55-16K5 | 55 | 16 | 56.4 | 49.91 | 6.35 | 5 | 185 | 7420 | 26157 | 82 | 25 | 213 | | | | | | | | | | |
| 63-10K5 | | 10 | | | | 5 | 192 | 7720 | 29190 | | 25 | 173 | | | | | | | | | | |
| 63-12K5 | | 12 | | | | 5 | 196 | 7720 | 29180 | | 25 | 194 | | | | | | | | | | |
| 63-20K5 | | 20 | 64.4 | 57.91 | 6.35 | 5 | 208 | 7850 | 30020 | 95 | 25 | 270 | | | | | | | | | | |
| 63-40K2 | | 40 | | | | 2 | 82 | 3310 | 11100 | | 25 | 226 | | | | | | | | | | |
| 63-12K5 | | 12 | 64.8 | 56.688 | 7.938 | 5 | 202 | 10520 | 36440 | 98 | 25 | 194 | | | | | | | | | | |
| 63-16K4 | | 16 | | | | 4 | 175 | 11010 | 34520 | | 25 | 206 | | | | | | | | | | |
| 63-20K5 | | 20 | 65.2 | 55.466 | 9.525 | 5 | 222 | 13430 | 43530 | 107 | 25 | 286 | | | | | | | | | | |
| 63-25K5 | | 25 | | | | 5 | 218 | 13390 | 43420 | 110 | 25 | 336 | | | | | | | | | | |
| 70-16K4 | | 70 | 16 | 72.2 | 62.466 | 9.525 | 4 | 187 | 11470 | 38040 | 115 | 25 | 216 | | | | | | | | | |
| 70-20K4 | | | 20 | | | | 4 | 190 | 11450 | 37990 | | 25 | 250 | | | | | | | | | |
| 80-10K5 | | | 10 | 81.4 | 74.91 | 6.35 | 5 | 223 | 8620 | 37980 | 110 | 25 | 170 | | | | | | | | | |
| 80-12K5 | 12 | | 81.8 | 73.688 | 7.938 | 5 | 238 | 11740 | 47130 | 115 | 25 | 210 | | | | | | | | | | |
| 80-16K4 | 16 | | | | | 4 | 206 | 12410 | 44960 | 125 | 25 | 216 | | | | | | | | | | |
| 80-20K4 | 20 | | | | | 4 | 212 | 12400 | 44910 | | 25 | 250 | | | | | | | | | | |
| 80-25K4 | 25 | | 82.2 | 72.466 | 9.525 | 4 | 211 | 12370 | 44840 | 120 | 25 | 296 | | | | | | | | | | |
| 80-30K4 | 30 | | | | | 4 | 212 | 12340 | 44750 | | 25 | 336 | | | | | | | | | | |

Note: 1. Rigidity with preload: The axial load is calculated by 10% of dynamic load.
2. Circuits less than K5 also available.

FST Type ◀ Standard Product



Re-circulation plate below the nut body

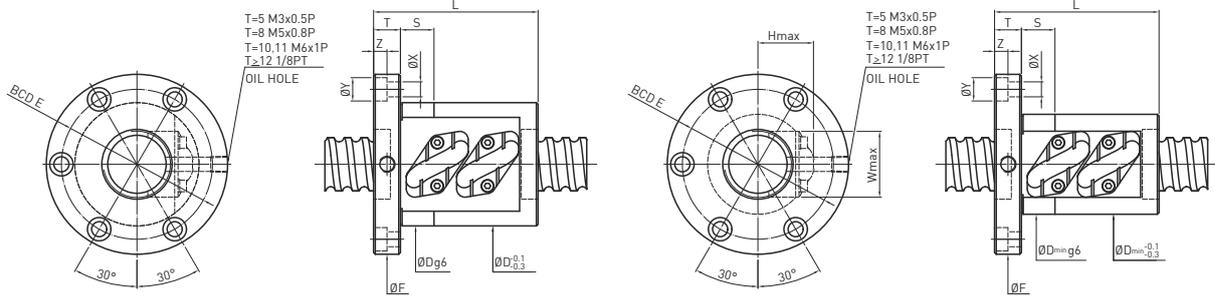


Re-circulation plate above the nut body

| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|--------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|-----|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R8-3A1 | 8 | 3 | 8.22 | 6.156 | 2 | 1.6x1 | 7.9 | 230 | 350 | 21 | 17 | 28 | 36 | 5 | 28 | 14 | 12 | 4.5 | 0 | 0 | 0 |
| R8-5B1 | 8 | 5 | 8.22 | 6.156 | 2 | 2.6x1 | 11.5 | 360 | 600 | 24 | 18 | 37 | 44 | 8 | 34 | 15 | 13 | 4.5 | 8 | 4 | 0 |
| R10-4B1 | 10 | 4 | 9.82 | 7.756 | 2 | 2.6x1 | 14 | 410 | 770 | 24 | 20 | 39 | 46 | 10 | 36 | 16 | 13 | 4.5 | 8 | 4 | 10 |
| R10-5A1 | 10 | 5 | 10.02 | 7.956 | 2 | 1.6x1 | 10.1 | 270 | 470 | 23 | 19 | 30 | 46 | 10 | 36 | 15 | 13 | 4.5 | 8 | 4 | 10 |
| R10-4B1 | 10 | 4 | 10.2 | 7.742 | 2.381 | 2.6x1 | 15.8 | 500 | 870 | 27 | 23 | 41 | 49 | 10 | 37 | 17 | 16 | 4.5 | 8 | 4 | 10 |
| R12-5B1 | 12 | 5 | 12.1 | 9.642 | 2.381 | 2.6x1 | 18.9 | 560 | 1090 | 31 | 24 | 40 | 50 | 10 | 40 | 18 | 18 | 4.5 | 8 | 4 | 12 |
| R12-6B1 | 12 | 6 | 12.1 | 9.642 | 2.381 | 2.6x1 | 18.9 | 560 | 1090 | 29 | 24 | 43 | 50 | 10 | 40 | 20 | 16 | 4.5 | 8 | 4 | 12 |
| R12-10A1 | 12 | 10 | 12.08 | 9.622 | 2.381 | 1.6x1 | 11.5 | 360 | 650 | 30 | 24 | 42 | 50 | 10 | 40 | 17 | 17 | 4.5 | 8 | 4 | 12 |
| R12-10B1 | 12 | 10 | 12.08 | 9.622 | 2.381 | 2.6x1 | 18.4 | 550 | 1070 | 31 | 25 | 50 | 50 | 10 | 40 | 19 | 18 | 4.5 | 8 | 4 | 12 |
| R12-20A1 | 12 | 20 | 12.25 | 9.792 | 2.381 | 1.6x1 | 10.8 | 350 | 670 | 29 | 25 | 65 | 50 | 10 | 40 | 20 | 16 | 4.5 | 8 | 4 | 12 |
| R14-4B1 | 14 | 4 | 14.25 | 11.792 | 2.381 | 2.6x1 | 20.7 | 600 | 1250 | 32 | 26 | 41 | 52 | 10 | 42 | 20 | 17 | 4.5 | 8 | 4 | 12 |
| R15-5B1 | 15 | 5 | 15.6 | 12.324 | 3.175 | 2.6x1 | 23.3 | 920 | 1820 | 35 | 30 | 44 | 58 | 10 | 45 | 23 | 20 | 5.5 | 9.5 | 5.5 | 12 |
| R15-10B1 | 15 | 10 | 15.64 | 12.364 | 3.175 | 2.6x1 | 23.2 | 900 | 1800 | 34 | 30 | 55 | 57 | 11 | 45 | 24 | 19 | 5.5 | 9.5 | 5.5 | 12 |
| R15-20A1 | 15 | 20 | 15.675 | 12.399 | 3.175 | 1.6x1 | 13.9 | 570 | 1110 | 40 | 32 | 64 | 60 | 11 | 47 | 25 | 22 | 5.5 | 9.5 | 5.5 | 12 |
| R15-30A1 | 15 | 30 | 15.6 | 12.324 | 3.175 | 1.6x1 | 13.1 | 560 | 1150 | 41 | 33 | 85 | 62 | 11 | 50 | 27 | 21 | 5.5 | 9.5 | 5.5 | 12 |
| R16-5B1 | 16 | 5 | 16.6 | 12.324 | 3.175 | 2.6x1 | 24.5 | 950 | 1960 | 38 | 31 | 45 | 64 | 12 | 51 | 24 | 20 | 5.5 | 9.5 | 5.5 | 12 |
| R16-5B2 | 16 | 5 | 16.6 | 12.324 | 3.175 | 2.6x2 | 47.7 | 1730 | 3920 | 38 | 31 | 60 | 64 | 12 | 51 | 24 | 20 | 5.5 | 9.5 | 5.5 | 12 |
| R16-10B1 | 16 | 10 | 16.6 | 12.324 | 3.175 | 2.6x1 | 24.6 | 940 | 1930 | 39 | 31 | 60 | 64 | 12 | 51 | 23 | 21 | 5.5 | 9.5 | 5.5 | 12 |
| R20-4B1 | 20 | 4 | 20.25 | 17.792 | 2.381 | 2.6x1 | 27.4 | 720 | 1850 | 40 | 36 | 42 | 68 | 12 | 55 | 26 | 22 | 5.5 | 9.5 | 5.5 | 12 |
| R20-4B2 | 20 | 4 | 20.25 | 17.792 | 2.381 | 2.6x2 | 53.3 | 1310 | 3700 | 40 | 36 | 54 | 68 | 12 | 55 | 26 | 22 | 5.5 | 9.5 | 5.5 | 12 |
| R20-5B1 | 20 | 5 | 20.6 | 17.324 | 3.175 | 2.6x1 | 29.3 | 1070 | 2490 | 42 | 37 | 45 | 68 | 12 | 55 | 26 | 23 | 5.5 | 9.5 | 5.5 | 12 |
| R20-5B2 | 20 | 5 | 20.6 | 17.324 | 3.175 | 2.6x2 | 56.8 | 1950 | 4980 | 42 | 37 | 60 | 68 | 12 | 55 | 26 | 23 | 5.5 | 9.5 | 5.5 | 12 |
| R20-40A1 | 20 | 40 | 20.36 | 17.084 | 3.175 | 1.6x1 | 22.1 | 630 | 1500 | 48 | 41 | 100 | 73 | 12 | 60 | 33 | 24 | 5.5 | 9.5 | 5.5 | 12 |
| R20-10B1 | 20 | 10 | 20.38 | 16.744 | 3.969 | 2.6x1 | 32.7 | 1410 | 3040 | 46 | 40 | 54 | 72 | 12 | 59 | 30 | 25 | 5.5 | 9.5 | 5.5 | 12 |
| R25-4B2 | 25 | 4 | 25.25 | 22.792 | 2.381 | 2.6x2 | 63.2 | 1450 | 4740 | 46 | 42 | 48 | 69 | 11 | 57 | 30 | 25 | 5.5 | 9.5 | 5.5 | 12 |
| R25-5B2 | 25 | 5 | 25.57 | 22.294 | 3.175 | 2.6x2 | 67.4 | 2170 | 6310 | 49 | 44 | 60 | 74 | 12 | 62 | 33 | 25 | 5.5 | 9.5 | 5.5 | 12 |
| R25-10B1 | 25 | 10 | 25.6 | 22.324 | 3.175 | 2.6x1 | 35.8 | 1180 | 3130 | 49 | 44 | 65 | 74 | 12 | 62 | 31 | 26 | 5.5 | 9.5 | 5.5 | 12 |
| R25-12A1 | 25 | 12 | 25.8 | 21.744 | 3.969 | 1.6x1 | 24.8 | 1040 | 2370 | 55 | 47 | 48 | 78 | 11 | 64 | 33 | 29 | 6.6 | 11 | 6.5 | 12 |
| R25-12B1 | 25 | 12 | 25.8 | 21.744 | 3.969 | 2.6x1 | 39.5 | 1590 | 3860 | 53 | 46 | 60 | 78 | 11 | 64 | 33 | 28 | 6.6 | 11 | 6.5 | 12 |
| R25-12C1 | 25 | 12 | 25.8 | 21.744 | 3.969 | 3.6x1 | 53.9 | 2100 | 5350 | 53 | 46 | 72 | 78 | 11 | 64 | 33 | 28 | 6.6 | 11 | 6.5 | 12 |
| R25-25A1 | 25 | 25 | 26.03 | 21.974 | 3.969 | 1.6x1 | 24.6 | 1030 | 2410 | 55 | 50 | 78 | 82 | 12 | 69 | 37 | 29 | 6.6 | 11 | 6.5 | 12 |
| R25-8B1 | 25 | 8 | 26 | 21.132 | 4.763 | 2.6x1 | 40.6 | 2050 | 4700 | 57 | 48 | 56 | 86 | 15 | 73 | 34 | 30 | 6.6 | 11 | 6.5 | 12 |
| R25-8B2 | 25 | 8 | 26 | 21.132 | 4.763 | 2.6x2 | 78.7 | 3730 | 9400 | 57 | 48 | 80 | 86 | 15 | 73 | 34 | 30 | 6.6 | 11 | 6.5 | 12 |
| R25-10A2 | 25 | 10 | 26.1 | 21.232 | 4.763 | 1.6x2 | 49.7 | 2440 | 5770 | 55 | 49 | 75 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 12 |
| R25-10B1 | 25 | 10 | 26.1 | 21.232 | 4.763 | 2.6x1 | 40.7 | 2040 | 4690 | 55 | 49 | 65 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 12 |
| R25-10B2 | 25 | 10 | 26.1 | 21.232 | 4.763 | 2.6x2 | 79.7 | 3710 | 9380 | 55 | 49 | 97 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 12 |
| R25-16B1 | 25 | 16 | 26 | 21.132 | 4.763 | 2.6x1 | 40.6 | 2010 | 4630 | 57 | 49 | 83 | 86 | 15 | 73 | 36 | 29 | 6.6 | 11 | 6.5 | 12 |
| R25-20B1 | 25 | 20 | 26 | 21.132 | 4.763 | 2.6x1 | 40 | 1990 | 4590 | 55 | 48 | 95 | 86 | 15 | 73 | 35 | 29 | 6.6 | 11 | 6.5 | 12 |
| R28-5B1 | 28 | 5 | 28.76 | 25.484 | 3.175 | 2.6x1 | 37.7 | 1250 | 3550 | 54 | 48 | 45 | 85 | 12 | 69 | 34 | 28 | 6.6 | 11 | 6.5 | 12 |
| R28-5B2 | 28 | 5 | 28.76 | 25.484 | 3.175 | 2.6x2 | 73.3 | 2280 | 7100 | 54 | 48 | 60 | 85 | 12 | 69 | 34 | 28 | 6.6 | 11 | 6.5 | 12 |
| R28-6B1 | 28 | 6 | 28.6 | 25.324 | 3.175 | 2.6x1 | 38.3 | 1250 | 3550 | 55 | 47 | 48 | 85 | 12 | 69 | 34 | 27 | 6.6 | 11 | 6.5 | 12 |
| R28-6B2 | 28 | 6 | 28.6 | 25.324 | 3.175 | 2.6x2 | 74.4 | 2280 | 7100 | 55 | 47 | 63 | 85 | 12 | 69 | 34 | 27 | 6.6 | 11 | 6.5 | 12 |
| R28-8B1 | 28 | 8 | 29 | 24.132 | 4.763 | 2.6x1 | 44.2 | 2170 | 5300 | 58 | 52 | 60 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 12 |
| R28-8B2 | 28 | 8 | 29 | 24.132 | 4.763 | 2.6x2 | 85.8 | 3950 | 10600 | 58 | 52 | 83 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 12 |
| R28-8C1 | 28 | 8 | 29 | 24.132 | 4.763 | 3.6x1 | 60.3 | 2880 | 7340 | 58 | 52 | 65 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 12 |
| R28-8C2 | 28 | 8 | 29 | 24.132 | 4.763 | 3.6x2 | 117.1 | 5230 | 14680 | 58 | 52 | 97 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 12 |
| R28-10B1 | 28 | 10 | 29 | 24.132 | 4.763 | 2.6x1 | 44.7 | 2170 | 5290 | 60 | 53 | 64 | 88 | 12 | 75 | 39 | 32 | 6.6 | 11 | 6.5 | 12 |
| R28-10B2 | 28 | 10 | 29 | 24.132 | 4.763 | 2.6x2 | 86.7 | 3940 | 10580 | 60 | 53 | 94 | 88 | 12 | 75 | 39 | 32 | 6.6 | 11 | 6.5 | 12 |

Note: Rigidity without preload: The axial load is calculated by 30% of dynamic load.

FST Type ◀ Standard Product



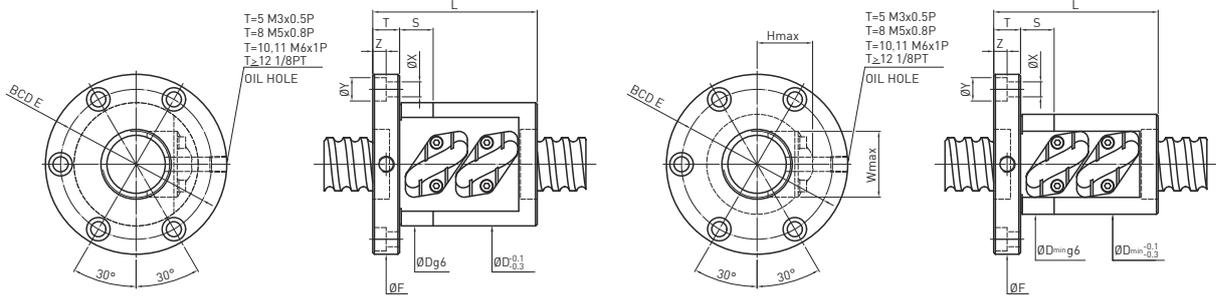
Re-circulation plate below the nut body

Re-circulation plate above the nut body

| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|-------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R28-12C2 | 28 | 12 | 29 | 24.132 | 4.763 | 3.6x2 | 118.7 | 5200 | 14610 | 60 | 52 | 125 | 86 | 12 | 73 | 37 | 32 | 6.6 | 11 | 6.5 | 12 |
| R28-16B2 | 28 | 16 | 29.4 | 22.91 | 6.35 | 2.6x2 | 87.6 | 5520 | 13440 | 66 | 56 | 128 | 94 | 12 | 80 | 39 | 35 | 6.6 | 11 | 6.5 | 12 |
| R32-4B2 | 32 | 4 | 32.25 | 29.792 | 2.381 | 2.6x2 | 74.4 | 1600 | 6080 | 54 | 50 | 55 | 84 | 12 | 71 | 35 | 27 | 6.6 | 11 | 6.5 | 12 |
| R32-5B2 | 32 | 5 | 32.4 | 29.124 | 3.175 | 2.6x2 | 80.3 | 2420 | 8160 | 57 | 52 | 60 | 84 | 12 | 71 | 34 | 29 | 6.6 | 11 | 6.5 | 12 |
| R32-6B2 | 32 | 6 | 32.94 | 28.884 | 3.969 | 2.6x2 | 90.8 | 3310 | 10270 | 60 | 56 | 63 | 88 | 12 | 75 | 39 | 31 | 6.6 | 11 | 6.5 | 12 |
| R32-10B2 | 32 | 10 | 32.62 | 28.564 | 3.969 | 2.6x2 | 93.8 | 3300 | 10230 | 58 | 54 | 87 | 84 | 12 | 71 | 38 | 31 | 6.6 | 11 | 6.5 | 12 |
| R32-8B2 | 32 | 8 | 33.16 | 28.292 | 4.763 | 2.6x2 | 92.3 | 4130 | 11820 | 62 | 58 | 86 | 96 | 16 | 78 | 40 | 33 | 9 | 14 | 8.5 | 15 |
| R32-10B2 | 32 | 10 | 33 | 28.132 | 4.763 | 2.6x2 | 93.3 | 4120 | 11800 | 60 | 57 | 95 | 96 | 16 | 78 | 39 | 33 | 9 | 14 | 8.5 | 15 |
| R32-12B2 | 32 | 12 | 33 | 28.132 | 4.763 | 2.6x2 | 93.9 | 4110 | 11770 | 61 | 57 | 105 | 96 | 16 | 78 | 39 | 33 | 9 | 14 | 8.5 | 15 |
| R32-20B1 | 32 | 20 | 33 | 28.132 | 4.763 | 2.6x1 | 50.3 | 2300 | 6090 | 64 | 57 | 100 | 102 | 16 | 84 | 40 | 34 | 9 | 14 | 8.5 | 15 |
| R32-25B1 | 32 | 25 | 33.1 | 28.232 | 4.763 | 2.6x1 | 49.6 | 2270 | 6030 | 63 | 58 | 110 | 102 | 16 | 84 | 41 | 32 | 9 | 14 | 8.5 | 15 |
| R32-10A2 | 32 | 10 | 33.4 | 26.91 | 6.35 | 1.6x2 | 61.3 | 3980 | 9650 | 68 | 62 | 80 | 102 | 16 | 84 | 43 | 36 | 9 | 14 | 8.5 | 15 |
| R32-10B2 | 32 | 10 | 33.4 | 26.91 | 6.35 | 2.6x2 | 97.6 | 6040 | 15690 | 70 | 61 | 98 | 108 | 16 | 90 | 43 | 36 | 9 | 14 | 8.5 | 15 |
| R32-10C1 | 32 | 10 | 33.4 | 26.91 | 6.35 | 3.6x1 | 68.7 | 4400 | 10860 | 70 | 60 | 78 | 108 | 16 | 90 | 42 | 37 | 9 | 14 | 8.5 | 15 |
| R32-12A2 | 32 | 12 | 33.4 | 26.91 | 6.35 | 1.6x2 | 61.7 | 3970 | 9630 | 68 | 60 | 97 | 108 | 18 | 90 | 42 | 35 | 9 | 14 | 8.5 | 15 |
| R32-12B2 | 32 | 12 | 33.4 | 26.91 | 6.35 | 2.6x2 | 97.9 | 6020 | 15660 | 66 | 60 | 110 | 108 | 18 | 90 | 42 | 35 | 9 | 14 | 8.5 | 15 |
| R32-12C1 | 32 | 12 | 33.4 | 26.91 | 6.35 | 3.6x1 | 69 | 4390 | 10840 | 69 | 61 | 98 | 108 | 18 | 90 | 43 | 36 | 9 | 14 | 8.5 | 15 |
| R32-16B1 | 32 | 16 | 33.4 | 26.91 | 6.35 | 2.6x1 | 50.7 | 3290 | 7790 | 71 | 61 | 94 | 108 | 16 | 90 | 44 | 37 | 9 | 14 | 8.5 | 15 |
| R32-16B2 | 32 | 16 | 33.4 | 26.91 | 6.35 | 2.6x2 | 98.4 | 5980 | 15580 | 71 | 61 | 130 | 108 | 16 | 90 | 44 | 37 | 9 | 14 | 8.5 | 15 |
| R32-16C1 | 32 | 16 | 33.4 | 26.91 | 6.35 | 3.6x1 | 69.2 | 4360 | 10790 | 71 | 61 | 100 | 108 | 16 | 90 | 44 | 37 | 9 | 14 | 8.5 | 15 |
| R32-20B1 | 32 | 20 | 33.4 | 26.91 | 6.35 | 2.6x1 | 50.4 | 3270 | 7740 | 68 | 60 | 98 | 108 | 16 | 90 | 42 | 36 | 9 | 14 | 8.5 | 15 |
| R32-12B2 | 32 | 12 | 33.6 | 26.299 | 7.144 | 2.6x2 | 97.9 | 6900 | 17180 | 74 | 64 | 115 | 108 | 16 | 90 | 44 | 39 | 9 | 14 | 8.5 | 15 |
| R32-12C1 | 32 | 12 | 33.6 | 26.299 | 7.144 | 3.6x1 | 68.8 | 5020 | 11900 | 74 | 64 | 95 | 108 | 16 | 90 | 44 | 39 | 9 | 14 | 8.5 | 15 |
| R32-15B2 | 32 | 15 | 33.6 | 26.299 | 7.144 | 2.6x2 | 98.1 | 6860 | 17120 | 74 | 65 | 130 | 108 | 16 | 90 | 46 | 39 | 9 | 14 | 8.5 | 15 |
| R32-16B2 | 32 | 16 | 33.6 | 26.299 | 7.144 | 2.6x2 | 98 | 6850 | 17100 | 74 | 65 | 139 | 108 | 16 | 90 | 45 | 39 | 9 | 14 | 8.5 | 15 |
| R36-6B2 | 36 | 6 | 36.8 | 32.744 | 3.969 | 2.6x2 | 98.1 | 3470 | 11510 | 65 | 60 | 68 | 100 | 12 | 82 | 43 | 33 | 6.6 | 11 | 6.5 | 12 |
| R36-10B2 | 36 | 10 | 37.45 | 30.96 | 6.35 | 2.6x2 | 106.9 | 6430 | 17810 | 72 | 65 | 102 | 125 | 18 | 98 | 45 | 38 | 11 | 17.5 | 11 | 15 |
| R36-16A2 | 36 | 16 | 37.4 | 30.91 | 6.35 | 1.6x2 | 68.3 | 4210 | 10900 | 74 | 66 | 105 | 120 | 18 | 98 | 47 | 38 | 11 | 17.5 | 11 | 15 |
| R36-16B2 | 36 | 16 | 37.4 | 30.91 | 6.35 | 2.6x2 | 108.6 | 6390 | 17720 | 74 | 66 | 140 | 120 | 18 | 98 | 47 | 38 | 11 | 17.5 | 11 | 15 |
| R36-20B1 | 36 | 20 | 37.4 | 30.91 | 6.35 | 2.6x1 | 55.9 | 3490 | 8810 | 76 | 66 | 100 | 120 | 18 | 98 | 47 | 39 | 11 | 17.5 | 11 | 15 |
| R40-8A2 | 40 | 8 | 41 | 36.132 | 4.763 | 1.6x2 | 70.3 | 3070 | 9460 | 75 | 70 | 70 | 108 | 16 | 90 | 47 | 38 | 9 | 14 | 8.5 | 15 |
| R40-8B2 | 40 | 8 | 41 | 36.132 | 4.763 | 2.6x2 | 111.9 | 4670 | 15380 | 74 | 72 | 86 | 108 | 16 | 90 | 50 | 38 | 9 | 14 | 8.5 | 15 |
| R40-8C2 | 40 | 8 | 41 | 36.132 | 4.763 | 3.6x2 | 152.9 | 6180 | 21300 | 74 | 70 | 100 | 108 | 16 | 90 | 47 | 38 | 9 | 14 | 8.5 | 15 |
| R40-10B2 | 40 | 10 | 41 | 36.132 | 4.763 | 2.6x2 | 113.3 | 4660 | 15360 | 72 | 66 | 100 | 108 | 16 | 90 | 46 | 37 | 9 | 14 | 8.5 | 15 |
| R40-16B2 | 40 | 16 | 41 | 36.132 | 4.763 | 2.6x2 | 115.5 | 4630 | 15290 | 72 | 69 | 134 | 108 | 16 | 90 | 48 | 37 | 9 | 14 | 8.5 | 15 |
| R40-10B2 | 40 | 10 | 41.4 | 34.91 | 6.35 | 2.6x2 | 116 | 6790 | 19940 | 78 | 74 | 102 | 125 | 18 | 104 | 53 | 41 | 11 | 17.5 | 11 | 15 |
| R40-10C1 | 40 | 10 | 41.4 | 34.91 | 6.35 | 3.6x1 | 81.7 | 4950 | 13800 | 79 | 70 | 82 | 125 | 18 | 104 | 48 | 41 | 11 | 17.5 | 11 | 15 |
| R40-12B2 | 40 | 12 | 41.4 | 34.91 | 6.35 | 2.6x2 | 117.2 | 6780 | 19910 | 78 | 70 | 117 | 128 | 18 | 106 | 48 | 41 | 11 | 17.5 | 11 | 15 |
| R40-12C2 | 40 | 12 | 41.4 | 34.91 | 6.35 | 3.6x2 | 160 | 8970 | 27570 | 78 | 71 | 141 | 128 | 18 | 106 | 50 | 40 | 11 | 17.5 | 11 | 15 |
| R40-16B2 | 40 | 16 | 41.49 | 35 | 6.35 | 2.6x2 | 118.5 | 6750 | 19850 | 81 | 73 | 139 | 128 | 18 | 106 | 48 | 41 | 11 | 17.5 | 11 | 15 |
| R40-20A1 | 40 | 20 | 41.4 | 34.91 | 6.35 | 1.6x1 | 38.4 | 2430 | 6080 | 80 | 72 | 84 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 15 |
| R40-20A2 | 40 | 20 | 41.4 | 34.91 | 6.35 | 1.6x2 | 74.5 | 4420 | 12160 | 80 | 72 | 124 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 15 |
| R40-20B1 | 40 | 20 | 41.4 | 34.91 | 6.35 | 2.6x1 | 61.6 | 3700 | 9880 | 80 | 71 | 104 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 15 |
| R40-20B2 | 40 | 20 | 41.4 | 34.91 | 6.35 | 2.6x2 | 118.5 | 6710 | 19760 | 80 | 71 | 161 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 15 |
| R40-20C1 | 40 | 20 | 41.4 | 34.91 | 6.35 | 3.6x1 | 83.4 | 4890 | 13680 | 80 | 71 | 121 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 15 |
| R40-25A1 | 40 | 25 | 41.4 | 34.91 | 6.35 | 1.6x1 | 38.2 | 2410 | 6040 | 78 | 73 | 90 | 128 | 18 | 106 | 52 | 40 | 11 | 17.5 | 11 | 15 |
| R40-25B1 | 40 | 25 | 41.4 | 34.91 | 6.35 | 2.6x1 | 60.7 | 3670 | 9820 | 78 | 73 | 115 | 128 | 18 | 106 | 52 | 40 | 11 | 17.5 | 11 | 15 |
| R40-10A2 | 40 | 10 | 41.6 | 34.299 | 7.144 | 1.6x2 | 74.6 | 5250 | 13870 | 82 | 73 | 82 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 20 |

Note: Rigidity without preload: The axial load is calculated by 30% of dynamic load.

FST Type ◀ Standard Product



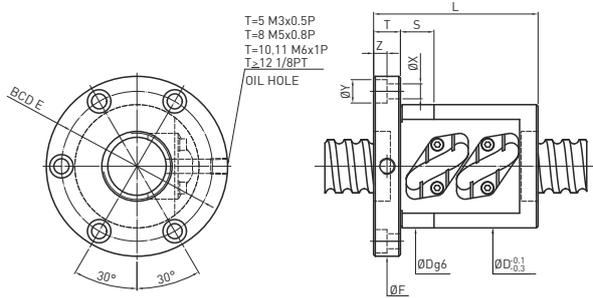
Re-circulation plate below the nut body

Re-circulation plate above the nut body

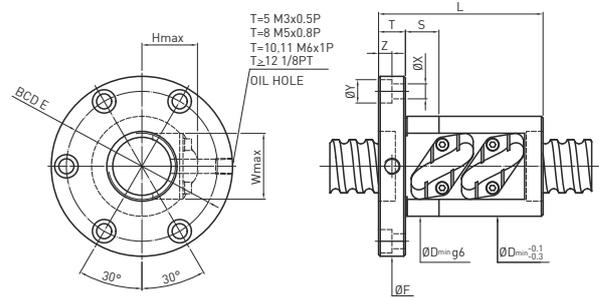
| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/µm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R40-10B2 | 40 | 10 | 41.6 | 34.299 | 7.144 | 2.6x2 | 118.8 | 7980 | 22550 | 82 | 73 | 102 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 20 |
| R40-10C2 | 40 | 10 | 41.6 | 34.299 | 7.144 | 3.6x2 | 162.2 | 10550 | 31220 | 82 | 73 | 122 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 20 |
| R40-12A2 | 40 | 12 | 41.6 | 34.299 | 7.144 | 1.6x2 | 75.3 | 5240 | 13860 | 80 | 73 | 93 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| R40-12B1 | 40 | 12 | 41.6 | 34.299 | 7.144 | 2.6x1 | 61.7 | 4390 | 11260 | 79 | 74 | 81 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| R40-12B2 | 40 | 12 | 41.6 | 34.299 | 7.144 | 2.6x2 | 119.7 | 7960 | 22520 | 79 | 74 | 117 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| R40-12C1 | 40 | 12 | 41.6 | 34.299 | 7.144 | 3.6x1 | 84.2 | 5800 | 15590 | 79 | 74 | 93 | 128 | 18 | 106 | 52 | 41 | 11 | 17.5 | 11 | 20 |
| R40-12C2 | 40 | 12 | 41.6 | 34.299 | 7.144 | 3.6x2 | 163.4 | 10540 | 31180 | 79 | 74 | 141 | 128 | 18 | 106 | 52 | 41 | 11 | 17.5 | 11 | 20 |
| R40-16A2 | 40 | 16 | 41.6 | 34.299 | 7.144 | 1.6x2 | 76.1 | 5220 | 13810 | 81 | 73 | 118 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 20 |
| R40-16B1 | 40 | 16 | 41.6 | 34.299 | 7.144 | 2.6x1 | 62.4 | 4370 | 11220 | 81 | 72 | 102 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 20 |
| R40-16B2 | 40 | 16 | 41.6 | 34.299 | 7.144 | 2.6x2 | 121 | 7930 | 22450 | 81 | 72 | 145 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 20 |
| R40-16C1 | 40 | 16 | 41.6 | 34.299 | 7.144 | 3.6x1 | 85.1 | 5780 | 15540 | 81 | 73 | 118 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 20 |
| R40-20A2 | 40 | 20 | 41.6 | 34.299 | 7.144 | 1.6x2 | 76.2 | 5190 | 13750 | 82 | 74 | 124 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| R40-20B1 | 40 | 20 | 41.6 | 34.299 | 7.144 | 2.6x1 | 62.5 | 4340 | 11170 | 82 | 74 | 104 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| R40-20B2 | 40 | 20 | 41.6 | 34.299 | 7.144 | 2.6x2 | 121.2 | 7890 | 22350 | 82 | 74 | 161 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| R40-20C1 | 40 | 20 | 41.6 | 34.299 | 7.144 | 3.6x1 | 85.3 | 5750 | 15470 | 82 | 74 | 121 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| R40-25A1 | 40 | 25 | 41.6 | 34.299 | 7.144 | 1.6x1 | 39.1 | 2840 | 6830 | 83 | 73 | 90 | 128 | 18 | 106 | 51 | 43 | 11 | 17.5 | 11 | 20 |
| R40-25B1 | 40 | 25 | 41.6 | 34.299 | 7.144 | 2.6x1 | 62.2 | 4310 | 11100 | 83 | 73 | 115 | 128 | 18 | 106 | 51 | 43 | 11 | 17.5 | 11 | 20 |
| R45-5B2 | 45 | 5 | 45.6 | 42.324 | 3.175 | 2.6x2 | 100.6 | 2780 | 11610 | 72 | 68 | 65 | 108 | 16 | 90 | 45 | 37 | 9 | 14 | 8.5 | 15 |
| R45-8B2 | 45 | 8 | 46 | 41.132 | 4.763 | 2.6x2 | 120.4 | 4880 | 17180 | 80 | 75 | 84 | 116 | 16 | 98 | 50 | 39 | 9 | 14 | 8.5 | 15 |
| R45-10B1 | 45 | 10 | 46.4 | 39.91 | 6.35 | 2.6x1 | 66.5 | 4020 | 11540 | 84 | 77 | 74 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 15 |
| R45-10B2 | 45 | 10 | 46.4 | 39.91 | 6.35 | 2.6x2 | 129.1 | 7300 | 23090 | 84 | 77 | 104 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 15 |
| R45-12A2 | 45 | 12 | 46.4 | 39.91 | 6.35 | 1.6x2 | 75.3 | 4800 | 14190 | 85 | 78 | 86 | 132 | 18 | 110 | 53 | 43 | 11 | 17.5 | 11 | 15 |
| R45-16A2 | 45 | 16 | 46.4 | 39.91 | 6.35 | 1.6x2 | 83.2 | 4780 | 14160 | 84 | 78 | 102 | 132 | 18 | 110 | 53 | 43 | 11 | 17.5 | 11 | 15 |
| R45-20B2 | 45 | 20 | 46.4 | 39.91 | 6.35 | 2.6x2 | 132.9 | 7230 | 22930 | 84 | 78 | 162 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 15 |
| R45-20C1 | 45 | 20 | 46.4 | 39.91 | 6.35 | 3.6x1 | 93.5 | 5270 | 15870 | 84 | 78 | 120 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 15 |
| R45-12B2 | 45 | 12 | 46.6 | 39.299 | 7.144 | 2.6x2 | 130 | 8390 | 25230 | 87 | 80 | 115 | 132 | 18 | 110 | 55 | 45 | 11 | 17.5 | 11 | 20 |
| R45-25A1 | 45 | 25 | 46.6 | 39.299 | 7.144 | 1.6x1 | 42.8 | 3000 | 7670 | 90 | 82 | 90 | 132 | 18 | 110 | 58 | 47 | 11 | 17.5 | 11 | 20 |
| R45-25B1 | 45 | 25 | 46.6 | 39.299 | 7.144 | 2.6x1 | 68.1 | 4550 | 12470 | 90 | 82 | 115 | 132 | 18 | 110 | 58 | 47 | 11 | 17.5 | 11 | 20 |
| R45-25C1 | 45 | 25 | 46.6 | 39.299 | 7.144 | 3.6x1 | 93 | 6030 | 17270 | 90 | 82 | 140 | 132 | 18 | 110 | 58 | 47 | 11 | 17.5 | 11 | 20 |
| R45-12B2 | 45 | 12 | 46.8 | 38.688 | 7.938 | 2.6x2 | 131.7 | 9620 | 27850 | 92 | 84 | 123 | 142 | 22 | 117 | 58 | 47 | 13 | 20 | 13 | 20 |
| R45-20B2 | 45 | 20 | 46.8 | 38.688 | 7.938 | 2.6x2 | 133.7 | 9550 | 27690 | 91 | 80 | 175 | 142 | 22 | 117 | 55 | 47 | 13 | 20 | 13 | 20 |
| R45-25B1 | 45 | 25 | 46.8 | 38.688 | 7.938 | 2.6x1 | 68.9 | 5220 | 13770 | 93 | 81 | 124 | 142 | 22 | 117 | 55 | 48 | 13 | 20 | 13 | 20 |
| R50-8B2 | 50 | 8 | 51 | 46.132 | 4.763 | 2.6x2 | 127.8 | 5070 | 18980 | 83 | 80 | 88 | 128 | 18 | 107 | 55 | 41 | 11 | 17.5 | 11 | 15 |
| R50-8B3 | 50 | 8 | 51 | 46.132 | 4.763 | 2.6x3 | 188.5 | 7180 | 28470 | 83 | 80 | 112 | 128 | 18 | 107 | 55 | 41 | 11 | 17.5 | 11 | 15 |
| R50-12B1 | 50 | 12 | 51 | 46.132 | 4.763 | 2.6x1 | 68.4 | 2780 | 9470 | 85 | 82 | 74 | 128 | 18 | 107 | 57 | 43 | 11 | 17.5 | 11 | 15 |
| R50-10B2 | 50 | 10 | 51.4 | 44.91 | 6.35 | 2.6x2 | 136.9 | 7550 | 25240 | 90 | 85 | 104 | 135 | 18 | 114 | 57 | 47 | 11 | 17.5 | 11 | 15 |
| R50-20B2 | 50 | 20 | 51.4 | 44.91 | 6.35 | 2.6x2 | 141.9 | 7490 | 25100 | 90 | 83 | 162 | 135 | 18 | 114 | 55 | 46 | 11 | 17.5 | 11 | 15 |
| R50-25B2 | 50 | 25 | 51.6 | 44.299 | 7.144 | 2.6x2 | 143 | 8670 | 27680 | 95 | 90 | 191 | 140 | 18 | 118 | 64 | 47 | 11 | 17.5 | 11 | 15 |
| R50-12B1 | 50 | 12 | 51.8 | 43.688 | 7.938 | 2.6x1 | 73.4 | 5590 | 15580 | 96 | 90 | 87 | 150 | 22 | 125 | 62 | 50 | 13 | 20 | 13 | 20 |
| R50-12B2 | 50 | 12 | 51.8 | 43.688 | 7.938 | 2.6x2 | 142.5 | 10150 | 31170 | 96 | 90 | 123 | 150 | 22 | 125 | 62 | 50 | 13 | 20 | 13 | 20 |
| R50-16A2 | 50 | 16 | 51.8 | 43.688 | 7.938 | 1.6x2 | 91 | 6670 | 19140 | 96 | 89 | 113 | 150 | 22 | 125 | 61 | 50 | 13 | 20 | 13 | 20 |
| R50-16B2 | 50 | 16 | 51.8 | 43.688 | 7.938 | 2.6x2 | 144.8 | 10120 | 31100 | 97 | 88 | 152 | 150 | 22 | 125 | 61 | 50 | 13 | 20 | 13 | 20 |
| R50-16C2 | 50 | 16 | 51.8 | 43.688 | 7.938 | 3.6x2 | 197.5 | 13390 | 43070 | 96 | 89 | 184 | 150 | 22 | 125 | 61 | 50 | 13 | 20 | 13 | 20 |
| R50-20A2 | 50 | 20 | 51.8 | 43.688 | 7.938 | 1.6x2 | 91.6 | 6640 | 19090 | 98 | 91 | 134 | 150 | 22 | 125 | 63 | 50 | 13 | 20 | 13 | 20 |
| R50-20B2 | 50 | 20 | 51.8 | 43.688 | 7.938 | 2.6x2 | 145.7 | 10090 | 31020 | 97 | 89 | 165 | 150 | 22 | 125 | 62 | 50 | 13 | 20 | 13 | 20 |
| R50-20C1 | 50 | 20 | 51.8 | 43.688 | 7.938 | 3.6x1 | 102.6 | 7350 | 21470 | 98 | 91 | 130 | 150 | 22 | 125 | 63 | 50 | 13 | 20 | 13 | 20 |
| R50-25B2 | 50 | 25 | 51.8 | 43.688 | 7.938 | 2.6x2 | 145.7 | 10030 | 30890 | 99 | 88 | 193 | 150 | 22 | 125 | 60 | 49 | 13 | 20 | 13 | 20 |
| R50-20B2 | 50 | 20 | 52.2 | 42.466 | 9.525 | 2.6x2 | 152.7 | 13500 | 37530 | 99 | 93 | 175 | 152 | 28 | 128 | 67 | 51 | 13 | 20 | 13 | 30 |

Note: Rigidity without preload: The axial load is calculated by 30% of dynamic load.

FST Type ◀ Standard Product



Re-circulation plate below the nut body

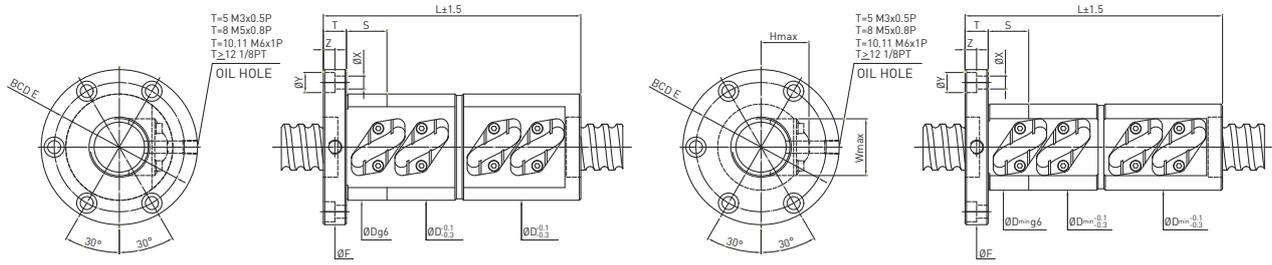


Re-circulation plate above the nut body

| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|-------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|------|------|-----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R55-10B2 | 55 | 10 | 56.46 | 49.97 | 6.35 | 2.6x2 | 144.2 | 7790 | 27390 | 95 | 92 | 103 | 144 | 18 | 122 | 62 | 48 | 11 | 17.5 | 11 | 20 |
| R55-20B2 | 55 | 20 | 56.6 | 49.299 | 7.144 | 2.6x2 | 157.8 | 9330 | 31780 | 96 | 93 | 165 | 144 | 18 | 122 | 64 | 49 | 11 | 17.5 | 11 | 20 |
| R55-24A1 | 55 | 24 | 56.6 | 49.299 | 7.144 | 1.6x1 | 51.5 | 3370 | 9750 | 99 | 93 | 94 | 144 | 18 | 122 | 64 | 50 | 11 | 17.5 | 11 | 20 |
| R55-24A2 | 55 | 24 | 56.6 | 49.299 | 7.144 | 1.6x2 | 99.8 | 6120 | 19500 | 99 | 93 | 142 | 144 | 18 | 122 | 64 | 50 | 11 | 17.5 | 11 | 20 |
| R55-24B2 | 55 | 24 | 56.6 | 49.299 | 7.144 | 2.6x2 | 158.7 | 9290 | 31690 | 99 | 93 | 189 | 144 | 18 | 122 | 64 | 50 | 11 | 17.5 | 11 | 20 |
| R60-24A2 | 60 | 24 | 62.2 | 52.466 | 9.525 | 1.6x2 | 108.7 | 9285 | 27490 | 113 | 104 | 150 | 170 | 22 | 145 | 71 | 58 | 13 | 20 | 13 | 20 |
| R60-32C1 | 60 | 32 | 62.2 | 52.466 | 9.525 | 3.6x1 | 123.8 | 10731 | 30750 | 114 | 105 | 180 | 170 | 22 | 145 | 72 | 57 | 13 | 20 | 13 | 20 |
| R63-8B2 | 63 | 8 | 64 | 59.132 | 4.763 | 2.6x2 | 151.3 | 5610 | 24340 | 102 | 98 | 100 | 146 | 18 | 124 | 66 | 49 | 11 | 17.5 | 11 | 20 |
| R63-10B2 | 63 | 10 | 64.4 | 57.91 | 6.35 | 2.6x2 | 159.4 | 8270 | 31630 | 107 | 103 | 107 | 152 | 20 | 130 | 71 | 52 | 11 | 17.5 | 11 | 20 |
| R63-10B3 | 63 | 10 | 64.4 | 57.91 | 6.35 | 2.6x3 | 235.1 | 11720 | 47440 | 107 | 103 | 137 | 152 | 20 | 130 | 71 | 52 | 11 | 17.5 | 11 | 20 |
| R63-12B2 | 63 | 12 | 64.8 | 56.688 | 7.938 | 2.6x2 | 167.5 | 11270 | 39470 | 110 | 106 | 124 | 166 | 22 | 141 | 71 | 57 | 13 | 20 | 13 | 20 |
| R63-32B1 | 63 | 32 | 64.8 | 56.688 | 7.938 | 2.6x1 | 90.2 | 6120 | 19530 | 113 | 107 | 145 | 166 | 22 | 141 | 76 | 55 | 13 | 20 | 13 | 20 |
| R63-16B2 | 63 | 16 | 65.2 | 55.466 | 9.525 | 2.6x2 | 178.6 | 14861 | 47240 | 122 | 114 | 153 | 172 | 22 | 147 | 82 | 60 | 13 | 20 | 13 | 20 |
| R63-20B2 | 63 | 20 | 65.2 | 55.466 | 9.525 | 2.6x2 | 180.3 | 14861 | 47160 | 118 | 111 | 176 | 172 | 22 | 147 | 77 | 60 | 13 | 20 | 13 | 20 |
| R63-25B2 | 63 | 25 | 65.2 | 55.466 | 9.525 | 2.6x2 | 181.7 | 14861 | 47040 | 118 | 110 | 200 | 172 | 22 | 147 | 76 | 59 | 13 | 20 | 13 | 20 |
| R63-32A2 | 63 | 32 | 65.2 | 55.466 | 9.525 | 1.6x2 | 113.9 | 9629 | 28810 | 115 | 107 | 180 | 172 | 22 | 147 | 73 | 58 | 13 | 20 | 13 | 20 |
| R70-32B1 | 70 | 32 | 71.8 | 63.688 | 7.938 | 2.6x1 | 99.2 | 6470 | 22020 | 125 | 119 | 150 | 178 | 22 | 152 | 85 | 62 | 13 | 20 | 13 | 20 |
| R80-16B2 | 80 | 16 | 82.2 | 72.466 | 9.525 | 2.6x2 | 214.2 | 16483 | 61530 | 142 | 136 | 156 | 210 | 28 | 174 | 97 | 68 | 18 | 26 | 17.5 | 25 |
| R80-16B3 | 80 | 16 | 82.2 | 72.466 | 9.525 | 2.6x3 | 315.9 | 23361 | 92300 | 142 | 136 | 204 | 210 | 28 | 174 | 97 | 68 | 18 | 26 | 17.5 | 25 |
| R80-24B2 | 80 | 24 | 82.2 | 72.466 | 9.525 | 2.6x2 | 219 | 16483 | 61380 | 134 | 130 | 209 | 210 | 28 | 174 | 86 | 67 | 18 | 26 | 17.5 | 25 |
| R80-32B2 | 80 | 32 | 82.2 | 72.466 | 9.525 | 2.6x2 | 222.5 | 16483 | 61180 | 142 | 137 | 250 | 210 | 28 | 174 | 98 | 68 | 18 | 26 | 17.5 | 25 |

Note: Rigidity without preload: The axial load is calculated by 30% of dynamic load.

FDT Type ◀ Standard Product



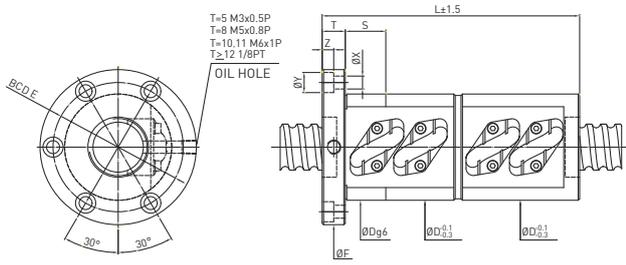
Re-circulation plate below the nut body

Re-circulation plate above the nut body

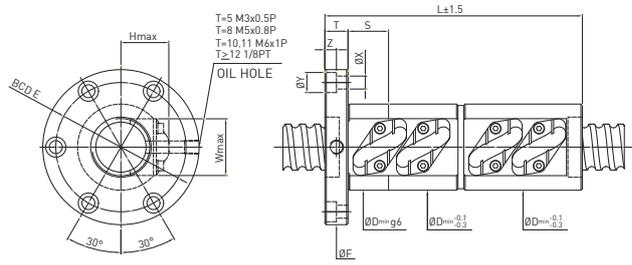
| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Col(kgf) | Nut | | | Flange | | Return Tube | | Bolt | | | Fit | |
|----------|--------------|------|--------|--------|-----------|----------|----------------------|---------------------|----------------------|-----|------------------|-----|--------|----|-------------|----|------|-----|-----|-----|----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | | Z |
| R8-3A1 | 8 | 3 | 8.22 | 6.156 | 2 | 1.6x1 | 10.4 | 230 | 350 | 21 | 17 | 57 | 36 | 5 | 28 | 14 | 12 | 4.5 | 0 | 0 | 0 |
| R8-5B1 | 8 | 5 | 8.22 | 6.156 | 2 | 2.6x1 | 15.1 | 360 | 600 | 24 | 18 | 74 | 44 | 8 | 34 | 15 | 13 | 4.5 | 8 | 4 | 0 |
| R10-4B1 | 10 | 4 | 9.82 | 7.756 | 2 | 2.6x1 | 18.4 | 410 | 770 | 24 | 20 | 73 | 46 | 10 | 36 | 16 | 13 | 4.5 | 8 | 4 | 20 |
| R10-5A1 | 10 | 5 | 10.02 | 7.956 | 2 | 1.6x1 | 13.2 | 270 | 470 | 23 | 19 | 57 | 46 | 10 | 36 | 15 | 13 | 4.5 | 8 | 4 | 20 |
| R10-4B1 | 10 | 4 | 10.2 | 7.742 | 2.381 | 2.6x1 | 18.4 | 500 | 870 | 27 | 23 | 80 | 49 | 10 | 37 | 17 | 16 | 4.5 | 8 | 4 | 20 |
| R12-5B1 | 12 | 5 | 12.1 | 9.642 | 2.381 | 2.6x1 | 24.8 | 560 | 1090 | 31 | 24 | 78 | 50 | 10 | 40 | 18 | 18 | 4.5 | 8 | 4 | 24 |
| R12-6B1 | 12 | 6 | 12.1 | 9.642 | 2.381 | 2.6x1 | 24.8 | 560 | 1090 | 29 | 24 | 82 | 50 | 10 | 40 | 20 | 16 | 4.5 | 8 | 4 | 24 |
| R12-10A1 | 12 | 10 | 12.08 | 9.622 | 2.381 | 1.6x1 | 15.1 | 360 | 650 | 30 | 24 | 85 | 50 | 10 | 40 | 17 | 17 | 4.5 | 8 | 4 | 24 |
| R12-10B1 | 12 | 10 | 12.08 | 9.622 | 2.381 | 2.6x1 | 24.1 | 550 | 1070 | 31 | 25 | 103 | 50 | 10 | 40 | 19 | 18 | 4.5 | 8 | 4 | 24 |
| R12-20A1 | 12 | 20 | 12.25 | 9.792 | 2.381 | 1.6x1 | 14.2 | 350 | 670 | 29 | 25 | 128 | 50 | 10 | 40 | 20 | 16 | 4.5 | 8 | 4 | 24 |
| R14-4B1 | 14 | 4 | 14.25 | 11.792 | 2.381 | 2.6x1 | 27.3 | 600 | 1250 | 32 | 26 | 80 | 52 | 10 | 42 | 20 | 17 | 4.5 | 8 | 4 | 24 |
| R15-5B1 | 15 | 5 | 15.6 | 12.324 | 3.175 | 2.6x1 | 30.7 | 920 | 1820 | 35 | 30 | 88 | 58 | 10 | 45 | 23 | 20 | 5.5 | 9.5 | 5.5 | 24 |
| R15-10B1 | 15 | 10 | 15.64 | 12.364 | 3.175 | 2.6x1 | 30.5 | 900 | 1800 | 34 | 30 | 109 | 57 | 11 | 45 | 24 | 19 | 5.5 | 9.5 | 5.5 | 24 |
| R15-20A1 | 15 | 20 | 15.675 | 12.399 | 3.175 | 1.6x1 | 18.2 | 570 | 1110 | 40 | 32 | 128 | 60 | 11 | 47 | 25 | 22 | 5.5 | 9.5 | 5.5 | 24 |
| R15-30A1 | 15 | 30 | 15.6 | 12.324 | 3.175 | 1.6x1 | 17.1 | 560 | 1150 | 41 | 33 | 179 | 62 | 11 | 50 | 27 | 21 | 5.5 | 9.5 | 5.5 | 24 |
| R16-5B1 | 16 | 5 | 16.6 | 12.324 | 3.175 | 2.6x1 | 32.4 | 950 | 1960 | 38 | 31 | 89 | 64 | 12 | 51 | 24 | 20 | 5.5 | 9.5 | 5.5 | 24 |
| R16-5B2 | 16 | 5 | 16.6 | 12.324 | 3.175 | 2.6x2 | 62.9 | 1730 | 3920 | 38 | 31 | 119 | 64 | 12 | 51 | 24 | 20 | 5.5 | 9.5 | 5.5 | 24 |
| R16-10B1 | 16 | 10 | 16.6 | 12.324 | 3.175 | 2.6x1 | 32.3 | 940 | 1930 | 39 | 31 | 124 | 64 | 12 | 51 | 23 | 21 | 5.5 | 9.5 | 5.5 | 24 |
| R20-4B1 | 20 | 4 | 20.25 | 17.792 | 2.381 | 2.6x1 | 36.3 | 720 | 1850 | 40 | 36 | 81 | 68 | 12 | 55 | 26 | 22 | 5.5 | 9.5 | 5.5 | 24 |
| R20-4B2 | 20 | 4 | 20.25 | 17.792 | 2.381 | 2.6x2 | 70.6 | 1310 | 3700 | 40 | 36 | 105 | 68 | 12 | 55 | 26 | 22 | 5.5 | 9.5 | 5.5 | 24 |
| R20-5B1 | 20 | 5 | 20.6 | 17.324 | 3.175 | 2.6x1 | 38.7 | 1070 | 2490 | 42 | 37 | 89 | 68 | 12 | 55 | 26 | 23 | 5.5 | 9.5 | 5.5 | 24 |
| R20-5B2 | 20 | 5 | 20.6 | 17.324 | 3.175 | 2.6x2 | 75.1 | 1950 | 4980 | 42 | 37 | 119 | 68 | 12 | 55 | 26 | 23 | 5.5 | 9.5 | 5.5 | 24 |
| R20-40A1 | 20 | 40 | 20.36 | 17.084 | 3.175 | 1.6x1 | 20.9 | 630 | 1500 | 48 | 41 | 224 | 73 | 12 | 60 | 33 | 24 | 5.5 | 9.5 | 5.5 | 24 |
| R20-10B1 | 20 | 10 | 20.08 | 16.744 | 3.969 | 2.6x1 | 43 | 1410 | 3040 | 46 | 40 | 108 | 72 | 12 | 59 | 30 | 25 | 5.5 | 9.5 | 5.5 | 24 |
| R25-4B2 | 25 | 4 | 25.25 | 22.792 | 2.381 | 2.6x2 | 84 | 1450 | 4740 | 46 | 42 | 91 | 69 | 11 | 57 | 30 | 25 | 5.5 | 9.5 | 5.5 | 24 |
| R25-5B2 | 25 | 5 | 25.57 | 22.294 | 3.175 | 2.6x2 | 89.2 | 2170 | 6310 | 49 | 44 | 119 | 74 | 12 | 62 | 33 | 25 | 5.5 | 9.5 | 5.5 | 24 |
| R25-10B1 | 25 | 10 | 25.6 | 22.324 | 3.175 | 2.6x1 | 47.1 | 1180 | 3130 | 49 | 44 | 129 | 74 | 12 | 62 | 31 | 26 | 5.5 | 9.5 | 5.5 | 24 |
| R25-12A1 | 25 | 12 | 25.8 | 21.744 | 3.969 | 1.6x1 | 32.6 | 1040 | 2370 | 55 | 47 | 100 | 78 | 11 | 64 | 33 | 29 | 6.6 | 11 | 6.5 | 24 |
| R25-12B1 | 25 | 12 | 25.8 | 21.744 | 3.969 | 2.6x1 | 52 | 1590 | 3860 | 53 | 46 | 124 | 78 | 11 | 64 | 33 | 28 | 6.6 | 11 | 6.5 | 24 |
| R25-12C1 | 25 | 12 | 25.8 | 21.744 | 3.969 | 3.6x1 | 70.9 | 2100 | 5350 | 53 | 46 | 148 | 78 | 11 | 64 | 33 | 28 | 6.6 | 11 | 6.5 | 24 |
| R25-25A1 | 25 | 25 | 26.03 | 21.974 | 3.969 | 1.6x1 | 32.3 | 1030 | 2410 | 55 | 50 | 157 | 82 | 12 | 69 | 37 | 29 | 6.6 | 11 | 6.5 | 24 |
| R25-8B1 | 25 | 8 | 26 | 21.132 | 4.763 | 2.6x1 | 53.5 | 2050 | 4700 | 57 | 48 | 109 | 86 | 15 | 73 | 34 | 30 | 6.6 | 11 | 6.5 | 24 |
| R25-8B2 | 25 | 8 | 26 | 21.132 | 4.763 | 2.6x2 | 103.9 | 3730 | 9400 | 57 | 48 | 157 | 86 | 15 | 73 | 34 | 30 | 6.6 | 11 | 6.5 | 24 |
| R25-10A2 | 25 | 10 | 26.1 | 21.232 | 4.763 | 1.6x2 | 65.5 | 2440 | 5770 | 55 | 49 | 150 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 24 |
| R25-10B1 | 25 | 10 | 26.1 | 21.232 | 4.763 | 2.6x1 | 47.1 | 2040 | 4690 | 55 | 49 | 130 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 24 |
| R25-10B2 | 25 | 10 | 26.1 | 21.232 | 4.763 | 2.6x2 | 104.2 | 3710 | 9380 | 55 | 49 | 192 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 24 |
| R25-16B1 | 25 | 16 | 26 | 21.132 | 4.763 | 2.6x1 | 53.3 | 2010 | 4630 | 57 | 49 | 168 | 86 | 15 | 73 | 36 | 29 | 6.6 | 11 | 6.5 | 24 |
| R25-20B1 | 25 | 20 | 26 | 21.132 | 4.763 | 2.6x1 | 52.5 | 1990 | 4590 | 55 | 48 | 200 | 86 | 15 | 73 | 35 | 29 | 6.6 | 11 | 6.5 | 24 |
| R28-5B1 | 28 | 5 | 28.76 | 25.484 | 3.175 | 2.6x1 | 50 | 1250 | 3550 | 54 | 48 | 89 | 85 | 12 | 69 | 34 | 28 | 6.6 | 11 | 6.5 | 24 |
| R28-5B2 | 28 | 5 | 28.76 | 25.484 | 3.175 | 2.6x2 | 97.2 | 2280 | 7100 | 54 | 48 | 119 | 85 | 12 | 69 | 34 | 28 | 6.6 | 11 | 6.5 | 24 |
| R28-6B1 | 28 | 6 | 28.6 | 25.324 | 3.175 | 2.6x1 | 50.7 | 1250 | 3550 | 55 | 47 | 94 | 85 | 12 | 69 | 34 | 27 | 6.6 | 11 | 6.5 | 24 |
| R28-6B2 | 28 | 6 | 28.6 | 25.324 | 3.175 | 2.6x2 | 98.5 | 2280 | 7100 | 55 | 47 | 127 | 85 | 12 | 69 | 34 | 27 | 6.6 | 11 | 6.5 | 24 |
| R28-8B1 | 28 | 8 | 29 | 24.132 | 4.763 | 2.6x1 | 58.4 | 2170 | 5300 | 58 | 52 | 121 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 24 |
| R28-8B2 | 28 | 8 | 29 | 24.132 | 4.763 | 2.6x2 | 113.3 | 3950 | 10600 | 58 | 52 | 168 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 24 |
| R28-8C1 | 28 | 8 | 29 | 24.132 | 4.763 | 3.6x1 | 79.7 | 2880 | 7340 | 58 | 52 | 134 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 24 |
| R28-8C2 | 28 | 8 | 29 | 24.132 | 4.763 | 3.6x2 | 154.7 | 5230 | 14680 | 58 | 52 | 198 | 86 | 12 | 73 | 37 | 31 | 6.6 | 11 | 6.5 | 24 |
| R28-10B1 | 28 | 10 | 29 | 24.132 | 4.763 | 2.6x1 | 58.9 | 2170 | 5290 | 60 | 53 | 129 | 88 | 12 | 75 | 39 | 32 | 6.6 | 11 | 6.5 | 24 |
| R28-10B2 | 28 | 10 | 29 | 24.132 | 4.763 | 2.6x2 | 114.3 | 3940 | 10580 | 60 | 53 | 189 | 88 | 12 | 75 | 39 | 32 | 6.6 | 11 | 6.5 | 24 |

Note: Rigidity with preload: The axial load is calculated by 10% of dynamic load.

FDT Type ◀ Standard Product



Re-circulation plate below the nut body

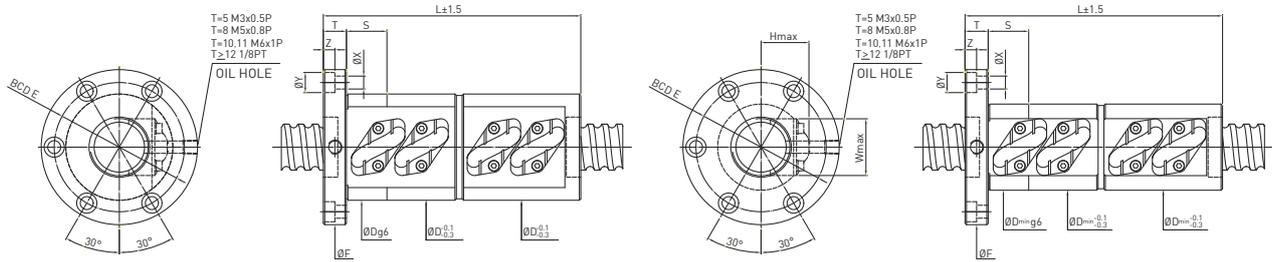


Re-circulation plate above the nut body

| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|-------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R28-12C2 | 28 | 12 | 29 | 24.132 | 4.763 | 3.6x2 | 156.2 | 5200 | 14610 | 60 | 52 | 250 | 86 | 12 | 73 | 37 | 32 | 6.6 | 11 | 6.5 | 24 |
| R28-16B2 | 28 | 16 | 29.4 | 22.91 | 6.35 | 2.6x2 | 115.1 | 5520 | 13440 | 66 | 56 | 263 | 94 | 12 | 80 | 39 | 35 | 6.6 | 11 | 6.5 | 24 |
| R32-4B2 | 32 | 4 | 32.25 | 29.792 | 2.381 | 2.6x2 | 99.3 | 1600 | 6080 | 54 | 50 | 90 | 84 | 12 | 71 | 35 | 27 | 6.6 | 11 | 6.5 | 24 |
| R32-5B2 | 32 | 5 | 32.4 | 29.124 | 3.175 | 2.6x2 | 106.8 | 2420 | 8160 | 57 | 52 | 119 | 84 | 12 | 71 | 34 | 29 | 6.6 | 11 | 6.5 | 24 |
| R32-6B2 | 32 | 6 | 32.94 | 28.884 | 3.969 | 2.6x2 | 120.6 | 3310 | 10270 | 60 | 56 | 127 | 88 | 12 | 75 | 39 | 31 | 6.6 | 11 | 6.5 | 24 |
| R32-10B2 | 32 | 10 | 32.62 | 28.564 | 3.969 | 2.6x2 | 123.9 | 3300 | 10230 | 58 | 54 | 171 | 84 | 12 | 71 | 38 | 31 | 6.6 | 11 | 6.5 | 24 |
| R32-8B2 | 32 | 8 | 33.16 | 28.292 | 4.763 | 2.6X2 | 122.2 | 4130 | 11820 | 62 | 58 | 171 | 96 | 16 | 78 | 40 | 33 | 9 | 14 | 8.5 | 30 |
| R32-10B2 | 32 | 10 | 33 | 28.132 | 4.763 | 2.6X2 | 123.9 | 4120 | 11800 | 60 | 57 | 190 | 96 | 16 | 78 | 39 | 33 | 9 | 14 | 8.5 | 30 |
| R32-12B2 | 32 | 12 | 33 | 28.132 | 4.763 | 2.6X2 | 123.8 | 4110 | 11770 | 61 | 57 | 206 | 96 | 16 | 78 | 39 | 33 | 9 | 14 | 8.5 | 30 |
| R32-20B1 | 32 | 20 | 33 | 28.132 | 4.763 | 2.6X1 | 66.1 | 2300 | 6090 | 64 | 57 | 205 | 102 | 16 | 84 | 40 | 34 | 9 | 14 | 8.5 | 30 |
| R32-25B1 | 32 | 25 | 33.1 | 28.232 | 4.763 | 2.6X1 | 65.1 | 2270 | 6030 | 63 | 58 | 215 | 102 | 16 | 84 | 41 | 32 | 9 | 14 | 8.5 | 30 |
| R32-10A2 | 32 | 10 | 33.4 | 26.91 | 6.35 | 1.6x2 | 80.9 | 3980 | 9650 | 68 | 62 | 157 | 102 | 16 | 84 | 43 | 36 | 9 | 14 | 8.5 | 30 |
| R32-10B2 | 32 | 10 | 33.4 | 26.91 | 6.35 | 2.6x2 | 123.9 | 6040 | 15690 | 70 | 61 | 195 | 108 | 16 | 90 | 43 | 36 | 9 | 14 | 8.5 | 30 |
| R32-10C1 | 32 | 10 | 33.4 | 26.91 | 6.35 | 3.6x1 | 90.6 | 4400 | 10860 | 70 | 60 | 155 | 108 | 16 | 90 | 42 | 37 | 9 | 14 | 8.5 | 30 |
| R32-12A2 | 32 | 12 | 33.4 | 26.91 | 6.35 | 1.6x2 | 81.3 | 3970 | 9630 | 68 | 60 | 188 | 108 | 18 | 90 | 42 | 35 | 9 | 14 | 8.5 | 30 |
| R32-12B2 | 32 | 12 | 33.4 | 26.91 | 6.35 | 2.6x2 | 123.8 | 6020 | 15660 | 66 | 60 | 213 | 108 | 18 | 90 | 42 | 35 | 9 | 14 | 8.5 | 30 |
| R32-12C1 | 32 | 12 | 33.4 | 26.91 | 6.35 | 3.6x1 | 91 | 4390 | 10840 | 69 | 61 | 189 | 108 | 18 | 90 | 43 | 36 | 9 | 14 | 8.5 | 30 |
| R32-16B1 | 32 | 16 | 33.4 | 26.91 | 6.35 | 2.6x1 | 66.7 | 3290 | 7790 | 71 | 61 | 197 | 108 | 16 | 90 | 44 | 37 | 9 | 14 | 8.5 | 30 |
| R32-16B2 | 32 | 16 | 33.4 | 26.91 | 6.35 | 2.6x2 | 129.4 | 5980 | 15580 | 71 | 61 | 265 | 108 | 16 | 90 | 44 | 37 | 9 | 14 | 8.5 | 30 |
| R32-16C1 | 32 | 16 | 33.4 | 26.91 | 6.35 | 3.6x1 | 91.1 | 4360 | 10790 | 71 | 61 | 203 | 108 | 16 | 90 | 44 | 37 | 9 | 14 | 8.5 | 30 |
| R32-20B1 | 32 | 20 | 33.4 | 26.91 | 6.35 | 2.6x1 | 66.1 | 3270 | 7740 | 68 | 60 | 205 | 108 | 16 | 90 | 42 | 36 | 9 | 14 | 8.5 | 30 |
| R32-12B2 | 32 | 12 | 33.6 | 26.299 | 7.144 | 2.6x2 | 123.8 | 6900 | 17180 | 74 | 64 | 231 | 108 | 16 | 90 | 44 | 39 | 9 | 14 | 8.5 | 30 |
| R32-12C1 | 32 | 12 | 33.6 | 26.299 | 7.144 | 3.6x1 | 91 | 5020 | 11900 | 74 | 64 | 187 | 108 | 16 | 90 | 44 | 39 | 9 | 14 | 8.5 | 30 |
| R32-15B2 | 32 | 15 | 33.6 | 26.299 | 7.144 | 2.6x2 | 129 | 6860 | 17120 | 74 | 65 | 258 | 108 | 16 | 90 | 46 | 39 | 9 | 14 | 8.5 | 30 |
| R32-16B2 | 32 | 16 | 33.6 | 26.299 | 7.144 | 2.6x2 | 129.4 | 6850 | 17100 | 74 | 65 | 275 | 108 | 16 | 90 | 45 | 39 | 9 | 14 | 8.5 | 30 |
| R36-6B2 | 36 | 6 | 36.8 | 32.744 | 3.969 | 2.6x2 | 130.5 | 3470 | 11510 | 65 | 60 | 132 | 100 | 12 | 82 | 43 | 33 | 6.6 | 11 | 6.5 | 24 |
| R36-10B2 | 36 | 10 | 37.45 | 30.96 | 6.35 | 2.6x2 | 141.2 | 6430 | 17810 | 72 | 65 | 199 | 125 | 18 | 98 | 45 | 38 | 11 | 17.5 | 11 | 30 |
| R36-16A2 | 36 | 16 | 37.4 | 30.91 | 6.35 | 1.6x2 | 89.9 | 4210 | 10900 | 74 | 66 | 208 | 120 | 18 | 98 | 47 | 38 | 11 | 17.5 | 11 | 30 |
| R36-16B2 | 36 | 16 | 37.4 | 30.91 | 6.35 | 2.6x2 | 142.9 | 6390 | 17720 | 74 | 66 | 275 | 120 | 18 | 98 | 47 | 38 | 11 | 17.5 | 11 | 30 |
| R36-20B1 | 36 | 20 | 37.4 | 30.91 | 6.35 | 2.6x1 | 73.5 | 3490 | 8810 | 76 | 66 | 207 | 120 | 18 | 98 | 47 | 39 | 11 | 17.5 | 11 | 30 |
| R40-8A2 | 40 | 8 | 41 | 36.132 | 4.763 | 1.6x2 | 93.2 | 3070 | 9460 | 75 | 70 | 139 | 108 | 16 | 90 | 47 | 38 | 9 | 14 | 8.5 | 30 |
| R40-8B2 | 40 | 8 | 41 | 36.132 | 4.763 | 2.6x2 | 148.5 | 4670 | 15380 | 74 | 72 | 171 | 108 | 16 | 90 | 50 | 38 | 9 | 14 | 8.5 | 30 |
| R40-8C2 | 40 | 8 | 41 | 36.132 | 4.763 | 3.6x2 | 202.7 | 6180 | 21300 | 74 | 70 | 193 | 108 | 16 | 90 | 47 | 38 | 9 | 14 | 8.5 | 30 |
| R40-10B2 | 40 | 10 | 41 | 36.132 | 4.763 | 2.6x2 | 150 | 4660 | 15360 | 72 | 66 | 195 | 108 | 16 | 90 | 46 | 37 | 9 | 14 | 8.5 | 30 |
| R40-16B2 | 40 | 16 | 41 | 36.132 | 4.763 | 2.6x2 | 152.3 | 4630 | 15290 | 72 | 69 | 267 | 108 | 16 | 90 | 48 | 37 | 9 | 14 | 8.5 | 30 |
| R40-10B2 | 40 | 10 | 41.4 | 34.91 | 6.35 | 2.6x2 | 150 | 6790 | 19940 | 78 | 74 | 199 | 125 | 18 | 104 | 53 | 41 | 11 | 17.5 | 11 | 30 |
| R40-10C1 | 40 | 10 | 41.4 | 34.91 | 6.35 | 3.6x1 | 108.1 | 4950 | 13800 | 79 | 70 | 159 | 125 | 18 | 104 | 48 | 41 | 11 | 17.5 | 11 | 30 |
| R40-12B2 | 40 | 12 | 41.4 | 34.91 | 6.35 | 2.6x2 | 154.8 | 6780 | 19910 | 78 | 70 | 232 | 128 | 18 | 106 | 48 | 41 | 11 | 17.5 | 11 | 30 |
| R40-12C2 | 40 | 12 | 41.4 | 34.91 | 6.35 | 3.6x2 | 211.2 | 8970 | 27570 | 78 | 71 | 280 | 128 | 18 | 106 | 50 | 40 | 11 | 17.5 | 11 | 30 |
| R40-16B2 | 40 | 16 | 41.49 | 35 | 6.35 | 2.6x2 | 152.3 | 6750 | 19850 | 81 | 73 | 274 | 128 | 18 | 106 | 48 | 41 | 11 | 17.5 | 11 | 30 |
| R40-20A1 | 40 | 20 | 41.4 | 34.91 | 6.35 | 1.6x1 | 50.5 | 2430 | 6080 | 80 | 72 | 171 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 30 |
| R40-20A2 | 40 | 20 | 41.4 | 34.91 | 6.35 | 1.6x2 | 98 | 4420 | 12160 | 80 | 72 | 251 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 30 |
| R40-20B1 | 40 | 20 | 41.4 | 34.91 | 6.35 | 2.6x1 | 80.4 | 3700 | 9880 | 80 | 71 | 211 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 30 |
| R40-20B2 | 40 | 20 | 41.4 | 34.91 | 6.35 | 2.6x2 | 155.8 | 6710 | 19760 | 80 | 71 | 328 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 30 |
| R40-20C1 | 40 | 20 | 41.4 | 34.91 | 6.35 | 3.6x1 | 109.7 | 4890 | 13680 | 80 | 71 | 248 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 30 |
| R40-25A1 | 40 | 25 | 41.4 | 34.91 | 6.35 | 1.6x1 | 50.2 | 2410 | 6040 | 78 | 73 | 197 | 128 | 18 | 106 | 52 | 40 | 11 | 17.5 | 11 | 30 |
| R40-25B1 | 40 | 25 | 41.4 | 34.91 | 6.35 | 2.6x1 | 79.8 | 3670 | 9820 | 78 | 73 | 247 | 128 | 18 | 106 | 52 | 40 | 11 | 17.5 | 11 | 30 |
| R40-10A2 | 40 | 10 | 41.6 | 34.299 | 7.144 | 1.6x2 | 98.8 | 5250 | 13870 | 82 | 73 | 160 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 40 |

Note: Rigidity with preload: The axial load is calculated by 10% of dynamic load.

FDT Type ◀ Standard Product



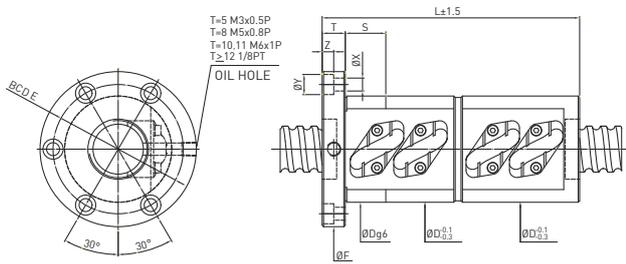
Re-circulation plate below the nut body

Re-circulation plate above the nut body

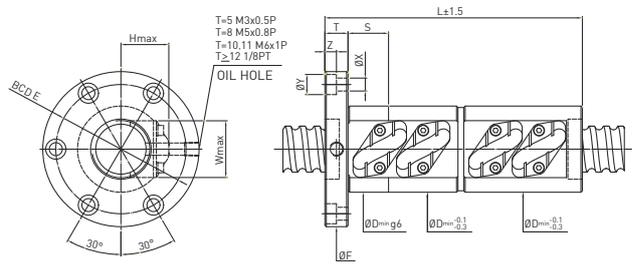
| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R40-10B2 | 40 | 10 | 41.6 | 34.299 | 7.144 | 2.6x2 | 150 | 7980 | 22550 | 82 | 73 | 200 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 40 |
| R40-10C2 | 40 | 10 | 41.6 | 34.299 | 7.144 | 3.6x2 | 214.5 | 10550 | 31220 | 82 | 73 | 240 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 40 |
| R40-12A2 | 40 | 12 | 41.6 | 34.299 | 7.144 | 1.6x2 | 99.4 | 5240 | 13860 | 80 | 73 | 185 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 40 |
| R40-12B1 | 40 | 12 | 41.6 | 34.299 | 7.144 | 2.6x1 | 81.5 | 4390 | 11260 | 79 | 74 | 161 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 40 |
| R40-12B2 | 40 | 12 | 41.6 | 34.299 | 7.144 | 2.6x2 | 154.8 | 7960 | 22520 | 79 | 74 | 233 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 40 |
| R40-12C1 | 40 | 12 | 41.6 | 34.299 | 7.144 | 3.6x1 | 111.2 | 5800 | 15590 | 79 | 74 | 185 | 128 | 18 | 106 | 52 | 41 | 11 | 17.5 | 11 | 40 |
| R40-12C2 | 40 | 12 | 41.6 | 34.299 | 7.144 | 3.6x2 | 211.2 | 10540 | 31180 | 79 | 74 | 281 | 128 | 18 | 106 | 52 | 41 | 11 | 17.5 | 11 | 40 |
| R40-16A2 | 40 | 16 | 41.6 | 34.299 | 7.144 | 1.6x2 | 100.2 | 5220 | 13810 | 81 | 73 | 238 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 40 |
| R40-16B1 | 40 | 16 | 41.6 | 34.299 | 7.144 | 2.6x1 | 82.2 | 4370 | 11220 | 81 | 72 | 206 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 40 |
| R40-16B2 | 40 | 16 | 41.6 | 34.299 | 7.144 | 2.6x2 | 152.3 | 7930 | 22450 | 81 | 72 | 297 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 40 |
| R40-16C1 | 40 | 16 | 41.6 | 34.299 | 7.144 | 3.6x1 | 112.2 | 5780 | 15540 | 81 | 73 | 238 | 128 | 18 | 106 | 49 | 42 | 11 | 17.5 | 11 | 40 |
| R40-20A2 | 40 | 20 | 41.6 | 34.299 | 7.144 | 1.6x2 | 98 | 5190 | 13750 | 82 | 74 | 252 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 40 |
| R40-20B1 | 40 | 20 | 41.6 | 34.299 | 7.144 | 2.6x1 | 80.4 | 4340 | 11170 | 82 | 74 | 212 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 40 |
| R40-20B2 | 40 | 20 | 41.6 | 34.299 | 7.144 | 2.6x2 | 155.8 | 7890 | 22350 | 82 | 74 | 329 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 40 |
| R40-20C1 | 40 | 20 | 41.6 | 34.299 | 7.144 | 3.6x1 | 109.7 | 5750 | 15470 | 82 | 74 | 249 | 128 | 18 | 106 | 52 | 42 | 11 | 17.5 | 11 | 40 |
| R40-25A1 | 40 | 25 | 41.6 | 34.299 | 7.144 | 1.6x1 | 50.2 | 2840 | 6830 | 83 | 73 | 198 | 128 | 18 | 106 | 51 | 43 | 11 | 17.5 | 11 | 40 |
| R40-25B1 | 40 | 25 | 41.6 | 34.299 | 7.144 | 2.6x1 | 79.8 | 4310 | 11100 | 83 | 73 | 248 | 128 | 18 | 106 | 51 | 43 | 11 | 17.5 | 11 | 40 |
| R45-5B2 | 45 | 5 | 45.6 | 42.324 | 3.175 | 2.6x2 | 134.7 | 2780 | 11610 | 72 | 68 | 124 | 108 | 16 | 90 | 45 | 37 | 9 | 14 | 8.5 | 30 |
| R45-8B2 | 45 | 8 | 46 | 41.132 | 4.763 | 2.6x2 | 160 | 4880 | 17180 | 80 | 75 | 161 | 116 | 16 | 98 | 50 | 39 | 9 | 14 | 8.5 | 30 |
| R45-10B1 | 45 | 10 | 46.4 | 39.91 | 6.35 | 2.6x1 | 88.1 | 4020 | 11540 | 84 | 77 | 141 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 30 |
| R45-10B2 | 45 | 10 | 46.4 | 39.91 | 6.35 | 2.6x2 | 171.1 | 7300 | 23090 | 84 | 77 | 201 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 30 |
| R45-12A2 | 45 | 12 | 46.4 | 39.91 | 6.35 | 1.6x2 | 99.5 | 4800 | 14190 | 85 | 78 | 165 | 132 | 18 | 110 | 53 | 43 | 11 | 17.5 | 11 | 30 |
| R45-16A2 | 45 | 16 | 46.4 | 39.91 | 6.35 | 1.6x2 | 109.7 | 4780 | 14160 | 84 | 78 | 205 | 132 | 18 | 110 | 53 | 43 | 11 | 17.5 | 11 | 30 |
| R45-20B2 | 45 | 20 | 46.4 | 39.91 | 6.35 | 2.6x2 | 175 | 7230 | 22930 | 84 | 78 | 329 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 30 |
| R45-20C1 | 45 | 20 | 46.4 | 39.91 | 6.35 | 3.6x1 | 123.2 | 5270 | 15870 | 84 | 78 | 247 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 30 |
| R45-12B2 | 45 | 12 | 46.6 | 39.299 | 7.144 | 2.6x2 | 171.9 | 8390 | 25230 | 87 | 80 | 231 | 132 | 18 | 110 | 55 | 45 | 11 | 17.5 | 11 | 40 |
| R45-25A1 | 45 | 25 | 46.6 | 39.299 | 7.144 | 1.6x1 | 56.3 | 3000 | 7670 | 90 | 82 | 198 | 132 | 18 | 110 | 58 | 47 | 11 | 17.5 | 11 | 40 |
| R45-25B1 | 45 | 25 | 46.6 | 39.299 | 7.144 | 2.6x1 | 89.5 | 4550 | 12470 | 90 | 82 | 248 | 132 | 18 | 110 | 58 | 47 | 11 | 17.5 | 11 | 40 |
| R45-25C1 | 45 | 25 | 46.6 | 39.299 | 7.144 | 3.6x1 | 122.2 | 6030 | 17270 | 90 | 82 | 298 | 132 | 18 | 110 | 58 | 47 | 11 | 17.5 | 11 | 40 |
| R45-12B2 | 45 | 12 | 46.8 | 38.688 | 7.938 | 2.6x2 | 171.9 | 9620 | 27850 | 92 | 84 | 239 | 142 | 22 | 117 | 58 | 47 | 13 | 20 | 13 | 40 |
| R45-20B2 | 45 | 20 | 46.8 | 38.688 | 7.938 | 2.6x2 | 175 | 9550 | 27690 | 91 | 80 | 343 | 142 | 22 | 117 | 55 | 47 | 13 | 20 | 13 | 40 |
| R45-25B1 | 45 | 25 | 46.8 | 38.688 | 7.938 | 2.6x1 | 89.5 | 5220 | 13770 | 93 | 81 | 257 | 142 | 22 | 117 | 55 | 48 | 13 | 20 | 13 | 40 |
| R50-8B2 | 50 | 8 | 51 | 46.132 | 4.763 | 2.6x2 | 170.2 | 5070 | 18980 | 83 | 80 | 173 | 128 | 18 | 107 | 55 | 41 | 11 | 17.5 | 11 | 30 |
| R50-8B3 | 50 | 8 | 51 | 46.132 | 4.763 | 2.6x3 | 250.9 | 7180 | 28470 | 83 | 80 | 221 | 128 | 18 | 107 | 55 | 41 | 11 | 17.5 | 11 | 30 |
| R50-12B1 | 50 | 12 | 51 | 46.132 | 4.763 | 2.6x1 | 90.6 | 2780 | 9470 | 85 | 82 | 139 | 128 | 18 | 107 | 57 | 43 | 11 | 17.5 | 11 | 30 |
| R50-10B2 | 50 | 10 | 51.4 | 44.91 | 6.35 | 2.6x2 | 181.7 | 7550 | 25240 | 90 | 85 | 201 | 135 | 18 | 114 | 57 | 47 | 11 | 17.5 | 11 | 30 |
| R50-20B2 | 50 | 20 | 51.4 | 44.91 | 6.35 | 2.6x2 | 187 | 7490 | 25100 | 90 | 83 | 329 | 135 | 18 | 114 | 55 | 46 | 11 | 17.5 | 11 | 30 |
| R50-25B2 | 50 | 25 | 51.6 | 44.299 | 7.144 | 2.6x2 | 188.1 | 8670 | 27680 | 95 | 90 | 399 | 140 | 18 | 118 | 64 | 47 | 11 | 17.5 | 11 | 30 |
| R50-12B1 | 50 | 12 | 51.8 | 43.688 | 7.938 | 2.6x1 | 90.6 | 5590 | 15580 | 96 | 90 | 167 | 150 | 22 | 125 | 62 | 50 | 13 | 20 | 13 | 40 |
| R50-12B2 | 50 | 12 | 51.8 | 43.688 | 7.938 | 2.6x2 | 188.6 | 10150 | 31170 | 96 | 90 | 239 | 150 | 22 | 125 | 62 | 50 | 13 | 20 | 13 | 40 |
| R50-16A2 | 50 | 16 | 51.8 | 43.688 | 7.938 | 1.6x2 | 120.1 | 6670 | 19140 | 96 | 89 | 217 | 150 | 22 | 125 | 61 | 50 | 13 | 20 | 13 | 40 |
| R50-16B2 | 50 | 16 | 51.8 | 43.688 | 7.938 | 2.6x2 | 191.1 | 10120 | 31100 | 97 | 88 | 304 | 150 | 22 | 125 | 61 | 50 | 13 | 20 | 13 | 40 |
| R50-16C2 | 50 | 16 | 51.8 | 43.688 | 7.938 | 3.6x2 | 260.7 | 13390 | 43070 | 96 | 89 | 368 | 150 | 22 | 125 | 61 | 50 | 13 | 20 | 13 | 40 |
| R50-20A2 | 50 | 20 | 51.8 | 43.688 | 7.938 | 1.6x2 | 120.8 | 6640 | 19090 | 98 | 91 | 262 | 150 | 22 | 125 | 63 | 50 | 13 | 20 | 13 | 40 |
| R50-20B2 | 50 | 20 | 51.8 | 43.688 | 7.938 | 2.6x2 | 187 | 10090 | 31020 | 97 | 89 | 333 | 150 | 22 | 125 | 62 | 50 | 13 | 20 | 13 | 40 |
| R50-20C1 | 50 | 20 | 51.8 | 43.688 | 7.938 | 3.6x1 | 135.2 | 7350 | 21470 | 98 | 91 | 258 | 150 | 22 | 125 | 63 | 50 | 13 | 20 | 13 | 40 |
| R50-25B2 | 50 | 25 | 51.8 | 43.688 | 7.938 | 2.6x2 | 188.1 | 10030 | 30890 | 99 | 88 | 376 | 150 | 22 | 125 | 60 | 49 | 13 | 20 | 13 | 40 |
| R50-20B2 | 50 | 20 | 52.2 | 42.466 | 9.525 | 2.6x2 | 187 | 13500 | 37530 | 99 | 93 | 345 | 152 | 28 | 128 | 67 | 51 | 13 | 20 | 13 | 60 |

Note: Rigidity with preload: The axial load is calculated by 10% of dynamic load.

FDT Type ◀ Standard Product



Re-circulation plate below the nut body

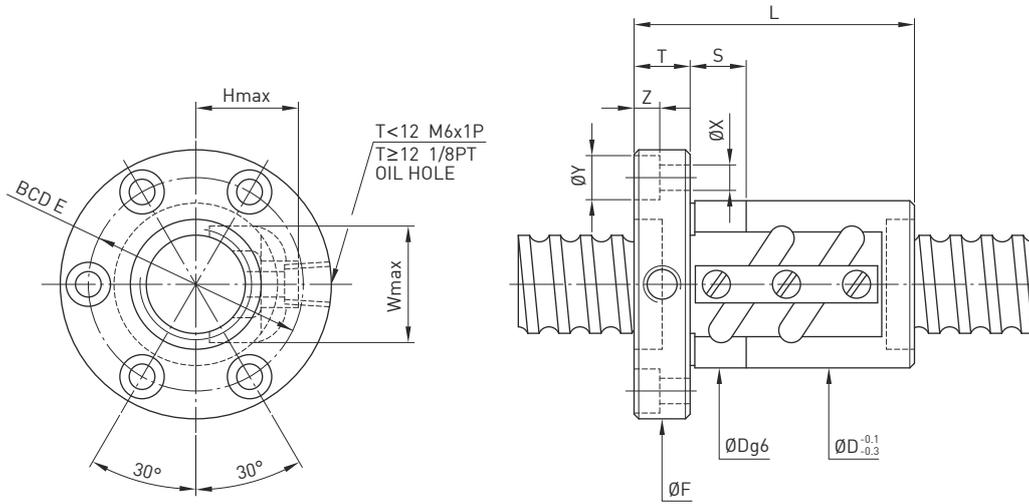


Re-circulation plate above the nut body

| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|-------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|------|------|-----|
| | Nominal Dia. | Lead | | | | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R55-10B2 | 55 | 10 | 56.46 | 49.97 | 6.35 | 2.6x2 | 191.7 | 7790 | 27390 | 95 | 92 | 200 | 144 | 18 | 122 | 62 | 48 | 11 | 17.5 | 11 | 40 |
| R55-20B2 | 55 | 20 | 56.6 | 49.299 | 7.144 | 2.6x2 | 208.2 | 9330 | 31780 | 96 | 93 | 333 | 144 | 18 | 122 | 64 | 49 | 11 | 17.5 | 11 | 40 |
| R55-24A1 | 55 | 24 | 56.6 | 49.299 | 7.144 | 1.6x1 | 67.8 | 3370 | 9750 | 99 | 93 | 198 | 144 | 18 | 122 | 64 | 50 | 11 | 17.5 | 11 | 40 |
| R55-24A2 | 55 | 24 | 56.6 | 49.299 | 7.144 | 1.6x2 | 131.5 | 6120 | 19500 | 99 | 93 | 294 | 144 | 18 | 122 | 64 | 50 | 11 | 17.5 | 11 | 40 |
| R55-24B2 | 55 | 24 | 56.6 | 49.299 | 7.144 | 2.6x2 | 209 | 9290 | 31690 | 99 | 93 | 389 | 144 | 18 | 122 | 64 | 50 | 11 | 17.5 | 11 | 40 |
| R60-24A2 | 60 | 24 | 62.2 | 52.466 | 9.525 | 1.6x2 | 143.3 | 9285 | 27490 | 113 | 104 | 304 | 170 | 22 | 145 | 71 | 58 | 13 | 20 | 13 | 40 |
| R60-32C1 | 60 | 32 | 62.2 | 52.466 | 9.525 | 3.6x1 | 162.9 | 10731 | 30750 | 114 | 105 | 382 | 170 | 22 | 145 | 72 | 57 | 13 | 20 | 13 | 40 |
| R63-8B2 | 63 | 8 | 64 | 59.132 | 4.763 | 2.6x2 | 202.2 | 5610 | 24340 | 102 | 98 | 201 | 146 | 18 | 124 | 66 | 49 | 11 | 17.5 | 11 | 40 |
| R63-10B2 | 63 | 10 | 64.4 | 57.91 | 6.35 | 2.6x2 | 212.2 | 8270 | 31630 | 107 | 103 | 214 | 152 | 20 | 130 | 71 | 52 | 11 | 17.5 | 11 | 40 |
| R63-10B3 | 63 | 10 | 64.4 | 57.91 | 6.35 | 2.6x3 | 312.9 | 11720 | 47440 | 107 | 103 | 274 | 152 | 20 | 130 | 71 | 52 | 11 | 17.5 | 11 | 40 |
| R63-12B2 | 63 | 12 | 64.8 | 56.688 | 7.938 | 2.6x2 | 222.5 | 11270 | 39470 | 110 | 106 | 252 | 166 | 22 | 141 | 71 | 57 | 13 | 20 | 13 | 40 |
| R63-32B1 | 63 | 32 | 64.8 | 56.688 | 7.938 | 2.6x1 | 118.7 | 6120 | 19530 | 113 | 107 | 313 | 166 | 22 | 141 | 76 | 55 | 13 | 20 | 13 | 40 |
| R63-16B2 | 63 | 16 | 65.2 | 55.466 | 9.525 | 2.6x2 | 236.3 | 14861 | 47240 | 122 | 114 | 307 | 172 | 22 | 147 | 82 | 60 | 13 | 20 | 13 | 40 |
| R63-20B2 | 63 | 20 | 65.2 | 55.466 | 9.525 | 2.6x2 | 238.1 | 14861 | 47160 | 118 | 111 | 366 | 172 | 22 | 147 | 77 | 60 | 13 | 20 | 13 | 40 |
| R63-25B2 | 63 | 25 | 65.2 | 55.466 | 9.525 | 2.6x2 | 239.5 | 14861 | 47040 | 118 | 110 | 410 | 172 | 22 | 147 | 76 | 59 | 13 | 20 | 13 | 40 |
| R63-32A2 | 63 | 32 | 65.2 | 55.466 | 9.525 | 1.6x2 | 149.9 | 9629 | 28810 | 115 | 107 | 382 | 172 | 22 | 147 | 73 | 58 | 13 | 20 | 13 | 40 |
| R70-32B1 | 70 | 32 | 71.8 | 63.688 | 7.938 | 2.6x1 | 130.6 | 6470 | 22020 | 125 | 119 | 318 | 178 | 22 | 152 | 85 | 62 | 13 | 20 | 13 | 40 |
| R80-16B2 | 80 | 16 | 82.2 | 72.466 | 9.525 | 2.6x2 | 284.2 | 16483 | 61530 | 142 | 136 | 310 | 210 | 28 | 174 | 97 | 68 | 18 | 26 | 17.5 | 50 |
| R80-16B3 | 80 | 16 | 82.2 | 72.466 | 9.525 | 2.6x3 | 419 | 23361 | 92300 | 142 | 136 | 406 | 210 | 28 | 174 | 97 | 68 | 18 | 26 | 17.5 | 50 |
| R80-24B2 | 80 | 24 | 82.2 | 72.466 | 9.525 | 2.6x2 | 289.5 | 16483 | 61380 | 134 | 130 | 411 | 210 | 28 | 174 | 86 | 67 | 18 | 26 | 17.5 | 50 |
| R80-32B2 | 80 | 32 | 82.2 | 72.466 | 9.525 | 2.6x2 | 293.2 | 16483 | 61180 | 142 | 137 | 516 | 210 | 28 | 174 | 98 | 68 | 18 | 26 | 17.5 | 50 |

Note: Rigidity with preload: The axial load is calculated by 10% of dynamic load.

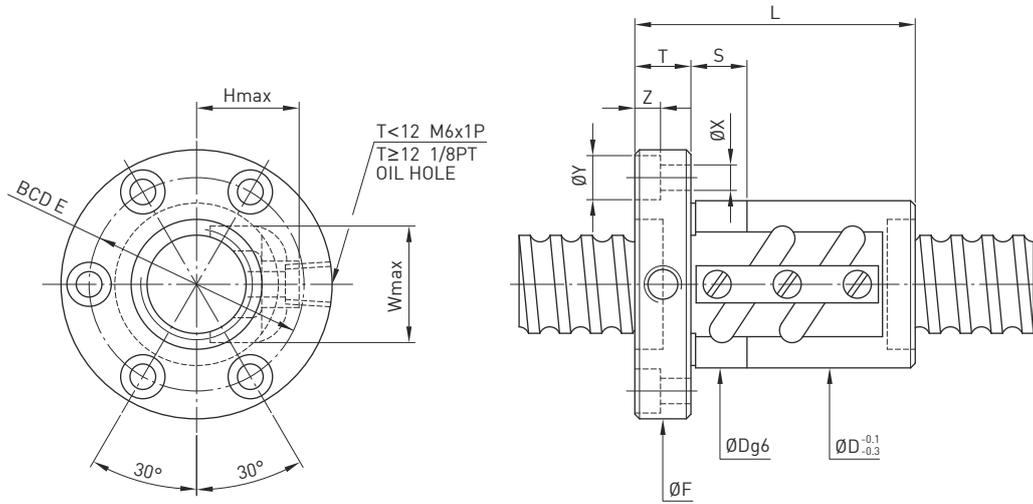
FSV Type ◀ Standard Product



| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | Flange | | | Return Tube | | Bolt | | | Fit | |
|---------|--------------|-------|-------|--------|-----------|----------|----------------------|---------------------|---------------------|-------|-----|--------|----|-------|-------------|-----|------|-----|-----|-----|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | W | H | X | Y | Z | | S |
| 16-4B2 | 16 | 4 | 2.381 | 16.25 | 13.792 | 2.5x2 | 26 | 802 | 1722 | 30 | 48 | 52 | 10 | 40 | 23 | 21 | 5.5 | 9.5 | 5.5 | 12 | |
| 16-5B1 | | 5 | 3.175 | 16.6 | 13.324 | 2.5x1 | 16 | 763 | 1400 | 31 | 45 | 54 | 12 | 41 | 27 | 22 | 5.5 | 9.5 | 5.5 | 12 | |
| 16-5B2 | | 5 | | 16.6 | 13.324 | 2.5x2 | 33 | 1385 | 2799 | 31 | 60 | 54 | 12 | 41 | 27 | 22 | 5.5 | 9.5 | 5.5 | 12 | |
| 16-5C1 | | 5 | | 16.6 | 13.324 | 3.5x1 | 22 | 1013 | 1946 | 31 | 50 | 54 | 12 | 41 | 27 | 22 | 5.5 | 9.5 | 5.5 | 12 | |
| 16-10B1 | | 10 | 16.6 | 13.324 | 2.5x1 | 16 | 763 | 1399 | 30 | 54 | 53 | 10 | 41 | 22.5 | 23 | 5.5 | 9.5 | 5.5 | 12 | | |
| 20-5B1 | 20 | 5 | 20.6 | 17.324 | 2.5x1 | 19 | 837 | 1733 | 35 | 45 | 58 | 12 | 46 | 27 | 25 | 5.5 | 9.5 | 5.5 | 12 | | |
| 20-5B2 | | 5 | 20.6 | 17.324 | 2.5x2 | 39 | 1519 | 3465 | 35 | 60 | 58 | 12 | 46 | 27 | 25 | 5.5 | 9.5 | 5.5 | 12 | | |
| 20-6B1 | | 6 | 3.969 | 20.8 | 16.744 | 2.5x1 | 20 | 1139 | 2187 | 36 | 48 | 60 | 12 | 47 | 28 | 27 | 5.5 | 9.5 | 5.5 | 12 | |
| 20-6C1 | | 6 | 3.969 | 20.8 | 16.744 | 3.5x1 | 28 | 1512 | 3041 | 36 | 66 | 60 | 12 | 47 | 28 | 27 | 5.5 | 9.5 | 5.5 | 12 | |
| 20-20A1 | | 20 | 20.8 | 16.744 | 1.5x1 | 13 | 719 | 1281 | 36 | 66 | 60 | 12 | 47 | 28 | 27 | 5.5 | 9.5 | 5.5 | 12 | | |
| 25-5B2 | 25 | 5 | 3.175 | 25.6 | 22.324 | 2.5x2 | 46 | 1704 | 4417 | 40 | 60 | 64 | 12 | 52 | 31 | 26 | 5.5 | 9.5 | 5.5 | 12 | |
| 25-5C1 | | 5 | 3.175 | 25.6 | 22.324 | 3.5x1 | 35 | 1252 | 3085 | 40 | 50 | 64 | 12 | 52 | 31 | 26 | 5.5 | 9.5 | 5.5 | 12 | |
| 25-6B2 | | 6 | 3.969 | 25.8 | 21.744 | 2.5x2 | 48 | 2308 | 5523 | 42 | 68 | 68 | 12 | 55 | 32 | 28 | 6.6 | 11 | 6.5 | 12 | |
| 25-6C1 | | 6 | 3.969 | 25.8 | 21.744 | 3.5x1 | 35 | 1690 | 3844 | 42 | 55 | 68 | 12 | 55 | 32 | 28 | 6.6 | 11 | 6.5 | 12 | |
| 25-8B2 | | 8 | 4.763 | 26 | 21.132 | 2.5x2 | 46 | 2888 | 6472 | 50 | 80 | 74 | 13 | 62 | 35 | 31 | 5.5 | 9.5 | 5.5 | 15 | |
| 25-10B1 | | 10 | | 26 | 21.132 | 2.5x1 | 25 | 1592 | 3237 | 45 | 65 | 72 | 16 | 58 | 34 | 29 | 6.6 | 11 | 6.5 | 12 | |
| 25-10B2 | | 10 | | 26 | 21.132 | 2.5x2 | 46 | 2888 | 6472 | 47 | 97 | 74 | 15 | 60 | 35 | 31 | 6.6 | 11 | 6.5 | 15 | |
| 25-16B1 | | 16 | | 26 | 21.132 | 2.5x1 | 28 | 1592 | 3237 | 45 | 84 | 72 | 16 | 58 | 34 | 29 | 6.6 | 11 | 6.5 | 12 | |
| 25-20B1 | | 20 | 26 | 21.132 | 2.5x1 | 28 | 1592 | 3237 | 45 | 96 | 72 | 16 | 58 | 34 | 29 | 6.6 | 11 | 6.5 | 12 | | |
| 25-25A1 | | 25 | 26 | 21.132 | 1.5x1 | 16 | 1019 | 1927 | 45 | 90 | 72 | 16 | 58 | 34 | 29 | 6.6 | 11 | 6.5 | 12 | | |
| 28-5B1 | 28 | 5 | 3.175 | 28.6 | 25.324 | 2.5x1 | 26 | 984 | 2466 | 44 | 45 | 70 | 12 | 56 | 34 | 28 | 6.6 | 11 | 6.5 | 12 | |
| 28-5B2 | | 5 | 3.175 | 28.6 | 25.324 | 2.5x2 | 50 | 1785 | 4932 | 44 | 60 | 70 | 12 | 56 | 34 | 28 | 6.6 | 11 | 6.5 | 12 | |
| 28-6A2 | | 6 | 3.175 | 28.6 | 25.324 | 1.5x2 | 29 | 1150 | 2960 | 44 | 55 | 70 | 12 | 56 | 34 | 28 | 6.6 | 11 | 6.5 | 12 | |
| 28-6B2 | | 6 | 3.175 | 28.6 | 25.324 | 2.5x2 | 48 | 1784 | 4932 | 50 | 61 | 74 | 12 | 60 | 36 | 29 | 6.6 | 11 | 6.5 | 15 | |
| 32-5B2 | 32 | 5 | 3.969 | 32.6 | 29.324 | 2.5x2 | 55 | 1886 | 5666 | 50 | 60 | 76 | 12 | 63 | 38 | 30 | 6.6 | 11 | 6.5 | 12 | |
| 32-5C1 | | 5 | 3.969 | 32.6 | 29.324 | 3.5x1 | 39 | 1388 | 3967 | 50 | 50 | 76 | 12 | 63 | 38 | 30 | 6.6 | 11 | 6.5 | 12 | |
| 32-6B2 | | 6 | 3.969 | 32.8 | 28.744 | 2.5x2 | 56 | 2556 | 7020 | 52 | 68 | 78 | 12 | 65 | 39 | 32 | 6.6 | 11 | 6.5 | 12 | |
| 32-6C1 | | 6 | 3.969 | 32.8 | 28.744 | 3.5x1 | 39 | 1888 | 4936 | 52 | 55 | 78 | 12 | 65 | 39 | 32 | 6.6 | 11 | 6.5 | 12 | |
| 32-8B2 | | 8 | 4.763 | 33 | 28.132 | 2.5x2 | 59 | 3284 | 8453 | 54 | 86 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 15 | |
| 32-8C1 | | 8 | 4.763 | 33 | 28.132 | 3.5x1 | 41 | 2428 | 5948 | 54 | 70 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 15 | |
| 32-10B1 | | 10 | 10 | 6.350 | 33.4 | 26.91 | 2.5x1 | 30 | 2650 | 5599 | 54 | 70 | 88 | 16 | 70 | 44 | 37 | 9 | 14 | 8.5 | 15 |
| 32-10B2 | | | 10 | 6.350 | 33.4 | 26.91 | 2.5x2 | 60 | 4810 | 11199 | 57 | 98 | 91 | 16 | 73 | 44 | 37 | 9 | 14 | 8.5 | 15 |
| 32-10C1 | | | 10 | 6.350 | 33.4 | 26.91 | 3.5x1 | 44 | 3519 | 7785 | 57 | 78 | 91 | 16 | 73 | 44 | 37 | 9 | 14 | 8.5 | 15 |
| 32-16B1 | | | 16 | 33.4 | 26.91 | 2.5x1 | 30 | 2650 | 5599 | 54 | 100 | 88 | 16 | 70 | 45 | 38 | 9 | 14 | 8.5 | 15 | |
| 32-20B1 | 20 | | 33 | 28.132 | 2.5x1 | 33 | 1810 | 4227 | 54 | 100 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 15 | | |
| 32-25B1 | 25 | 4.763 | 33 | 28.132 | 2.5x1 | 33 | 1810 | 4227 | 54 | 118 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 15 | | |
| 32-32A1 | 32 | 4.763 | 33 | 28.132 | 1.5x1 | 18 | 1154 | 2505 | 54 | 110 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 15 | | |
| 36-6B1 | 36 | 6 | 3.969 | 36.8 | 32.744 | 2.5x1 | 35 | 1486 | 3969 | 55 | 50 | 82 | 12 | 68 | 42 | 32 | 6.6 | 11 | 6.5 | 12 | |
| 36-6B2 | | 6 | 3.969 | 36.8 | 32.744 | 2.5x2 | 60 | 2696 | 7937 | 55 | 68 | 82 | 12 | 68 | 42 | 32 | 6.6 | 11 | 6.5 | 12 | |

Remark: Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

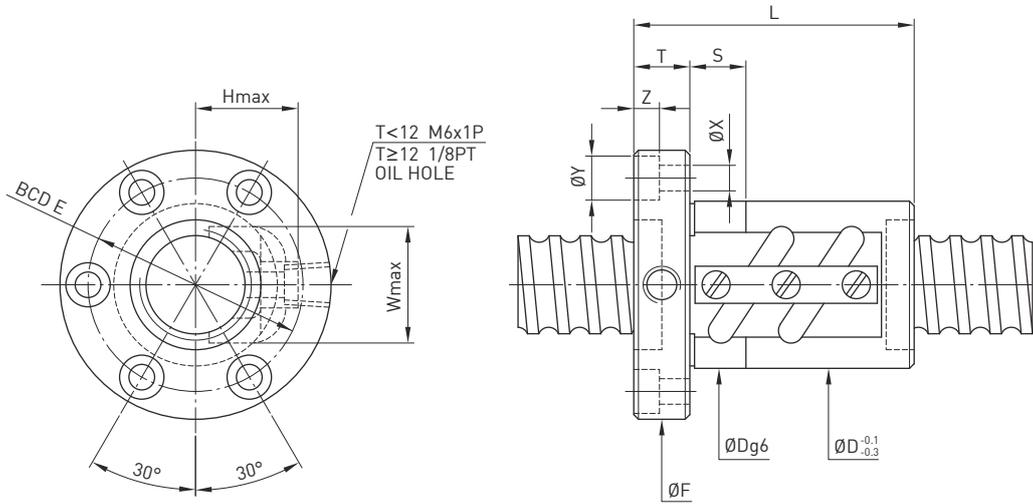
FSV Type ◀ Standard Product



| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load C(kgf) | Static Load Co(kgf) | Nut | | Flange | | | Return Tube | | Bolt | | | Fit |
|---------|--------------|-------|--------|--------|-----------|----------|----------------------|---------------------|---------------------|-----|-----|--------|-----|-------|-------------|------|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | W | H | X | Y | Z | |
| 36-10B2 | 36 | 10 | 6.350 | 37.4 | 30.91 | 2.5x2 | 68 | 5105 | 12669 | 62 | 102 | 104 | 18 | 82 | 49 | 40 | 11 | 17.5 | 11 | 15 |
| 40-5B2 | 40 | 5 | 3.175 | 40.6 | 37.324 | 2.5x2 | 66 | 2071 | 7134 | 58 | 65 | 92 | 16 | 72 | 46 | 34 | 9 | 14 | 8.5 | 15 |
| 40-6B2 | | 6 | 3.969 | 40.8 | 36.744 | 2.5x2 | 69 | 2817 | 8855 | 60 | 72 | 94 | 16 | 76 | 47 | 36 | 9 | 14 | 8.5 | 15 |
| 40-8B2 | | 8 | 4.763 | 41 | 36.132 | 2.5x2 | 70 | 3634 | 10603 | 62 | 86 | 96 | 16 | 78 | 48 | 38 | 9 | 14 | 8.5 | 15 |
| 40-8C1 | | 41 | | 36.132 | 3.5x1 | 49 | 2679 | 7438 | 62 | 70 | 96 | 16 | 78 | 48 | 38 | 9 | 14 | 8.5 | 15 | |
| 40-10B2 | | 10 | 6.350 | 41.4 | 34.91 | 2.5x2 | 74 | 5370 | 14138 | 65 | 102 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 15 |
| 40-10C1 | | 41.4 | 34.91 | 3.5x1 | 51 | 3932 | 9841 | 65 | 82 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 15 | | |
| 40-12B2 | | 12 | 7.144 | 41.6 | 34.299 | 2.5x2 | 72 | 6216 | 15674 | 64 | 108 | 112 | 18 | 88 | 53 | 42 | 11 | 17.5 | 11 | 30 |
| 40-16B2 | | 16 | | 41.6 | 34.299 | 2.5x2 | 72 | 6216 | 15674 | 74 | 135 | 110 | 18 | 90 | 52 | 49 | 11 | 17.5 | 11 | 30 |
| 40-25B1 | | 25 | 6.350 | 41.4 | 34.91 | 2.5x1 | 39 | 2959 | 7069 | 65 | 123 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 15 |
| 40-32B1 | | 32 | | 41.4 | 34.91 | 2.5x1 | 39 | 2959 | 7069 | 65 | 146 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 15 |
| 40-40A1 | 40 | 6.350 | 41.4 | 34.91 | 1.5x1 | 24 | 1875 | 4159 | 65 | 133 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 15 | |
| 45-10B1 | 45 | 10 | 46.4 | 39.91 | 2.5x1 | 45 | 4170 | 11161 | 70 | 74 | 112 | 18 | 90 | 58 | 48 | 11 | 17.5 | 11 | 15 | |
| 45-10B2 | | | 46.4 | 39.91 | 2.5x2 | 79 | 5655 | 15905 | 70 | 104 | 112 | 18 | 90 | 58 | 48 | 11 | 17.5 | 11 | 15 | |
| 45-12B2 | | 12 | 7.938 | 46.8 | 38.688 | 2.5x2 | 81 | 7627 | 19799 | 74 | 123 | 122 | 22 | 97 | 60 | 49 | 13 | 20 | 13 | 20 |
| 50-5A2 | 50 | 5 | 50.6 | 47.324 | 1.5x2 | 48 | 1447 | 5382 | 70 | 63 | 104 | 16 | 86 | 56 | 40 | 9 | 14 | 8.5 | 15 | |
| 50-5A3 | | | 50.6 | 47.324 | 1.5x3 | 73 | 2051 | 8072 | 70 | 73 | 104 | 16 | 86 | 56 | 40 | 9 | 14 | 8.5 | 15 | |
| 50-6B2 | | 6 | 3.969 | 50.8 | 46.744 | 2.5x2 | 81 | 3093 | 11149 | 72 | 75 | 106 | 16 | 88 | 57 | 43 | 9 | 14 | 8.5 | 15 |
| 50-6B3 | | | | 50.8 | 46.744 | 2.5x3 | 119 | 4384 | 16723 | 72 | 93 | 106 | 16 | 88 | 57 | 43 | 9 | 14 | 8.5 | 15 |
| 50-8B2 | | 8 | 4.763 | 51 | 46.132 | 2.5x2 | 84 | 4004 | 13409 | 75 | 88 | 116 | 18 | 95 | 58 | 45 | 11 | 17.5 | 11 | 15 |
| 50-8B3 | | | | 51 | 46.132 | 2.5x3 | 124 | 5674 | 20114 | 75 | 112 | 116 | 18 | 95 | 58 | 45 | 11 | 17.5 | 11 | 15 |
| 50-10B2 | | 10 | 6.350 | 51.4 | 44.91 | 2.5x2 | 87 | 5923 | 17670 | 78 | 104 | 119 | 18 | 98 | 62 | 48 | 11 | 17.5 | 11 | 15 |
| 50-10B3 | | | | 51.4 | 44.91 | 2.5x3 | 129 | 8394 | 26505 | 78 | 134 | 119 | 18 | 98 | 62 | 48 | 11 | 17.5 | 11 | 15 |
| 50-10C1 | | | | 51.4 | 44.91 | 3.5x1 | 60 | 4393 | 12481 | 78 | 84 | 119 | 18 | 98 | 62 | 48 | 11 | 17.5 | 11 | 15 |
| 50-12B1 | | | | 51.8 | 43.688 | 2.5x1 | 46 | 4420 | 11047 | 82 | 87 | 130 | 22 | 105 | 64 | 52 | 13 | 20 | 13 | 20 |
| 50-12B2 | 12 | 7.938 | 51.8 | 43.688 | 2.5x2 | 90 | 8022 | 22094 | 82 | 123 | 130 | 22 | 105 | 64 | 52 | 13 | 20 | 13 | 20 | |
| 50-12C1 | 51.8 | | 43.688 | 3.5x1 | 63 | 5875 | 15380 | 82 | 99 | 130 | 22 | 105 | 64 | 52 | 13 | 20 | 13 | 20 | | |
| 50-40A1 | 40 | 50 | 51.8 | 43.688 | 1.5x1 | 27 | 2801 | 6499 | 82 | 135 | 130 | 22 | 105 | 64 | 52 | 13 | 20 | 13 | 20 | |
| 50-50A1 | 50 | | 51.8 | 43.688 | 1.5x1 | 30 | 2801 | 6499 | 82 | 162 | 130 | 22 | 105 | 64 | 52 | 13 | 20 | 13 | 20 | |
| 55-10C1 | 55 | 10 | 6.350 | 56.4 | 49.91 | 3.5x1 | 66 | 4562 | 13661 | 84 | 84 | 125 | 18 | 103 | 68 | 54 | 11 | 17.5 | 11 | 20 |
| 55-12B2 | | 12 | 7.938 | 56.8 | 48.688 | 2.5x2 | 95 | 8392 | 24390 | 88 | 123 | 136 | 22 | 110 | 70 | 56 | 13 | 20 | 13 | 20 |
| 55-20B2 | | 20 | 12.700 | 58 | 45.16 | 2.5x2 | 127 | 20160 | 52439 | 100 | 175 | 132 | 28 | 115 | 74 | 71 | 9 | 14 | 8.5 | 30 |
| 63-8A2 | 63 | 8 | 4.763 | 64 | 59.132 | 1.5x2 | 54 | 2826 | 10129 | 87 | 76 | 129 | 18 | 107 | 70 | 50 | 11 | 17.5 | 11 | 20 |
| 63-8A3 | | | | 64 | 59.132 | 1.5x3 | 80 | 4004 | 15193 | 87 | 92 | 129 | 18 | 107 | 70 | 50 | 11 | 17.5 | 11 | 20 |
| 63-10B2 | | 10 | 6.350 | 64.4 | 57.91 | 2.5x2 | 104 | 6533 | 22371 | 90 | 107 | 132 | 20 | 110 | 74 | 53 | 11 | 17.5 | 11 | 20 |
| 63-10B3 | | | | 64.4 | 57.91 | 2.5x3 | 154 | 9258 | 33556 | 90 | 137 | 132 | 20 | 110 | 74 | 53 | 11 | 17.5 | 11 | 20 |
| 63-12B2 | | 12 | 7.938 | 64.8 | 56.688 | 2.5x2 | 109 | 8943 | 28062 | 94 | 124 | 142 | 22 | 117 | 76 | 57 | 13 | 20 | 13 | 20 |
| 63-16B2 | | 16 | 9.525 | 65.2 | 55.466 | 2.5x2 | 141 | 14862 | 46009 | 100 | 153 | 150 | 22 | 123 | 78 | 62 | 13 | 20 | 13 | 20 |
| 63-20B2 | 20 | 65.2 | | 55.466 | 2.5x2 | 141 | 14862 | 46009 | 100 | 176 | 150 | 22 | 123 | 78 | 62 | 13 | 20 | 13 | 20 | |

Remark: Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

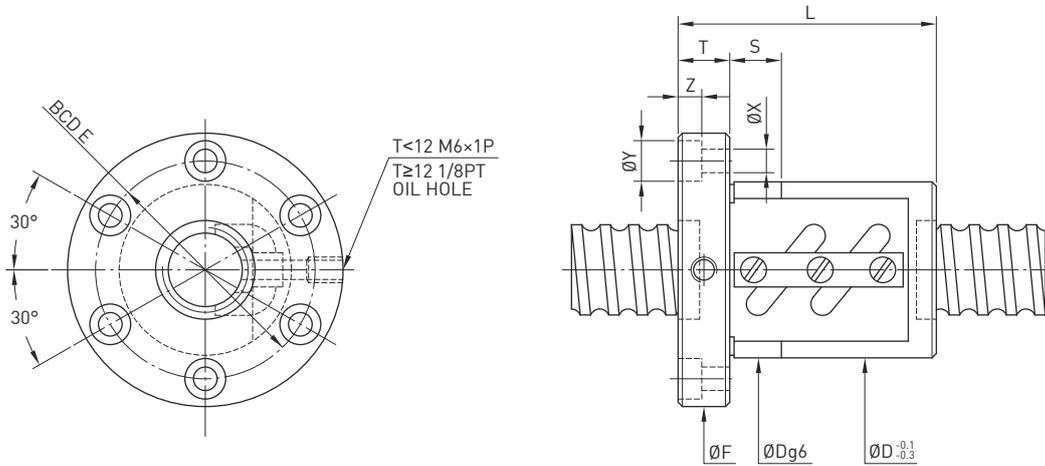
FSV Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Return Tube | | Bolt | | | Fit | | |
|----------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|--------|-------|--------|-----|-------|-------------|-----|------|------|------|------|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | W | H | X | Y | Z | | S | |
| 63-20B3 | 63 | 20 | 12.700 | 66 | 53.16 | 2.5x3 | 210 | 30715 | 90887 | 117 | 244 | 157 | 32 | 137 | 82 | 70 | 11 | 17.5 | 11 | 30 | | |
| 70-10B2 | 70 | 10 | 6.350 | 71.4 | 64.91 | 2.5x2 | 115 | 6843 | 25011 | 104 | 109 | 152 | 20 | 128 | 80 | 56 | 13 | 20 | 13 | 20 | | |
| 70-10B3 | | | | 71.4 | 64.91 | 2.5x3 | 170 | 9688 | 37516 | 104 | 139 | 152 | 20 | 128 | 80 | 56 | 13 | 20 | 13 | 20 | | |
| 70-12B2 | | 12 | 7.938 | 71.8 | 63.688 | 2.5x2 | 120 | 9382 | 31275 | 110 | 125 | 159 | 22 | 133 | 82 | 58 | 13 | 20 | 13 | 20 | | |
| 70-12B3 | | | | | 71.8 | 63.688 | 2.5x3 | 170 | 13296 | 46912 | 110 | 159 | 159 | 22 | 133 | 82 | 58 | 13 | 20 | 13 | 20 | |
| 80-10B2 | 80 | 10 | 6.350 | 81.4 | 74.91 | 2.5x2 | 126 | 7202 | 28538 | 115 | 109 | 163 | 22 | 137 | 90 | 64 | 13 | 20 | 13 | 20 | | |
| 80-10B3 | | | | | 81.4 | 74.91 | 2.5x3 | 186 | 10207 | 42807 | 115 | 139 | 163 | 22 | 137 | 90 | 64 | 13 | 20 | 13 | 20 | |
| 80-12B2 | | 12 | 7.938 | 81.8 | 73.688 | 2.5x2 | 130 | 9797 | 35422 | 120 | 125 | 169 | 22 | 143 | 92 | 67 | 13 | 20 | 13 | 25 | | |
| 80-12B3 | | | | | 81.8 | 73.688 | 2.5x3 | 192 | 13884 | 53132 | 120 | 159 | 169 | 22 | 143 | 92 | 67 | 13 | 20 | 13 | 25 | |
| 80-16B2 | | 16 | 9.525 | 82.2 | 72.466 | 2.5x2 | 171 | 16485 | 58851 | 125 | 156 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 | 25 | | |
| 80-16B3 | | | | | 82.2 | 72.466 | 2.5x3 | 252 | 23363 | 88276 | 125 | 204 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 | 25 | |
| 80-20B2 | | | | 20 | 9.525 | 82.2 | 72.466 | 2.5x2 | 171 | 16485 | 58851 | 125 | 185 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 | 25 |
| 80-20B3 | | | | | | | 82.2 | 72.466 | 2.5x3 | 252 | 23363 | 88276 | 125 | 245 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 |
| 100-12B2 | | 100 | 12 | 7.938 | 101.8 | 93.688 | 2.5x2 | 156 | 10761 | 44586 | 145 | 132 | 209 | 28 | 173 | 112 | 76 | 18 | 26 | 17.5 | 25 | |
| 100-12B3 | | | | | | 101.8 | 93.688 | 2.5x3 | 229 | 15251 | 66894 | 145 | 168 | 209 | 28 | 173 | 112 | 76 | 18 | 26 | 17.5 | 25 |
| 100-16B2 | 16 | | 9.525 | 102.2 | 92.466 | 2.5x2 | 200 | 18123 | 74425 | 150 | 162 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 30 | | |
| 100-16B3 | | | | | 102.2 | 92.466 | 2.5x3 | 305 | 25684 | 111637 | 150 | 212 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 30 | |
| 100-20B2 | 20 | | 9.525 | 102.2 | 92.466 | 2.5x2 | 200 | 18123 | 74425 | 150 | 190 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 30 | | |
| 100-20B3 | | | | | 102.2 | 92.466 | 2.5x3 | 305 | 25684 | 111637 | 150 | 250 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 30 | |

Remark: Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

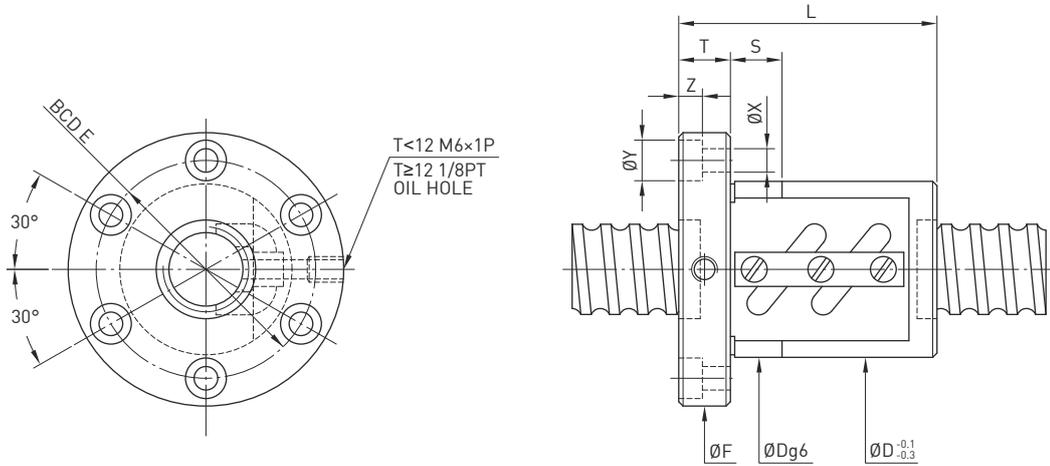
FSW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | | Fit | | |
|---------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|-------|------|--------|-----|-------|------|-----|-----|-----|-----|-----|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | S | | | |
| 12-4B1 | 12 | 4 | 2.381 | 12.25 | 9.792 | 2.5x1 | 8 | 383 | 638 | 30 | 38 | 50 | 10 | 40 | 4.5 | 8 | 4 | 12 | | | |
| 12-4C1 | | | | 12.25 | 9.792 | 3.5x1 | 9 | 511 | 893 | 30 | 44 | 50 | 10 | 40 | 4.5 | 8 | 4 | 12 | | | |
| 12-5B1 | | | | 12.25 | 9.792 | 2.5x1 | 8 | 383 | 638 | 30 | 40 | 50 | 10 | 40 | 4.5 | 8 | 4 | 12 | | | |
| 14-5B1 | 14 | 5 | | 14.6 | 11.324 | 2.5x1 | 10 | 710 | 1216 | 34 | 40 | 57 | 11 | 45 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 15-10A1 | 15 | 10 | 3.175 | 15.6 | 12.324 | 1.5x1 | 9 | 474 | 781 | 34 | 48 | 57 | 11 | 45 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 15-20A1 | | 20 | | 15.6 | 12.324 | 1.5x1 | 9 | 474 | 781 | 34 | 62 | 58 | 12 | 45 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 16-4B1 | 16 | 4 | 2.381 | 16.25 | 13.792 | 2.5x1 | 14 | 439 | 870 | 34 | 38 | 57 | 11 | 45 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 16-5B1 | | 5 | | 16.6 | 13.324 | 2.5x1 | 16 | 763 | 1400 | 40 | 45 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 16-5B2 | | | | 16.6 | 13.324 | 2.5x2 | 33 | 1385 | 2799 | 40 | 60 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 16-5C1 | | 5 | | 3.175 | 16.6 | 13.324 | 3.5x1 | 22 | 1013 | 1946 | 40 | 50 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 12 | | |
| 20-5B1 | 20 | 5 | 3.969 | 20.6 | 17.324 | 2.5x1 | 19 | 837 | 1733 | 44 | 45 | 68 | 12 | 55 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 20-5B2 | | | | 20.6 | 17.324 | 2.5x2 | 39 | 1519 | 3465 | 44 | 60 | 68 | 12 | 55 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 20-6B1 | | 6 | | 20.8 | 16.744 | 2.5x1 | 20 | 1137 | 2187 | 48 | 48 | 72 | 12 | 59 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 20-6C1 | | | | 20.8 | 16.744 | 3.5x1 | 28 | 1512 | 3041 | 48 | 66 | 72 | 12 | 59 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 25-4B2 | 25 | 4 | 2.381 | 25.25 | 22.792 | 2.5x2 | 38 | 976 | 2776 | 46 | 48 | 69 | 11 | 57 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 25-5B2 | | 5 | | 25.6 | 22.324 | 2.5x2 | 46 | 1704 | 4417 | 50 | 60 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 25-5C1 | | | | 25.6 | 22.324 | 3.5x1 | 35 | 1252 | 3085 | 50 | 50 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 12 | | | |
| 25-6B1 | | 6 | | 3.969 | 25.8 | 21.744 | 2.5x1 | 24 | 1255 | 2735 | 53 | 44 | 76 | 11 | 64 | 5.5 | 9.5 | 5.5 | 12 | | |
| 25-6B2 | | | | | 25.8 | 21.744 | 2.5x2 | 48 | 2308 | 5523 | 56 | 68 | 82 | 12 | 69 | 6.6 | 11 | 6.5 | 12 | | |
| 25-6C1 | | | | | 25.8 | 21.744 | 3.5x1 | 35 | 1690 | 3844 | 56 | 55 | 82 | 12 | 69 | 6.6 | 11 | 6.5 | 12 | | |
| 25-10B1 | | | | | 10 | 4.763 | 26 | 21.132 | 2.5x1 | 25 | 1592 | 3237 | 60 | 65 | 86 | 16 | 73 | 6.6 | 11 | 6.5 | 12 |
| 25-10B2 | | 26 | | 21.132 | | | 2.5x2 | 46 | 2888 | 6472 | 58 | 97 | 85 | 15 | 71 | 6.6 | 11 | 6.5 | 12 | | |
| 25-12B1 | 12 | 3.969 | 25.8 | 21.744 | 2.5x1 | 24 | 1271 | 2761 | 53 | 60 | 78 | 11 | 64 | 6.6 | 11 | 6.5 | 12 | | | | |
| 28-5B1 | 28 | 5 | 3.175 | 28.6 | 25.324 | 2.5x1 | 26 | 984 | 2466 | 55 | 45 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 12 | | | |
| 28-5B2 | | | | 28.6 | 25.324 | 2.5x2 | 50 | 1785 | 4932 | 55 | 60 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 12 | | | |
| 28-6A2 | | 6 | | 4.763 | 28.6 | 25.324 | 1.5x2 | 29 | 1150 | 2960 | 55 | 55 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 12 | | |
| 28-12B2 | | | | | 29 | 24.132 | 2.5x2 | 51 | 3060 | 7299 | 60 | 110 | 86 | 12 | 73 | 6.6 | 11 | 6.5 | 12 | | |
| 28-16B1 | | 16 | | 4.763 | 29 | 24.132 | 2.5x1 | 25 | 1686 | 3649 | 62 | 84 | 89 | 12 | 75 | 6.6 | 11 | 6.5 | 12 | | |
| 32-5B2 | | 32 | | 5 | 3.175 | 32.6 | 29.324 | 2.5x2 | 55 | 1886 | 5666 | 58 | 60 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 12 | |
| 32-5C1 | 32.6 | | 29.324 | | | 3.5x1 | 39 | 1388 | 3967 | 58 | 50 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 12 | | | |
| 32-6B2 | 6 | | 3.969 | 32.8 | | 28.744 | 2.5x2 | 56 | 2556 | 7020 | 62 | 68 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 12 | | |
| 32-6C1 | | | | 32.8 | | 28.744 | 3.5x1 | 39 | 1888 | 4936 | 62 | 55 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 12 | | |
| 32-8B2 | 8 | | 4.763 | 33 | | 28.132 | 2.5x2 | 59 | 3284 | 8453 | 66 | 86 | 100 | 16 | 82 | 9 | 14 | 8.5 | 15 | | |
| 32-8C1 | | | | 33 | | 28.132 | 3.5x1 | 41 | 2428 | 5948 | 66 | 70 | 100 | 16 | 82 | 9 | 14 | 8.5 | 15 | | |
| 32-10B2 | | | | 10 | | 6.350 | 33.4 | 26.91 | 2.5x2 | 60 | 4810 | 11199 | 74 | 98 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 |
| 32-10C1 | | | | | | | 33.4 | 26.91 | 3.5x1 | 44 | 3519 | 7785 | 74 | 78 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 |
| 32-12A2 | 12 | | 6.350 | 33.4 | | 26.91 | 1.5x2 | 37 | 3051 | 6612 | 74 | 97 | 108 | 18 | 90 | 9 | 14 | 8.5 | 15 | | |
| 32-12B2 | | | | 33.4 | | 26.91 | 2.5x2 | 59 | 4810 | 11199 | 74 | 110 | 108 | 18 | 90 | 9 | 14 | 8.5 | 15 | | |

Remark: Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

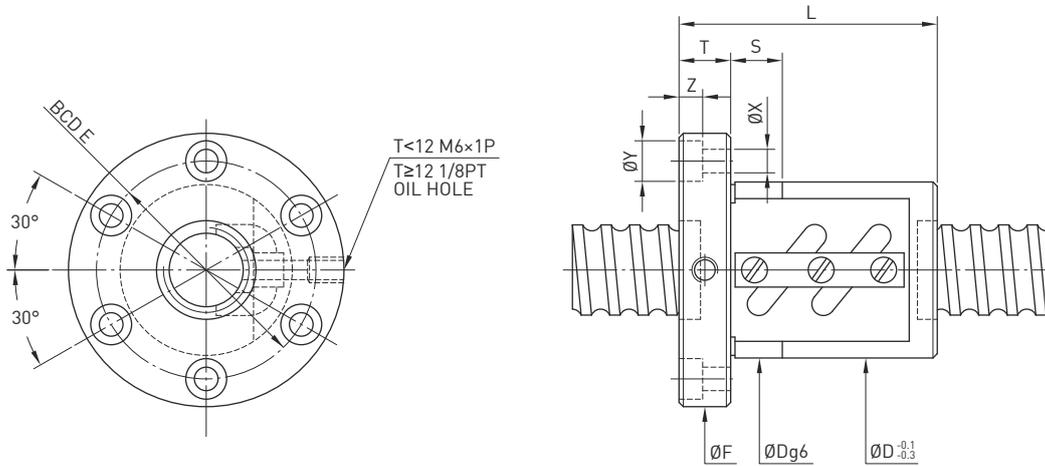
FSW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/µm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit | | |
|---------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|-------|--------|-----|-------|------|------|------|------|------|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | | S | |
| 32-16A2 | 32 | 16 | 6.350 | 33.4 | 26.91 | 1.5x2 | 36 | 3035 | 6555 | 74 | 99 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 | | |
| 32-16B1 | | | | 33.4 | 26.91 | 2.5x1 | 30 | 2650 | 5599 | 74 | 94 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 | | |
| 32-16B2 | | | | 33.4 | 26.91 | 2.5x2 | 59 | 4810 | 11199 | 74 | 130 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 | | |
| 32-20A2 | | | | 20 | 33.4 | 26.91 | 1.5x2 | 37 | 3035 | 6555 | 74 | 120 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 | |
| 32-20B1 | | | | | 33.4 | 26.91 | 2.5x1 | 30 | 2650 | 5599 | 74 | 98 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 | |
| 36-6B1 | 36 | 6 | 3.969 | 36.8 | 32.744 | 2.5x1 | 35 | 1486 | 3969 | 65 | 50 | 100 | 12 | 82 | 6.6 | 11 | 6.5 | 12 | | |
| 36-6B2 | | | | 36.8 | 32.744 | 2.5x2 | 60 | 2696 | 7937 | 65 | 68 | 100 | 12 | 82 | 6.6 | 11 | 6.5 | 12 | | |
| 36-10B2 | | | | 10 | 6.350 | 37.4 | 30.91 | 2.5x2 | 68 | 5105 | 12669 | 75 | 102 | 125 | 18 | 98 | 11 | 17.5 | 11 | 15 |
| 36-12B2 | | | | | | 37.4 | 30.91 | 2.5x2 | 65 | 5105 | 12668 | 75 | 110 | 125 | 18 | 98 | 11 | 17.5 | 11 | 15 |
| 36-16C1 | | | | | | 16 | 37.4 | 30.91 | 3.5x1 | 46 | 3736 | 8813 | 80 | 105 | 120 | 18 | 100 | 11 | 17.5 | 11 |
| 40-5B2 | 40 | 5 | 3.175 | 40.6 | 37.324 | 2.5x2 | 66 | 2071 | 7134 | 68 | 65 | 102 | 16 | 84 | 9 | 14 | 8.5 | 15 | | |
| 40-6B2 | | | | 6 | 3.969 | 40.8 | 36.744 | 2.5x2 | 69 | 2817 | 8855 | 70 | 72 | 104 | 16 | 86 | 9 | 14 | 8.5 | 15 |
| 40-8B2 | | 8 | 4.763 | 41 | 36.132 | 2.5x2 | 70 | 3634 | 10603 | 74 | 86 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 | | |
| 40-8C1 | | | | 41 | 36.132 | 3.5x1 | 49 | 2679 | 7438 | 74 | 70 | 108 | 16 | 90 | 9 | 14 | 8.5 | 15 | | |
| 40-10B2 | | | | 10 | 6.350 | 41.4 | 34.91 | 2.5x2 | 74 | 5370 | 14138 | 84 | 102 | 125 | 18 | 104 | 11 | 17.5 | 11 | 15 |
| 40-10C1 | | 41.4 | 34.91 | | | 3.5x1 | 51 | 3932 | 9841 | 84 | 82 | 125 | 18 | 104 | 11 | 17.5 | 11 | 15 | | |
| 40-12B1 | | 12 | 7.144 | | | 41.6 | 34.299 | 2.5x1 | 36 | 3425 | 7837 | 86 | 81 | 128 | 18 | 106 | 11 | 17.5 | 11 | 20 |
| 40-12B2 | | | | | | 41.6 | 34.299 | 2.5x2 | 72 | 6217 | 15674 | 86 | 117 | 128 | 18 | 106 | 11 | 17.5 | 11 | 20 |
| 40-16A2 | | 16 | 7.144 | 7.144 | 41.6 | 34.299 | 1.5x2 | 42 | 4007 | 9405 | 86 | 118 | 128 | 18 | 106 | 11 | 17.5 | 11 | 20 | |
| 40-16B1 | | | | | 41.6 | 34.299 | 2.5x1 | 37 | 3425 | 7837 | 86 | 102 | 128 | 18 | 106 | 11 | 17.5 | 11 | 20 | |
| 45-10B1 | 45 | 10 | 6.350 | 46.4 | 39.91 | 2.5x1 | 45 | 3116 | 7953 | 88 | 74 | 132 | 18 | 110 | 11 | 17.5 | 11 | 15 | | |
| 45-10B2 | | | | 46.4 | 39.91 | 2.5x2 | 79 | 5655 | 15905 | 88 | 104 | 132 | 18 | 110 | 11 | 17.5 | 11 | 15 | | |
| 45-12B2 | | | | 12 | 7.938 | 46.8 | 38.688 | 2.5x2 | 81 | 7627 | 19799 | 96 | 123 | 142 | 22 | 117 | 13 | 20 | 13 | 20 |
| 50-5A2 | 50 | 5 | 3.175 | 50.6 | 47.324 | 1.5x2 | 48 | 1447 | 5382 | 80 | 63 | 114 | 16 | 96 | 9 | 14 | 8.5 | 15 | | |
| 50-5A3 | | | | 50.6 | 47.324 | 1.5x3 | 73 | 2051 | 8072 | 80 | 73 | 114 | 16 | 96 | 9 | 14 | 8.5 | 15 | | |
| 50-6B2 | | | | 6 | 3.969 | 50.8 | 46.744 | 2.5x2 | 81 | 3093 | 11149 | 84 | 75 | 118 | 16 | 100 | 9 | 14 | 8.5 | 15 |
| 50-6C2 | | 50.8 | 46.744 | | | 3.5x2 | 109 | 4131 | 15608 | 84 | 80 | 118 | 15 | 100 | 9 | 14 | 8.5 | 15 | | |
| 50-6B3 | | 50.8 | 46.744 | | | 2.5x3 | 119 | 4384 | 16723 | 84 | 93 | 118 | 16 | 100 | 9 | 14 | 8.5 | 15 | | |
| 50-8B2 | | 8 | 4.763 | 51 | 46.132 | 2.5x2 | 84 | 4004 | 13409 | 87 | 88 | 128 | 18 | 107 | 11 | 17.5 | 11 | 15 | | |
| 50-8B3 | | | | 51 | 46.132 | 2.5x3 | 124 | 5674 | 20114 | 87 | 112 | 128 | 18 | 107 | 11 | 17.5 | 11 | 15 | | |
| 50-10B2 | | | | 10 | 6.350 | 51.4 | 44.91 | 2.5x2 | 87 | 5923 | 17670 | 94 | 104 | 135 | 18 | 114 | 11 | 17.5 | 11 | 15 |
| 50-10B3 | | 51.4 | 44.91 | | | 2.5x3 | 129 | 8394 | 26505 | 94 | 134 | 135 | 18 | 114 | 11 | 17.5 | 11 | 15 | | |
| 50-10C1 | | 51.4 | 44.91 | | | 3.5x1 | 60 | 4393 | 12481 | 94 | 84 | 135 | 18 | 114 | 11 | 17.5 | 11 | 15 | | |
| 50-12B1 | | 12 | 7.938 | | | 51.8 | 43.688 | 2.5x1 | 46 | 4420 | 11047 | 102 | 87 | 150 | 22 | 125 | 13 | 20 | 13 | 20 |
| 50-12B2 | | | | | | 51.8 | 43.688 | 2.5x2 | 90 | 8022 | 22094 | 102 | 123 | 150 | 22 | 125 | 13 | 20 | 13 | 20 |
| 50-12C1 | | 12 | 7.938 | 7.938 | 51.8 | 43.688 | 3.5x1 | 63 | 5875 | 15380 | 102 | 99 | 150 | 22 | 125 | 13 | 20 | 13 | 20 | |
| 50-30A2 | | | | | 30 | 6.350 | 51.4 | 44.91 | 1.5x2 | 52 | 3834 | 10658 | 94 | 160 | 135 | 18 | 114 | 11 | 17.5 | 11 |

Remark : Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

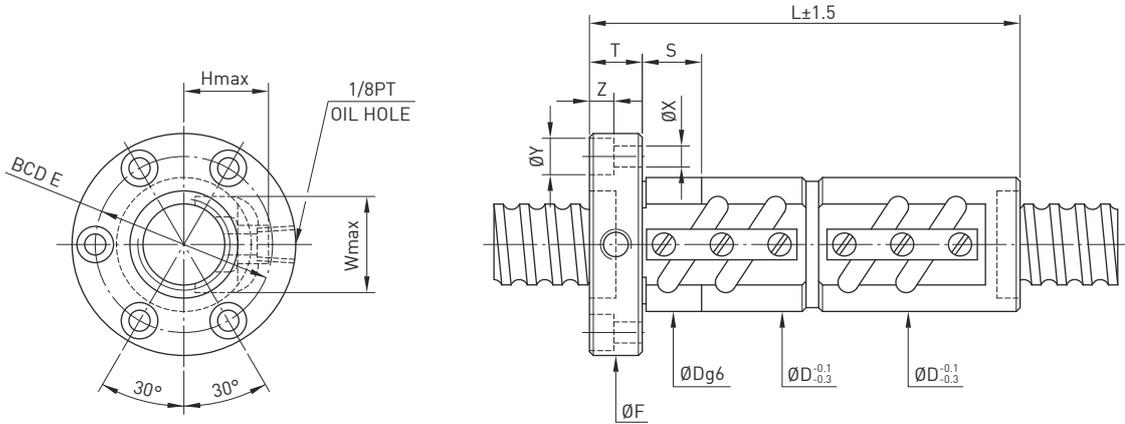
FSW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit | |
|----------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|-------|-----|--------|-------|-------|------|------|------|------|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | | S |
| 55-10B2 | 55 | 10 | 6.350 | 56.4 | 49.91 | 2.5x2 | 93 | 6071 | 19592 | 102 | 103 | 144 | 18 | 122 | 11 | 17.5 | 11 | 20 | |
| 55-10C1 | | | | 56.4 | 49.91 | 3.5x1 | 66 | 4562 | 13661 | 100 | 84 | 140 | 18 | 118 | 11 | 17.5 | 11 | 20 | |
| 55-12B2 | | 60 | 12 | 7.938 | 56.8 | 48.688 | 2.5x2 | 95 | 8392 | 24390 | 105 | 123 | 154 | 22 | 127 | 13 | 20 | 13 | 20 |
| 60-12B2 | 61.8 | | | | 53.688 | 2.5x2 | 101 | 8742 | 26685 | 112 | 135 | 154 | 18 | 132 | 11 | 17.5 | 11 | 20 | |
| 63-8A2 | 63 | | 8 | 4.763 | 64 | 59.132 | 1.5x2 | 54 | 2826 | 10129 | 104 | 76 | 146 | 18 | 124 | 11 | 17.5 | 11 | 20 |
| 63-8A3 | | 64 | | | 59.132 | 1.5x3 | 80 | 4004 | 15193 | 104 | 92 | 146 | 18 | 124 | 11 | 17.5 | 11 | 20 | |
| 63-10B2 | | 10 | 6.350 | 64.4 | 57.91 | 2.5x2 | 104 | 6533 | 22371 | 110 | 107 | 152 | 20 | 130 | 11 | 17.5 | 11 | 20 | |
| 63-10B3 | | | | 64.4 | 57.91 | 2.5x3 | 154 | 9528 | 33556 | 110 | 137 | 152 | 20 | 130 | 11 | 17.5 | 11 | 20 | |
| 63-12B2 | | 16 | 12 | 7.938 | 64.8 | 56.688 | 2.5x2 | 109 | 8943 | 28062 | 118 | 124 | 166 | 22 | 141 | 13 | 20 | 13 | 20 |
| 63-16B2 | | | | | 65.2 | 55.466 | 2.5x2 | 141 | 14862 | 46009 | 124 | 153 | 172 | 22 | 147 | 13 | 20 | 13 | 20 |
| 63-20B2 | | | 20 | 9.525 | 65.2 | 55.466 | 2.5x2 | 141 | 14862 | 46009 | 124 | 176 | 172 | 22 | 147 | 13 | 20 | 13 | 20 |
| 70-10B2 | | | | | 70 | 10 | 6.350 | 71.4 | 64.91 | 2.5x2 | 115 | 6843 | 25011 | 124 | 109 | 170 | 20 | 145 | 13 |
| 70-10B3 | 71.4 | 64.91 | 2.5x3 | 170 | | | | 9698 | 37516 | 124 | 139 | 170 | 20 | 145 | 13 | 20 | 13 | 20 | |
| 70-12B2 | 12 | 7.938 | 71.8 | 63.688 | | 2.5x2 | 120 | 9382 | 31275 | 130 | 125 | 178 | 22 | 152 | 13 | 20 | 13 | 20 | |
| 70-12B3 | | | 71.8 | 63.688 | | 2.5x3 | 170 | 13296 | 46912 | 130 | 159 | 178 | 22 | 152 | 13 | 20 | 13 | 20 | |
| 80-10B2 | 80 | 10 | 6.350 | 81.4 | | 74.91 | 2.5x2 | 126 | 7202 | 28538 | 130 | 109 | 178 | 22 | 152 | 13 | 20 | 13 | 20 |
| 80-10B3 | | | | 81.4 | | 74.91 | 2.5x3 | 186 | 10207 | 42807 | 130 | 139 | 178 | 22 | 152 | 13 | 20 | 13 | 20 |
| 80-12B2 | | 12 | 7.938 | 81.8 | | 73.688 | 2.5x2 | 130 | 9797 | 35422 | 136 | 125 | 185 | 22 | 159 | 13 | 20 | 13 | 20 |
| 80-12B3 | | | | 81.8 | | 73.688 | 2.5x3 | 192 | 13844 | 53132 | 136 | 159 | 185 | 22 | 159 | 13 | 20 | 13 | 20 |
| 80-16B2 | | 16 | 9.525 | 82.2 | 72.466 | 2.5x2 | 171 | 16485 | 58851 | 145 | 156 | 210 | 28 | 174 | 18 | 26 | 17.5 | 25 | |
| 80-16B3 | | | | 82.2 | 72.466 | 2.5x3 | 252 | 23363 | 88276 | 145 | 204 | 210 | 28 | 174 | 18 | 26 | 17.5 | 25 | |
| 80-20B2 | | | 20 | 9.525 | 82.2 | 72.466 | 2.5x2 | 171 | 16485 | 58851 | 145 | 185 | 210 | 28 | 174 | 18 | 26 | 17.5 | 25 |
| 80-20B3 | | | | | 82.2 | 72.466 | 2.5x3 | 252 | 23363 | 88276 | 145 | 245 | 210 | 28 | 174 | 18 | 26 | 17.5 | 25 |
| 100-12B2 | 100 | 12 | 7.938 | 101.8 | 93.688 | 2.5x2 | 156 | 10761 | 44596 | 160 | 132 | 224 | 24 | 188 | 18 | 26 | 17.5 | 25 | |
| 100-12B3 | | | | 101.8 | 93.688 | 2.5x3 | 229 | 15251 | 66894 | 160 | 168 | 224 | 24 | 188 | 18 | 26 | 17.5 | 25 | |
| 100-16B2 | | 16 | 9.525 | 102.2 | 92.466 | 2.5x2 | 200 | 18123 | 77425 | 170 | 162 | 248 | 32 | 205 | 22 | 32 | 21.5 | 30 | |
| 100-16B3 | | | | 102.2 | 92.466 | 2.5x3 | 305 | 25684 | 111637 | 170 | 212 | 248 | 32 | 205 | 22 | 32 | 21.5 | 30 | |
| 100-20B2 | | 20 | 9.525 | 102.2 | 92.466 | 2.5x2 | 200 | 18123 | 74425 | 170 | 190 | 248 | 32 | 205 | 22 | 32 | 21.5 | 30 | |
| 100-20B3 | | | | 102.2 | 92.466 | 2.5x3 | 305 | 25684 | 111637 | 170 | 250 | 248 | 32 | 205 | 22 | 32 | 21.5 | 30 | |

Remark: Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

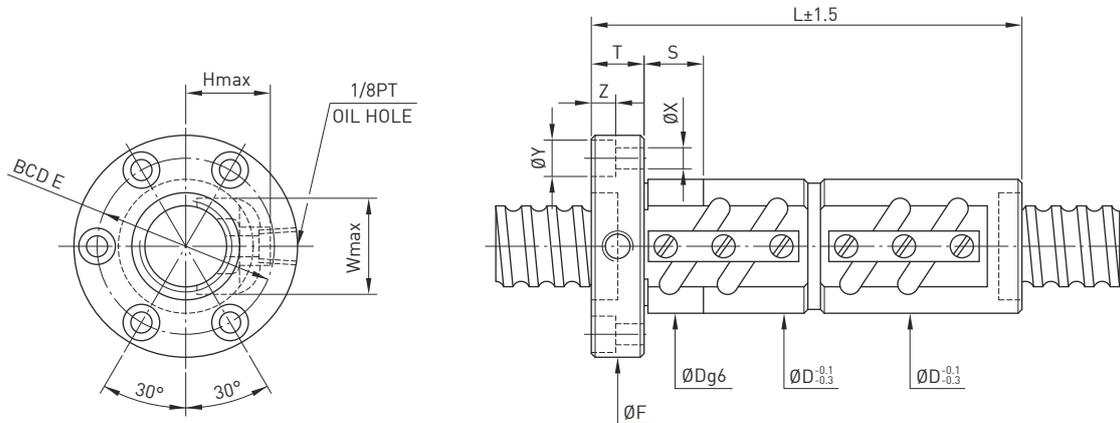
FDV Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/µm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Return Tube | | Bolt | | | Fit |
|---------|--------------|--------|-----------|------|--------|----------|----------------------|---|----------------------|-----|-----|--------|----|-------|-------------|-----|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | W | H | X | Y | Z | |
| 16-5B1 | 16 | 5 | 3.175 | 16.6 | 13.324 | 2.5x1 | 32 | 763 | 1400 | 31 | 80 | 54 | 12 | 41 | 24 | 22 | 5.5 | 9.5 | 5.5 | 24 |
| 16-5B2 | | | | 16.6 | 13.324 | 2.5x2 | 65 | 1385 | 2799 | 31 | 110 | 54 | 12 | 41 | 24 | 22 | 5.5 | 9.5 | 5.5 | 24 |
| 16-5C1 | | | | 16.6 | 13.324 | 3.5x1 | 46 | 1013 | 1946 | 31 | 90 | 54 | 12 | 41 | 24 | 22 | 5.5 | 9.5 | 5.5 | 24 |
| 20-5B1 | 20 | 6 | 3.969 | 20.6 | 17.324 | 2.5x1 | 38 | 837 | 1733 | 35 | 80 | 58 | 12 | 46 | 27 | 25 | 5.5 | 9.5 | 5.5 | 24 |
| 20-5B2 | | | | 20.6 | 17.324 | 2.5x2 | 76 | 1519 | 3465 | 35 | 110 | 58 | 12 | 46 | 27 | 25 | 5.5 | 9.5 | 5.5 | 24 |
| 20-6B1 | | | | 20.8 | 16.744 | 2.5x1 | 40 | 1139 | 2187 | 36 | 92 | 60 | 12 | 47 | 28 | 27 | 5.5 | 9.5 | 5.5 | 24 |
| 20-6C1 | 20.8 | 16.744 | 3.5x1 | 55 | 1512 | 3041 | 36 | 104 | 60 | 12 | 47 | 28 | 27 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 25-5B1 | 25 | 5 | 3.175 | 25.6 | 22.324 | 2.5x1 | 46 | 939 | 2209 | 40 | 80 | 64 | 12 | 52 | 31 | 26 | 5.5 | 9.5 | 5.5 | 24 |
| 25-5B2 | | | | 25.6 | 22.324 | 2.5x2 | 90 | 1704 | 4417 | 40 | 110 | 64 | 12 | 52 | 31 | 26 | 5.5 | 9.5 | 5.5 | 24 |
| 25-5C1 | | | | 25.6 | 22.324 | 3.5x1 | 68 | 1252 | 3085 | 40 | 90 | 64 | 12 | 52 | 31 | 26 | 5.5 | 9.5 | 5.5 | 24 |
| 25-6B1 | 25 | 6 | 3.969 | 25.8 | 21.744 | 2.5x2 | 94 | 2308 | 5523 | 42 | 128 | 68 | 12 | 55 | 32 | 28 | 6.6 | 11 | 6.5 | 24 |
| 25-6C1 | | | | 25.8 | 21.744 | 3.5x1 | 66 | 1690 | 3844 | 42 | 104 | 68 | 12 | 55 | 32 | 28 | 6.6 | 11 | 6.5 | 24 |
| 25-10B1 | | | | 26 | 21.132 | 2.5x1 | 48 | 1592 | 3237 | 45 | 122 | 72 | 16 | 58 | 34 | 29 | 6.6 | 11 | 6.5 | 24 |
| 28-5B1 | 28 | 5 | 3.175 | 28.6 | 25.324 | 2.5x1 | 51 | 984 | 2466 | 44 | 80 | 70 | 12 | 56 | 34 | 28 | 6.6 | 11 | 6.5 | 24 |
| 28-5B2 | | | | 28.6 | 25.324 | 2.5x2 | 98 | 1785 | 4932 | 44 | 110 | 70 | 12 | 56 | 34 | 28 | 6.6 | 11 | 6.5 | 24 |
| 28-6A2 | | | | 28.6 | 25.324 | 1.5x2 | 59 | 1150 | 2960 | 44 | 110 | 70 | 12 | 56 | 34 | 28 | 6.6 | 11 | 6.5 | 24 |
| 28-8A2 | 29 | 24.132 | 1.5x2 | 62 | 1960 | 4348 | 50 | 110 | 75 | 12 | 61 | 38 | 32 | 6.6 | 11 | 6.5 | 15 | | | |
| 28-10B2 | 29 | 24.132 | 2.5x2 | 102 | 3060 | 7299 | 54 | 177 | 94 | 15 | 74 | 37 | 32 | 9 | 14 | 8.5 | 30 | | | |
| 32-5B1 | 32 | 5 | 3.175 | 32.6 | 29.324 | 2.5x1 | 55 | 1039 | 2833 | 50 | 80 | 76 | 12 | 63 | 38 | 30 | 6.6 | 11 | 6.5 | 24 |
| 32-5B2 | | | | 32.6 | 29.324 | 2.5x2 | 109 | 1886 | 5666 | 50 | 110 | 76 | 12 | 63 | 38 | 30 | 6.6 | 11 | 6.5 | 24 |
| 32-5C1 | | | | 32.6 | 29.324 | 3.5x1 | 76 | 1388 | 3967 | 50 | 90 | 76 | 12 | 63 | 38 | 30 | 6.6 | 11 | 6.5 | 24 |
| 32-6B1 | 32 | 6 | 3.969 | 32.8 | 28.744 | 2.5x1 | 57 | 1409 | 3510 | 52 | 92 | 78 | 12 | 65 | 39 | 32 | 6.6 | 11 | 6.5 | 24 |
| 32-6B2 | | | | 32.8 | 28.744 | 2.5x2 | 112 | 2556 | 7020 | 52 | 128 | 78 | 12 | 65 | 39 | 32 | 6.6 | 11 | 6.5 | 24 |
| 32-6C1 | | | | 32.8 | 28.744 | 3.5x1 | 78 | 1888 | 4936 | 52 | 104 | 78 | 12 | 65 | 39 | 32 | 6.6 | 11 | 6.5 | 24 |
| 32-8B1 | 32 | 8 | 4.763 | 33 | 28.132 | 2.5x1 | 58 | 1810 | 4227 | 54 | 110 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 30 |
| 32-8B2 | | | | 33 | 28.132 | 2.5x2 | 115 | 3284 | 8453 | 54 | 158 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 30 |
| 32-8C1 | | | | 33 | 28.132 | 3.5x1 | 82 | 2428 | 5948 | 54 | 126 | 88 | 16 | 70 | 40 | 33 | 9 | 14 | 8.5 | 30 |
| 32-10B1 | 32 | 10 | 6.350 | 33.4 | 26.91 | 2.5x1 | 58 | 2651 | 5600 | 57 | 122 | 91 | 16 | 73 | 44 | 37 | 9 | 14 | 8.5 | 30 |
| 32-10B2 | | | | 33.4 | 26.91 | 2.5x2 | 118 | 4810 | 11199 | 57 | 182 | 91 | 16 | 73 | 44 | 37 | 9 | 14 | 8.5 | 30 |
| 32-10C1 | | | | 33.4 | 26.91 | 3.5x1 | 86 | 3519 | 7785 | 57 | 142 | 91 | 16 | 73 | 44 | 37 | 9 | 14 | 8.5 | 30 |
| 32-12A2 | 32 | 12 | 6.350 | 33.4 | 26.91 | 1.5x2 | 72 | 3035 | 6555 | 62 | 180 | 108 | 16 | 86 | 44 | 38 | 9 | 14 | 8.5 | 15 |
| 32-12B1 | | | | 33.4 | 26.91 | 2.5x1 | 62 | 2650 | 5599 | 62 | 138 | 108 | 16 | 86 | 44 | 38 | 9 | 14 | 8.5 | 20 |
| 32-16A2 | | | | 33.4 | 26.91 | 1.5x2 | 72 | 3035 | 6555 | 62 | 180 | 108 | 16 | 86 | 44 | 38 | 9 | 14 | 8.5 | 20 |
| 36-6B1 | 36 | 6 | 3.969 | 36.8 | 32.744 | 2.5x1 | 62 | 1486 | 3969 | 55 | 92 | 82 | 12 | 68 | 42 | 32 | 6.6 | 11 | 6.5 | 24 |
| 36-6B2 | | | | 36.8 | 32.744 | 2.5x2 | 121 | 2696 | 7937 | 55 | 128 | 82 | 12 | 68 | 42 | 32 | 6.6 | 11 | 6.5 | 24 |
| 36-10B2 | | | | 37.4 | 30.91 | 2.5x2 | 132 | 5105 | 12669 | 62 | 184 | 104 | 18 | 82 | 49 | 40 | 11 | 17.5 | 11 | 30 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

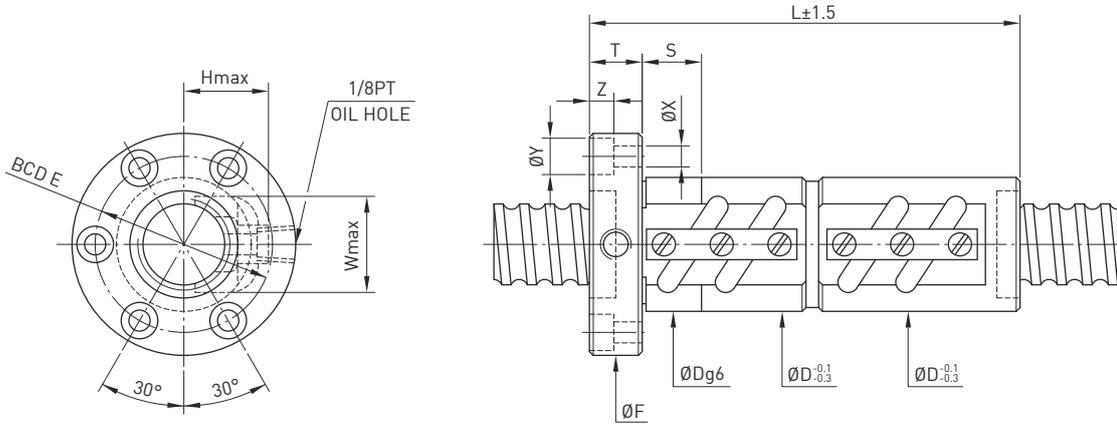
FDV Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Return Tube | | Bolt | | | Fit | |
|---------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|------|--------|-------|-------|-------------|-----|------|------|------|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | W | H | X | Y | Z | | S |
| 40-5B1 | 40 | 5 | 3.175 | 40.6 | 37.324 | 2.5x1 | 65 | 1141 | 3567 | 58 | 84 | 92 | 16 | 72 | 46 | 34 | 9 | 14 | 8.5 | 30 | |
| 40-5B2 | | | | 40.6 | 37.324 | 2.5x2 | 132 | 2071 | 7134 | 58 | 114 | 92 | 16 | 72 | 46 | 34 | 9 | 14 | 8.5 | 30 | |
| 40-6B2 | | 6 | 3.969 | 40.8 | 36.744 | 2.5x2 | 136 | 2817 | 8855 | 60 | 132 | 94 | 16 | 76 | 47 | 36 | 9 | 14 | 8.5 | 30 | |
| 40-8B1 | | | | | 41 | 36.132 | 2.5x1 | 69 | 2003 | 5302 | 62 | 110 | 96 | 16 | 78 | 48 | 38 | 9 | 14 | 8.5 | 30 |
| 40-8B2 | | 8 | 4.763 | 41 | 36.132 | 2.5x2 | 137 | 3634 | 10603 | 62 | 158 | 96 | 16 | 78 | 48 | 38 | 9 | 14 | 8.5 | 30 | |
| 40-8C1 | | | | | 41 | 36.132 | 3.5x1 | 96 | 2679 | 7438 | 62 | 126 | 96 | 16 | 78 | 48 | 38 | 9 | 14 | 8.5 | 30 |
| 40-10B1 | | 10 | 6.350 | 41.4 | 34.91 | 2.5x1 | 72 | 2959 | 7069 | 65 | 132 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 30 | |
| 40-10B2 | | | | | 41.4 | 34.91 | 2.5x2 | 145 | 5370 | 14138 | 65 | 192 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 30 |
| 40-10C1 | | | 41.4 | 34.91 | 3.5x1 | 102 | 3932 | 9841 | 65 | 152 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 | 30 | | |
| 40-12A2 | | | 12 | 6.350 | 41.4 | 34.91 | 1.5x2 | 88 | 3402 | 8316 | 65 | 160 | 106 | 18 | 84 | 52 | 42 | 11 | 17.5 | 11 | 20 |
| 40-12B1 | | | | | | 41.6 | 34.299 | 2.5x1 | 70 | 3425 | 7837 | 70 | 153 | 112 | 18 | 90 | 55 | 43 | 11 | 17.5 | 11 |
| 40-12B2 | | | 12 | 7.144 | 41.6 | 34.299 | 2.5x2 | 141 | 6217 | 15674 | 70 | 225 | 112 | 18 | 90 | 55 | 43 | 11 | 17.5 | 11 | 40 |
| 40-12C1 | | | | | | 41.6 | 34.299 | 3.5x1 | 103 | 3932 | 9841 | 65 | 158 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 |
| 40-16A2 | | | 16 | 7.144 | 41.6 | 34.299 | 1.5x2 | 88 | 4006 | 9404 | 75 | 209 | 117 | 18 | 95 | 53 | 43 | 11 | 17.5 | 11 | 40 |
| 40-16B1 | | | | | | 41.6 | 34.299 | 2.5x1 | 118 | 3425 | 7837 | 75 | 153 | 117 | 18 | 95 | 53 | 43 | 11 | 17.5 | 11 |
| 40-20A1 | | | | 20 | 7.144 | 41.4 | 34.91 | 1.5x1 | 44 | 1874 | 4158 | 65 | 152 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 |
| 45-10B1 | 45 | 10 | | | | | 6.350 | 46.4 | 39.91 | 2.5x1 | 76 | 3116 | 7953 | 70 | 134 | 112 | 18 | 90 | 58 | 48 | 11 |
| 45-10B2 | | | 46.4 | 39.91 | 2.5x2 | 156 | | 5655 | 15905 | 70 | 194 | 112 | 18 | 90 | 58 | 48 | 11 | 17.5 | 11 | 30 | |
| 45-12B2 | | 12 | 7.938 | 46.8 | 38.688 | 2.5x2 | 162 | 7627 | 19799 | 74 | 230 | 122 | 22 | 97 | 60 | 49 | 13 | 20 | 13 | 40 | |
| 50-5A2 | 50 | 5 | 3.175 | 50.6 | 47.324 | 1.5x2 | 96 | 1447 | 5382 | 70 | 107 | 104 | 16 | 86 | 56 | 40 | 9 | 14 | 8.5 | 30 | |
| 50-5A3 | | | | 50.6 | 47.324 | 1.5x3 | 143 | 2051 | 8072 | 70 | 127 | 104 | 16 | 86 | 56 | 40 | 9 | 14 | 8.5 | 30 | |
| 50-5B2 | | 5 | 3.969 | 50.8 | 46.744 | 2.5x2 | 153 | 2245 | 8969 | 70 | 116 | 104 | 16 | 86 | 56 | 40 | 9 | 14 | 8.5 | 30 | |
| 50-6B2 | | | | | 50.8 | 46.744 | 2.5x2 | 161 | 3093 | 11149 | 72 | 134 | 106 | 16 | 88 | 57 | 43 | 9 | 14 | 8.5 | 30 |
| 50-6B3 | | 6 | 3.969 | 50.8 | 46.744 | 2.5x3 | 235 | 4384 | 16723 | 72 | 170 | 106 | 16 | 88 | 57 | 43 | 9 | 14 | 8.5 | 30 | |
| 50-8B1 | | | | | 8 | 4.763 | 51 | 46.132 | 2.5x1 | 81 | 2206 | 6705 | 75 | 112 | 116 | 18 | 95 | 58 | 45 | 11 | 17.5 |
| 50-8B2 | | 51 | 46.132 | 2.5x2 | | | | 165 | 4004 | 13409 | 75 | 160 | 116 | 18 | 95 | 58 | 45 | 11 | 17.5 | 11 | 30 |
| 50-8B3 | | 51 | 46.132 | 2.5x3 | | | | 244 | 5674 | 20114 | 75 | 208 | 116 | 18 | 95 | 58 | 45 | 11 | 17.5 | 11 | 30 |
| 50-10B2 | | 10 | 6.350 | 51.4 | 44.91 | 2.5x2 | 173 | 5923 | 17670 | 78 | 194 | 119 | 18 | 98 | 62 | 48 | 11 | 17.5 | 11 | 30 | |
| 50-10B3 | | | | | 51.4 | 44.91 | 2.5x3 | 255 | 8394 | 26505 | 78 | 254 | 119 | 18 | 98 | 62 | 48 | 11 | 17.5 | 11 | 30 |
| 50-10C1 | | | 10 | 7.938 | 51.4 | 44.91 | 3.5x1 | 120 | 4393 | 12481 | 78 | 154 | 119 | 18 | 98 | 62 | 48 | 11 | 17.5 | 11 | 30 |
| 50-12B2 | | | | | | 12 | 7.938 | 51.8 | 43.688 | 2.5x2 | 178 | 8022 | 22094 | 82 | 232 | 130 | 22 | 105 | 64 | 52 | 13 |
| 50-12C1 | | 51.8 | 43.688 | 3.5x1 | 123 | | | | 5875 | 15380 | 82 | 184 | 130 | 22 | 105 | 64 | 52 | 13 | 20 | 13 | 40 |
| 55-10C1 | | 55 | 10 | 6.350 | 56.4 | 49.91 | 3.5x1 | 132 | 4562 | 13661 | 84 | 154 | 125 | 18 | 103 | 68 | 54 | 11 | 17.5 | 11 | 40 |
| 55-12B2 | | | 12 | 7.938 | 56.8 | 48.688 | 2.5x2 | 185 | 8392 | 24390 | 88 | 232 | 136 | 22 | 110 | 70 | 56 | 13 | 20 | 13 | 40 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

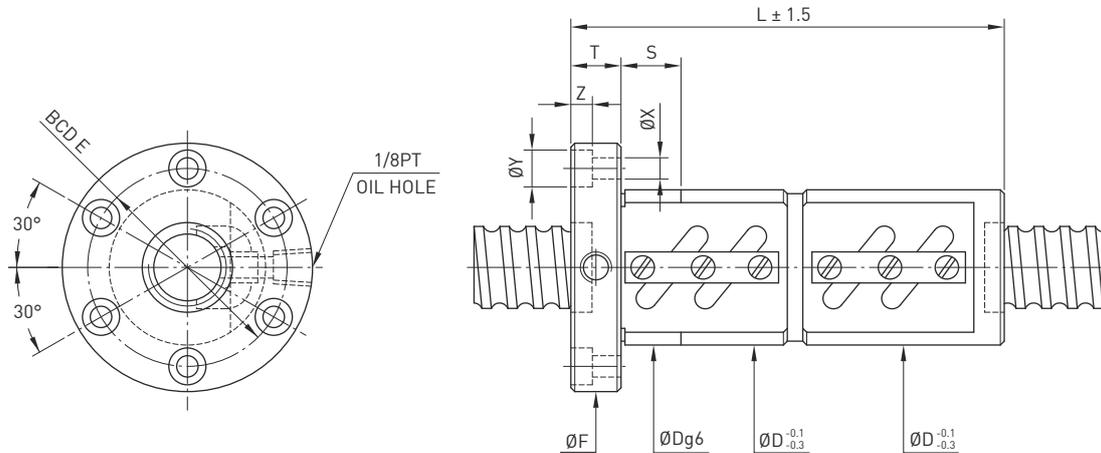
FDV Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | Return Tube | | Bolt | | | Fit | | |
|----------|--------------|--------|-----------|--------|--------|----------|----------------------|---|----------------------|-------|-------|--------|-----|-------------|-----|------|----|------|------|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | W | H | X | Y | | Z | S |
| 63-8A2 | 63 | 8 | 4.763 | 64 | 59.132 | 1.5x2 | 107 | 2826 | 10129 | 87 | 142 | 129 | 18 | 107 | 70 | 50 | 11 | 17.5 | 11 | 40 | |
| 63-8A3 | | | | 64 | 59.132 | 1.5x3 | 154 | 4004 | 15193 | 87 | 171 | 129 | 18 | 107 | 70 | 50 | 11 | 17.5 | 11 | 40 | |
| 63-10B2 | | 10 | 6.350 | 64.4 | 57.91 | 2.5x2 | 206 | 6533 | 22371 | 90 | 196 | 132 | 20 | 110 | 74 | 56 | 11 | 17.5 | 11 | 30 | |
| 63-10B3 | | | | 64.4 | 57.91 | 2.5x3 | 305 | 9258 | 33556 | 90 | 256 | 132 | 20 | 110 | 74 | 56 | 11 | 17.5 | 11 | 30 | |
| 63-12B2 | | | | 7.938 | 64.8 | 56.688 | 2.5x2 | 214 | 8943 | 28062 | 94 | 232 | 142 | 22 | 117 | 76 | 57 | 13 | 20 | 13 | 40 |
| 63-16B2 | | | | 9.525 | 65.2 | 55.466 | 2.5x2 | 280 | 14862 | 46009 | 100 | 296 | 150 | 22 | 123 | 78 | 62 | 13 | 20 | 13 | 40 |
| 63-20B2 | 20 | 65.2 | 55.466 | 2.5x2 | 280 | 14862 | 46009 | 100 | 334 | 150 | 22 | 123 | 78 | 62 | 13 | 20 | 13 | 40 | | | |
| 70-10B2 | 70 | 10 | 6.350 | 71.4 | 64.91 | 2.5x2 | 228 | 6843 | 25011 | 104 | 196 | 152 | 20 | 128 | 80 | 56 | 13 | 20 | 13 | 40 | |
| 70-10B3 | | | | 71.4 | 64.91 | 2.5x3 | 334 | 9698 | 37516 | 104 | 256 | 152 | 20 | 128 | 80 | 56 | 13 | 20 | 13 | 40 | |
| 70-12B2 | | 12 | 7.938 | 71.8 | 63.688 | 2.5x2 | 236 | 9382 | 31275 | 110 | 232 | 159 | 22 | 133 | 82 | 58 | 13 | 20 | 13 | 40 | |
| 70-12B3 | 71.8 | 63.688 | 2.5x3 | 336 | 13296 | 46912 | 110 | 302 | 159 | 22 | 133 | 82 | 58 | 13 | 20 | 13 | 40 | | | | |
| 80-10B2 | 80 | 10 | 6.350 | 81.4 | 74.91 | 2.5x2 | 251 | 7202 | 28538 | 115 | 200 | 163 | 22 | 137 | 90 | 64 | 13 | 20 | 13 | 40 | |
| 80-10B3 | | | | 81.4 | 74.91 | 2.5x3 | 368 | 10207 | 42807 | 115 | 260 | 163 | 22 | 137 | 90 | 64 | 13 | 20 | 13 | 40 | |
| 80-12B2 | | 12 | 7.938 | 81.8 | 73.688 | 2.5x2 | 257 | 9797 | 35422 | 120 | 232 | 169 | 22 | 143 | 92 | 67 | 13 | 20 | 13 | 40 | |
| 80-12B3 | | | | 81.8 | 73.688 | 2.5x3 | 380 | 13884 | 53132 | 120 | 302 | 169 | 22 | 143 | 92 | 67 | 13 | 20 | 13 | 40 | |
| 80-16B2 | | 16 | 9.525 | 82.2 | 72.466 | 2.5x2 | 340 | 16485 | 58851 | 125 | 302 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 | 50 | |
| 80-16B3 | | | | 82.2 | 72.466 | 2.5x3 | 498 | 23363 | 88276 | 125 | 398 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 | 50 | |
| 80-20B2 | | | | 20 | 82.2 | 72.466 | 2.5x2 | 338 | 16485 | 58851 | 125 | 345 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 | 50 |
| 80-20B3 | | | | | | 82.2 | 72.466 | 2.5x3 | 498 | 23363 | 88276 | 125 | 470 | 190 | 28 | 154 | 94 | 70 | 18 | 26 | 17.5 |
| 100-12B2 | 100 | 12 | 7.938 | 101.8 | 93.688 | 2.5x2 | 301 | 10761 | 44596 | 145 | 240 | 209 | 28 | 173 | 112 | 76 | 18 | 26 | 17.5 | 50 | |
| 100-12B3 | | | | 101.8 | 93.688 | 2.5x3 | 452 | 15251 | 66894 | 145 | 312 | 209 | 28 | 173 | 112 | 76 | 18 | 26 | 17.5 | 50 | |
| 100-16B2 | | 16 | 9.525 | 102.2 | 92.466 | 2.5x2 | 400 | 18125 | 74425 | 150 | 308 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 60 | |
| 100-16B3 | | | | 102.2 | 92.466 | 2.5x3 | 595 | 25684 | 111637 | 150 | 404 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 60 | |
| 100-20B2 | | 20 | 102.2 | 92.466 | 2.5x2 | 400 | 18123 | 74425 | 150 | 350 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 60 | | |
| 100-20B3 | | | | 92.466 | 2.5x3 | 595 | 25684 | 111637 | 150 | 475 | 228 | 32 | 185 | 114 | 80 | 22 | 32 | 21.5 | 60 | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

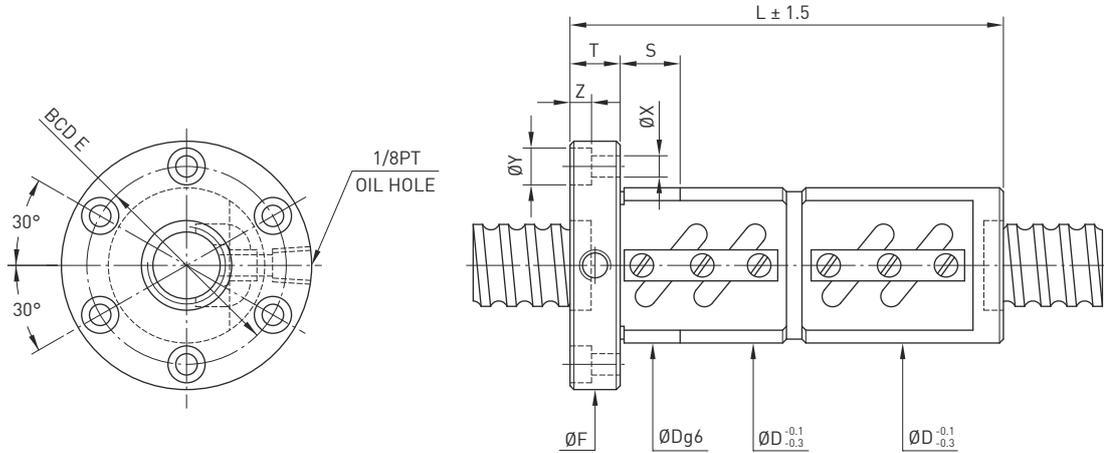
FDW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit | | |
|---------|--------------|--------|-----------|-------|--------|----------|----------------------|---|----------------------|------|------|--------|-----|-------|------|-----|-----|-----|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | | S | |
| 16-5B2 | 16 | 5 | 3.175 | 16.6 | 13.324 | 2.5x2 | 65 | 1385 | 2799 | 40 | 110 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 24 | | |
| 16-5B1 | | | | 16.6 | 13.324 | 2.5x1 | 32 | 763 | 1400 | 40 | 80 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 24 | | |
| 16-5C1 | | | | 16.6 | 13.324 | 3.5x1 | 46 | 1013 | 1946 | 40 | 90 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 24 | | |
| 20-5B1 | | | | 20 | 6 | 3.969 | 20.6 | 17.324 | 2.5x1 | 38 | 837 | 1733 | 44 | 80 | 68 | 12 | 55 | 5.5 | 9.5 | 5.5 |
| 20-5B2 | 20.6 | 17.324 | 2.5x2 | | | | 76 | 1519 | 3465 | 44 | 110 | 68 | 12 | 55 | 5.5 | 9.5 | 5.5 | 24 | | |
| 20-6B1 | 20.8 | 16.744 | 2.5x1 | | | | 40 | 1139 | 2187 | 48 | 92 | 72 | 12 | 59 | 5.5 | 9.5 | 5.5 | 24 | | |
| 20-6C1 | 20.8 | 16.744 | 3.5x1 | | | | 55 | 1512 | 3041 | 48 | 104 | 72 | 12 | 59 | 5.5 | 9.5 | 5.5 | 24 | | |
| 25-5A2 | 25 | 5 | 3.175 | 25.6 | 22.324 | 1.5x2 | 54 | 1092 | 2622 | 50 | 102 | 73 | 12 | 61 | 5.5 | 9.5 | 5.5 | 24 | | |
| 25-5B1 | | | | 25.6 | 22.324 | 2.5x1 | 46 | 939 | 2209 | 50 | 80 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | | |
| 25-5B2 | | | | 25.6 | 22.324 | 2.5x2 | 90 | 1704 | 4417 | 50 | 110 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | | |
| 25-5C1 | | | | 25.6 | 22.324 | 3.5x1 | 68 | 1252 | 3085 | 50 | 90 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | | |
| 25-6B2 | 25 | 6 | 3.969 | 25.8 | 21.744 | 2.5x2 | 94 | 2304 | 5524 | 56 | 128 | 82 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | | |
| 25-6C1 | | | | 25.8 | 21.744 | 3.5x1 | 66 | 1690 | 3844 | 56 | 104 | 82 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | | |
| 25-10B1 | | | | 10 | 4.763 | 26 | 21.132 | 2.5x1 | 48 | 1592 | 3237 | 60 | 122 | 86 | 16 | 73 | 6.6 | 11 | 6.5 | 24 |
| 28-5B1 | | | | 28 | 5 | 3.175 | 28.6 | 25.324 | 2.5x1 | 51 | 984 | 2466 | 55 | 80 | 85 | 12 | 69 | 6.6 | 11 | 6.5 |
| 28-5B2 | 28.6 | 25.324 | 2.5x2 | | | | 98 | 1785 | 4932 | 55 | 110 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | | |
| 28-6A2 | 6 | 28.6 | 25.324 | | | | 1.5x2 | 59 | 1150 | 2960 | 55 | 110 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | |
| 28-6B2 | | 28.6 | 25.324 | | | | 2.5x2 | 98 | 1776 | 4980 | 55 | 123 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | |
| 32-4B2 | 32 | 4 | 2.381 | 32.25 | 29.792 | 2.5x2 | 91 | 1071 | 3582 | 54 | 93 | 81 | 12 | 67 | 6.6 | 11 | 6.5 | 24 | | |
| 32-5B1 | | 5 | 3.175 | 32.6 | 29.324 | 2.5x1 | 55 | 1039 | 2833 | 58 | 80 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 24 | | |
| 32-5B2 | | | | 32.6 | 29.324 | 2.5x2 | 109 | 1886 | 5666 | 58 | 110 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 24 | | |
| 32-5C1 | | | | 32.6 | 29.324 | 3.5x1 | 76 | 1388 | 3967 | 58 | 90 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 24 | | |
| 32-6B1 | | 6 | 3.969 | 32.8 | 28.744 | 2.5x1 | 57 | 1409 | 3510 | 62 | 92 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 24 | | |
| 32-6B2 | | | | 32.8 | 28.744 | 2.5x2 | 112 | 2556 | 7020 | 62 | 128 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 24 | | |
| 32-6C1 | | | | 32.8 | 28.744 | 3.5x1 | 78 | 1888 | 4936 | 62 | 104 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 24 | | |
| 32-8A2 | | 8 | 4.763 | 33 | 28.132 | 1.5x2 | 70 | 2082 | 5151 | 66 | 135 | 100 | 15 | 82 | 9 | 14 | 8.5 | 30 | | |
| 32-8B1 | | | | 33 | 28.132 | 2.5x1 | 58 | 1810 | 4227 | 66 | 110 | 100 | 16 | 82 | 9 | 14 | 8.5 | 30 | | |
| 32-8B2 | | | | 33 | 28.132 | 2.5x2 | 115 | 3284 | 8453 | 66 | 158 | 100 | 16 | 82 | 9 | 14 | 8.5 | 30 | | |
| 32-8B3 | | | | 33 | 28.132 | 2.5x3 | 168 | 4653 | 12678 | 74 | 205 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | |
| 32-8C1 | | | | 33 | 28.132 | 3.5x1 | 82 | 2428 | 5948 | 66 | 126 | 100 | 16 | 82 | 9 | 14 | 8.5 | 30 | | |
| 32-10A2 | 10 | | | 6.350 | 33.4 | 26.91 | 1.5x2 | 72 | 3051 | 6612 | 74 | 167 | 108 | 15 | 90 | 9 | 14 | 8.5 | 30 | |
| 32-10B1 | | 33.4 | 26.91 | | 2.5x1 | 58 | 2651 | 5600 | 74 | 122 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | | |
| 32-10B2 | | 33.4 | 26.91 | | 2.5x2 | 118 | 4810 | 11199 | 74 | 182 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | | |
| 32-10C1 | | 33.4 | 26.91 | | 3.5x1 | 86 | 3519 | 7785 | 74 | 142 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | | |
| 32-12B1 | | 12 | 33.4 | | 26.91 | 2.5x1 | 62 | 2602 | 5510 | 74 | 153 | 108 | 18 | 90 | 9 | 14 | 8.5 | 30 | | |
| 32-12B2 | | | 33.4 | | 26.91 | 2.5x2 | 118 | 4810 | 11199 | 74 | 232 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | |
| 32-12C1 | 12 | 33.4 | 26.91 | 3.5x1 | 84 | 3518 | 7784 | 74 | 166 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

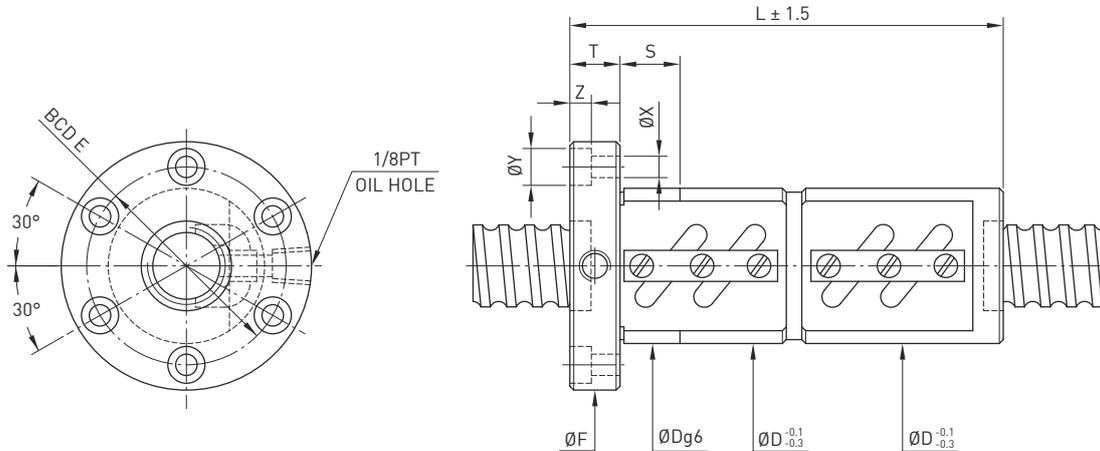
FDW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit |
|---------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|-------|------|--------|-----|-------|------|------|------|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | |
| 36-6B1 | 36 | 6 | 3.969 | 36.8 | 32.744 | 2.5x1 | 62 | 1486 | 3969 | 65 | 92 | 100 | 12 | 82 | 6.6 | 11 | 6.5 | 24 |
| 36-6B2 | | | | 36.8 | 32.744 | 2.5x2 | 121 | 2696 | 7937 | 65 | 128 | 100 | 12 | 82 | 6.6 | 11 | 6.5 | 24 |
| 36-12A2 | | 12 | 4.763 | 37 | 32.132 | 1.5x2 | 80 | 2557 | 6693 | 70 | 155 | 108 | 15 | 90 | 9 | 14 | 8.5 | 30 |
| 36-12B1 | | | | 37.4 | 30.91 | 2.5x1 | 67 | 2812 | 6334 | 75 | 126 | 120 | 16 | 98 | 11 | 17.5 | 11 | 30 |
| 36-10B2 | | 10 | 6.350 | 37.4 | 30.91 | 2.5x2 | 132 | 5105 | 12669 | 75 | 184 | 120 | 18 | 98 | 11 | 17.5 | 11 | 30 |
| 36-12B2 | | | | 37.4 | 30.91 | 2.5x2 | 130 | 5105 | 12668 | 75 | 206 | 120 | 18 | 98 | 11 | 17.5 | 11 | 30 |
| 36-8A2 | 8 | 4.763 | 37 | 32.132 | 1.5x2 | 77 | 2217 | 5669 | 70 | 135 | 108 | 15 | 90 | 9 | 14 | 8.5 | 30 | |
| 36-8B2 | | | 37 | 32.132 | 2.5x2 | 126 | 3489 | 9606 | 70 | 158 | 108 | 15 | 90 | 9 | 14 | 8.5 | 30 | |
| 40-5B1 | 40 | 5 | 3.175 | 40.6 | 37.324 | 2.5x1 | 65 | 1141 | 3567 | 68 | 84 | 102 | 16 | 84 | 9 | 14 | 8.5 | ~ |
| 40-5B2 | | | | 40.6 | 37.324 | 2.5x2 | 132 | 2071 | 7134 | 68 | 114 | 102 | 16 | 84 | 9 | 14 | 8.5 | 30 |
| 40-6B2 | | 6 | 3.969 | 40.8 | 36.744 | 2.5x2 | 136 | 2817 | 8855 | 70 | 132 | 104 | 16 | 86 | 9 | 14 | 8.5 | 30 |
| 40-8B1 | | | | 8 | 4.763 | 41 | 36.132 | 2.5x1 | 69 | 2003 | 5302 | 74 | 110 | 108 | 16 | 90 | 9 | 14 |
| 40-8B2 | | 41 | 36.132 | | | 2.5x2 | 137 | 3634 | 10603 | 74 | 158 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 |
| 40-8B3 | | 41 | 36.132 | 2.5x3 | 200 | 5150 | 15904 | 74 | 210 | 108 | 15 | 90 | 9 | 14 | 8.5 | 30 | | |
| 40-8C1 | 8 | 4.763 | 41 | 36.132 | 3.5x1 | 96 | 2679 | 7438 | 74 | 126 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | |
| 40-10A2 | | | 10 | 6.350 | 41.4 | 34.91 | 1.5x2 | 87 | 3418 | 8398 | 82 | 170 | 124 | 18 | 102 | 11 | 17.5 | 11 |
| 40-10B1 | 41.4 | 34.91 | | | 2.5x1 | 72 | 2959 | 7069 | 84 | 132 | 125 | 18 | 104 | 11 | 17.5 | 11 | 30 | |
| 40-10B2 | 10 | 6.350 | 41.4 | 34.91 | 2.5x2 | 145 | 5370 | 14138 | 84 | 192 | 125 | 18 | 104 | 11 | 17.5 | 11 | 30 | |
| 40-10C1 | | | 41.4 | 34.91 | 3.5x1 | 102 | 3932 | 9841 | 84 | 152 | 125 | 18 | 104 | 11 | 17.5 | 11 | 30 | |
| 40-12A2 | 12 | 7.144 | 41.6 | 34.299 | 1.5x2 | 88 | 4006 | 9404 | 86 | 160 | 128 | 18 | 106 | 11 | 17.5 | 11 | 30 | |
| 40-12B1 | | | 41.6 | 34.299 | 2.5x1 | 70 | 3425 | 7837 | 86 | 153 | 128 | 18 | 106 | 11 | 17.5 | 11 | 40 | |
| 40-12B2 | 12 | 7.144 | 41.6 | 34.299 | 2.5x2 | 141 | 6217 | 15674 | 86 | 225 | 128 | 18 | 106 | 11 | 17.5 | 11 | 40 | |
| 40-12C1 | | | 41.6 | 34.299 | 3.5x1 | 103 | 4637 | 11146 | 86 | 179 | 128 | 18 | 106 | 11 | 17.5 | 11 | 30 | |
| 40-16A2 | 16 | 7.144 | 41.6 | 34.299 | 1.5x2 | 83 | 4007 | 9405 | 86 | 214 | 128 | 18 | 106 | 11 | 17.5 | 11 | 40 | |
| 40-16B1 | | | 41.6 | 34.299 | 2.5x1 | 72 | 3425 | 7837 | 86 | 182 | 128 | 18 | 106 | 11 | 17.5 | 11 | 40 | |
| 40-16B2 | | | 41.6 | 34.299 | 2.5x2 | 143 | 6216 | 15674 | 86 | 272 | 128 | 22 | 106 | 11 | 17.5 | 11 | 30 | |
| 45-10B1 | 45 | 10 | 6.350 | 46.4 | 39.91 | 2.5x1 | 76 | 3111 | 7953 | 88 | 134 | 132 | 18 | 110 | 11 | 17.5 | 11 | 30 |
| 45-10B2 | | | | 46.4 | 39.91 | 2.5x2 | 156 | 5655 | 15905 | 88 | 194 | 132 | 18 | 110 | 11 | 17.5 | 11 | 30 |
| 45-12B2 | | 12 | 7.938 | 46.8 | 38.688 | 2.5x2 | 162 | 7627 | 19799 | 96 | 230 | 142 | 22 | 117 | 13 | 20 | 13 | 40 |
| 45-16B2 | 16 | | | 7.144 | 46.6 | 39.299 | 2.5x2 | 158 | 6636 | 17895 | 90 | 278 | 132 | 18 | 110 | 11 | 17.5 | 11 |
| 50-5A2 | 50 | 5 | 3.175 | 50.6 | 47.324 | 1.5x2 | 96 | 1447 | 5382 | 80 | 107 | 114 | 16 | 96 | 9 | 14 | 8.5 | 30 |
| 50-5A3 | | | | 50.6 | 47.324 | 1.5x3 | 143 | 2051 | 8072 | 80 | 127 | 114 | 16 | 96 | 9 | 14 | 8.5 | 30 |
| 50-6B2 | | 6 | 3.969 | 50.8 | 46.744 | 2.5x2 | 161 | 3093 | 11149 | 84 | 134 | 118 | 16 | 100 | 9 | 14 | 8.5 | 30 |
| 50-6B3 | | | | 50.8 | 46.744 | 2.5x3 | 235 | 4384 | 16723 | 84 | 170 | 118 | 16 | 100 | 9 | 14 | 8.5 | 30 |
| 50-8B1 | | 8 | 4.763 | 51 | 46.132 | 2.5x1 | 81 | 2206 | 6705 | 87 | 112 | 128 | 18 | 107 | 11 | 17.5 | 11 | 30 |
| 50-8B2 | | | | 51 | 46.132 | 2.5x2 | 165 | 4004 | 13409 | 87 | 160 | 128 | 18 | 107 | 11 | 17.5 | 11 | 30 |
| 50-8B3 | 51 | | | 46.132 | 2.5x3 | 244 | 5674 | 20114 | 87 | 208 | 128 | 18 | 107 | 11 | 17.5 | 11 | 30 | |
| 50-10B1 | 10 | 6.350 | 51.4 | 44.91 | 2.5x1 | 88 | 3245 | 8918 | 93 | 133 | 135 | 18 | 113 | 11 | 17.5 | 11 | 30 | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

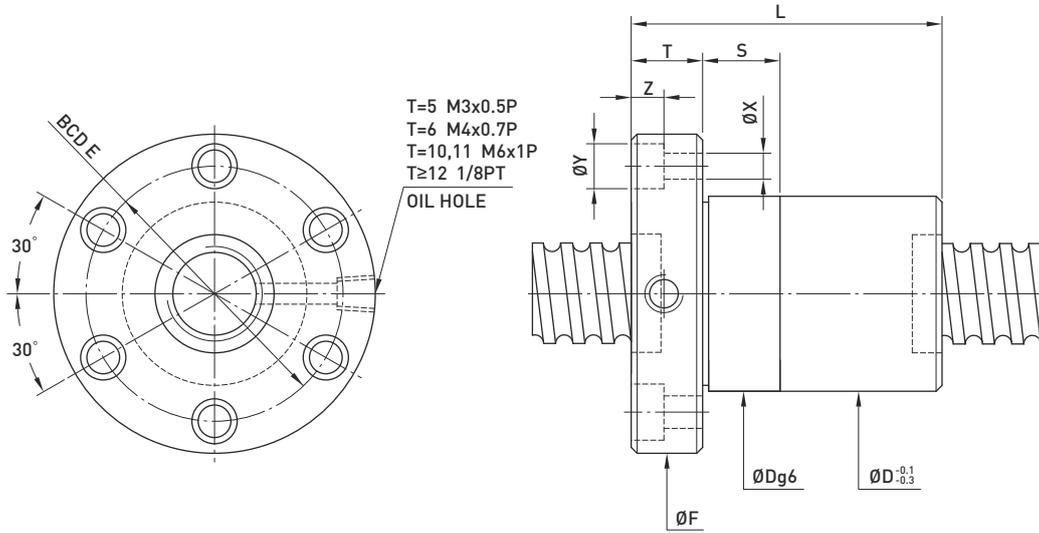
FDW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/µm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | | Fit | |
|----------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|--------|--------|-------|-------|------|------|------|------|------|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | S | | |
| 50-10B2 | 50 | 10 | 6.350 | 51.4 | 44.91 | 2.5x2 | 173 | 5923 | 17670 | 94 | 194 | 135 | 18 | 114 | 11 | 17.5 | 11 | 30 | | |
| 50-10B3 | | | | 51.4 | 44.91 | 2.5x3 | 255 | 8394 | 26505 | 94 | 254 | 135 | 18 | 114 | 11 | 17.5 | 11 | 30 | | |
| 50-10C1 | | | | 51.4 | 44.91 | 3.5x1 | 120 | 4393 | 12481 | 94 | 154 | 135 | 18 | 114 | 11 | 17.5 | 11 | 30 | | |
| 50-12B1 | | | | 12 | 7.938 | 51.8 | 43.688 | 2.5x1 | 90 | 4367 | 10918 | 100 | 159 | 146 | 22 | 122 | 14 | 20 | 13 | 40 |
| 50-12B2 | | 51.8 | 43.688 | | | 2.5x2 | 178 | 8022 | 22094 | 102 | 232 | 150 | 22 | 125 | 13 | 20 | 13 | 40 | | |
| 50-12C1 | | 51.8 | 43.688 | | | 3.5x1 | 123 | 5875 | 15380 | 102 | 184 | 150 | 22 | 125 | 13 | 20 | 13 | 40 | | |
| 50-16B2 | | 16 | 7.938 | | | 51.8 | 43.688 | 2.5x2 | 174 | 7918 | 21837 | 100 | 280 | 146 | 22 | 122 | 14 | 20 | 13 | 40 |
| 50-20B1 | | | | | | 51.8 | 43.688 | 2.5x1 | 90 | 4367 | 10918 | 100 | 227 | 146 | 28 | 122 | 14 | 20 | 13 | 40 |
| 55-10C1 | | 55 | 10 | | | 6.350 | 56.4 | 49.91 | 3.5x1 | 132 | 4562 | 13661 | 100 | 154 | 140 | 18 | 118 | 11 | 17.5 | 11 |
| 55-12B2 | | | 12 | 7.938 | 56.8 | 48.688 | 2.5x2 | 185 | 8392 | 24390 | 105 | 232 | 154 | 22 | 127 | 13 | 20 | 13 | 40 | |
| 63-8A2 | 63 | 8 | 4.763 | 64 | 59.132 | 1.5x2 | 107 | 2826 | 10129 | 104 | 142 | 146 | 18 | 124 | 11 | 17.5 | 11 | 40 | | |
| 63-8A3 | | | | 64 | 59.132 | 1.5x3 | 154 | 4004 | 15193 | 104 | 174 | 146 | 18 | 124 | 11 | 17.5 | 11 | 40 | | |
| 63-10B2 | | 10 | 6.350 | 64.4 | 57.91 | 2.5x2 | 206 | 6533 | 22371 | 110 | 196 | 152 | 20 | 130 | 11 | 17.5 | 11 | 30 | | |
| 63-10B3 | | | | 64.4 | 57.91 | 2.5x3 | 305 | 9258 | 33556 | 110 | 256 | 152 | 20 | 130 | 11 | 17.5 | 11 | 30 | | |
| 63-12B2 | | | | 12 | 7.938 | 64.8 | 56.688 | 2.5x2 | 214 | 8943 | 28062 | 118 | 232 | 166 | 22 | 141 | 13 | 20 | 13 | 40 |
| 63-16B2 | | | | | | 16 | 9.525 | 65.2 | 55.466 | 2.5x2 | 280 | 14862 | 46009 | 124 | 296 | 172 | 22 | 147 | 13 | 20 |
| 63-20B2 | | 65.2 | 55.466 | 2.5x2 | 280 | | | 14862 | 46009 | 124 | 334 | 172 | 22 | 147 | 13 | 20 | 13 | 40 | | |
| 70-10B2 | | 70 | 10 | 6.350 | 71.4 | 64.91 | 2.5x2 | 228 | 6843 | 25011 | 124 | 196 | 170 | 20 | 145 | 13 | 20 | 13 | 40 | |
| 70-10B3 | 71.4 | | | | 64.91 | 2.5x3 | 334 | 9698 | 37516 | 124 | 256 | 170 | 20 | 145 | 13 | 20 | 13 | 40 | | |
| 70-12B2 | 12 | | 7.938 | 71.8 | 63.688 | 2.5x2 | 236 | 9382 | 31275 | 130 | 232 | 178 | 22 | 152 | 13 | 20 | 13 | 40 | | |
| 70-12B3 | | | | 71.8 | 63.688 | 2.5x3 | 336 | 13296 | 46912 | 130 | 302 | 178 | 22 | 152 | 13 | 20 | 13 | 40 | | |
| 70-20B2 | 20 | | 9.525 | 72.2 | 62.466 | 2.5x2 | 300 | 15644 | 51502 | 130 | 325 | 186 | 28 | 158 | 18 | 26 | 17.5 | 60 | | |
| 80-10B2 | 80 | | 10 | 6.350 | 81.4 | 74.91 | 2.5x2 | 251 | 7202 | 28538 | 130 | 200 | 178 | 22 | 152 | 13 | 20 | 13 | 40 | |
| 80-10B3 | | 81.4 | | | 74.91 | 2.5x3 | 368 | 10207 | 42807 | 130 | 260 | 178 | 22 | 152 | 13 | 20 | 13 | 40 | | |
| 80-12B2 | | 12 | 7.938 | 81.8 | 73.688 | 2.5x2 | 257 | 9797 | 35422 | 136 | 232 | 185 | 22 | 159 | 13 | 20 | 13 | 40 | | |
| 80-12B3 | | | | 81.8 | 73.688 | 2.5x3 | 380 | 13884 | 53132 | 136 | 302 | 185 | 22 | 159 | 13 | 20 | 13 | 40 | | |
| 80-16B2 | | | | 16 | 9.525 | 82.2 | 72.466 | 2.5x2 | 340 | 16485 | 58851 | 145 | 302 | 210 | 28 | 174 | 18 | 26 | 17.5 | 50 |
| 80-16B3 | | | | | | 82.2 | 72.466 | 2.5x3 | 498 | 23363 | 88276 | 145 | 398 | 210 | 28 | 174 | 18 | 26 | 17.5 | 50 |
| 80-20B2 | | 20 | 9.525 | 82.2 | 72.466 | 2.5x2 | 338 | 16485 | 58851 | 145 | 345 | 210 | 28 | 174 | 18 | 26 | 17.5 | 50 | | |
| 80-20B3 | | | | 82.2 | 72.466 | 2.5x3 | 498 | 23363 | 88276 | 145 | 470 | 210 | 28 | 174 | 18 | 26 | 17.5 | 50 | | |
| 100-12B2 | | 100 | 12 | 7.938 | 101.8 | 93.688 | 2.5x2 | 301 | 10761 | 44596 | 160 | 240 | 224 | 28 | 188 | 18 | 26 | 17.5 | 50 | |
| 100-12B3 | | | | | 101.8 | 93.688 | 2.5x3 | 452 | 15251 | 66894 | 160 | 312 | 224 | 28 | 188 | 18 | 26 | 17.5 | 50 | |
| 100-16B2 | 16 | | 9.525 | 102.2 | 92.466 | 2.5x2 | 400 | 18123 | 74425 | 170 | 308 | 248 | 32 | 205 | 22 | 32 | 21.5 | 60 | | |
| 100-16B3 | | | | 102.2 | 92.466 | 2.5x3 | 595 | 25684 | 111637 | 170 | 404 | 248 | 32 | 205 | 22 | 32 | 21.5 | 60 | | |
| 100-20B2 | | | | 20 | 9.525 | 102.2 | 92.466 | 2.5x2 | 400 | 18123 | 74425 | 170 | 350 | 248 | 32 | 205 | 22 | 32 | 21.5 | 60 |
| 100-20B3 | | | | | | 102.2 | 92.466 | 2.5x3 | 595 | 25684 | 111637 | 170 | 475 | 248 | 32 | 205 | 22 | 32 | 21.5 | 60 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

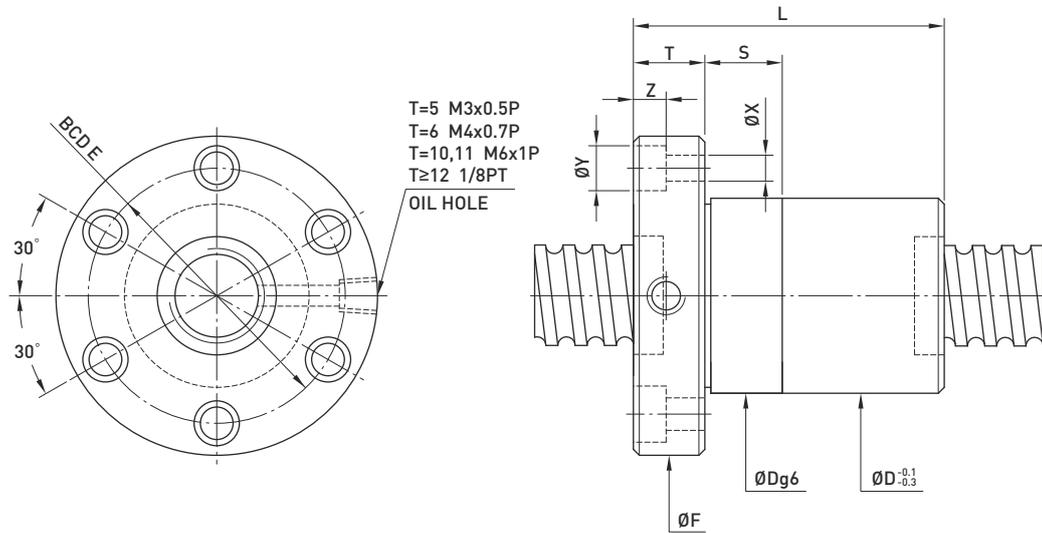
FSI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/µm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit |
|-----------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|-----|----|--------|------|-------|------|-----|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | |
| 8-2.5T3 | 8 | 2.5 | 1.500 | 8.2 | 6.652 | 3 | 8 | 170 | 267 | 18 | 28 | 35 | 5 | 27 | 4.5 | 0 | 0 | 0 |
| 14-2.54T3 | 14 | 2.54 | 2.000 | 14.2 | 12.136 | 3 | 12 | 339 | 655 | 30 | 39 | 50 | 10.6 | 40 | 5 | 7 | 5 | 0 |
| 14-4T3 | | 4 | | 14.2 | 12.136 | 3 | 12 | 339 | 655 | 26 | 33 | 48 | 6 | 36 | 5.5 | 0 | 0 | 0 |
| 16-2T3 | 16 | 2 | 1.500 | 16.2 | 14.652 | 3 | 14 | 252 | 593 | 27 | 36 | 44 | 10 | 34 | 4.5 | 8 | 4.5 | 0 |
| 16-2.5T4 | | 2.5 | | 16.2 | 14.652 | 4 | 19 | 358 | 862 | 27 | 44 | 44 | 10 | 34 | 4.5 | 8 | 4.5 | 12 |
| 16-5T3 | | 5 | 3.175 | 16.6 | 13.324 | 3 | 11 | 731 | 1331 | 30 | 46 | 54 | 12 | 41 | 5.5 | 9.5 | 5.5 | 12 |
| 16-5T4 | | | | 16.6 | 13.324 | 4 | 12 | 936 | 1775 | 30 | 52 | 54 | 12 | 41 | 5.5 | 9.5 | 5.5 | 12 |
| 16-6T4 | 6 | | 16.6 | 13.324 | 4 | 21 | 936 | 1775 | 32 | 58 | 54 | 12 | 42 | 5.5 | 9.5 | 5.5 | 12 | |
| 20-2T6 | 20 | 2 | 1.500 | 20.2 | 18.652 | 6 | 32 | 518 | 1551 | 32 | 52 | 52 | 10 | 40 | 5.5 | 9.5 | 5.5 | 12 |
| 20-2T4 | | | | 20.2 | 18.652 | 4 | 36 | 399 | 1112 | 32 | 40 | 52 | 10 | 40 | 5.5 | 9.5 | 5.5 | 12 |
| 20-2.5T5 | | 2.5 | 2.000 | 20.2 | 18.136 | 5 | 28 | 637 | 1635 | 36 | 51 | 59 | 12 | 47 | 5.5 | 9.5 | 5.5 | 12 |
| 20-2.54T6 | | 2.54 | | 20.2 | 18.136 | 6 | 33 | 745 | 1962 | 36 | 55 | 59 | 12 | 47 | 5.5 | 9.5 | 5.5 | 12 |
| 20-4T3 | | 4 | 2.381 | 20.25 | 17.792 | 3 | 17 | 509 | 1134 | 36 | 40 | 59 | 10 | 47 | 5.5 | 9.5 | 5.5 | 12 |
| 20-5T3 | | 5 | 3.175 | 20.6 | 17.324 | 3 | 20 | 852 | 1767 | 34 | 46 | 57 | 12 | 45 | 5.5 | 9.5 | 5.5 | 12 |
| 20-5T4 | | | | 20.6 | 17.324 | 4 | 27 | 1091 | 2356 | 34 | 53 | 57 | 12 | 45 | 5.5 | 9.5 | 5.5 | 12 |
| 20-6T3 | | 6 | 3.969 | 20.8 | 16.744 | 3 | 20 | 1091 | 2081 | 36 | 51 | 60 | 12 | 48 | 5.5 | 9.5 | 5.5 | 12 |
| 20-6T4 | | | | 20.8 | 16.744 | 4 | 27 | 1398 | 2774 | 36 | 61 | 60 | 12 | 48 | 5.5 | 9.5 | 5.5 | 12 |
| 20-10T3 | | 10 | | 20.8 | 16.744 | 3 | 20 | 1091 | 2080 | 35 | 64 | 57 | 12 | 45 | 5.5 | 9.5 | 5.5 | 12 |
| 25-2T6 | 25 | 2 | 1.500 | 25.2 | 23.652 | 6 | 39 | 560 | 1960 | 36 | 50 | 58 | 10 | 46 | 5.5 | 9.5 | 5.5 | 12 |
| 25-2T4 | | | | 25.2 | 23.652 | 4 | 27 | 395 | 1307 | 36 | 40 | 58 | 10 | 46 | 5.5 | 9.5 | 5.5 | 12 |
| 25-2T3 | | | | 25.2 | 23.652 | 3 | 20 | 309 | 980 | 36 | 35 | 58 | 10 | 46 | 5.5 | 9.5 | 5.5 | 12 |
| 25-2.5T5 | | 2.5 | 2.000 | 25.2 | 23.136 | 5 | 34 | 716 | 2117 | 40 | 52 | 64 | 10 | 51 | 6.6 | 11 | 6.5 | 12 |
| 25-4T4 | | 4 | 2.381 | 25.25 | 22.792 | 4 | 28 | 747 | 1989 | 40 | 53 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 12 |
| 25-5T3 | | 5 | 3.175 | 25.6 | 22.324 | 3 | 28 | 977 | 2314 | 40 | 46 | 63 | 11 | 51 | 5.5 | 9.5 | 5.5 | 10 |
| 25-5T4 | | | | 25.6 | 22.324 | 4 | 37 | 1252 | 3085 | 40 | 51 | 63 | 11 | 51 | 5.5 | 9.5 | 5.5 | 10 |
| 25-5T5 | | 5 | 3.175 | 25.6 | 22.324 | 5 | 40 | 1516 | 3856 | 40 | 56 | 63 | 11 | 51 | 5.5 | 9.5 | 5.5 | 10 |
| 25-5T6 | | | | 25.6 | 22.324 | 6 | 48 | 1773 | 4627 | 40 | 65 | 63 | 11 | 51 | 5.5 | 9.5 | 5.5 | 10 |
| 25-6T3 | | 6 | 3.969 | 25.8 | 21.744 | 3 | 28 | 1272 | 2762 | 42 | 51 | 65 | 12 | 53 | 5.5 | 9.5 | 5.5 | 12 |
| 25-6T4 | 25.8 | | | 21.744 | 4 | 37 | 1628 | 3682 | 42 | 61 | 65 | 12 | 53 | 5.5 | 9.5 | 5.5 | 12 | |
| 25-10T3 | 10 | 4.763 | 26 | 21.132 | 3 | 25 | 1591 | 3236 | 45 | 65 | 69 | 15 | 55 | 6.6 | 11 | 6.5 | 12 | |
| 25-10T4 | | | 26 | 21.132 | 4 | 33 | 2038 | 4315 | 45 | 80 | 69 | 15 | 55 | 6.6 | 11 | 6.5 | 12 | |

Remark : Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

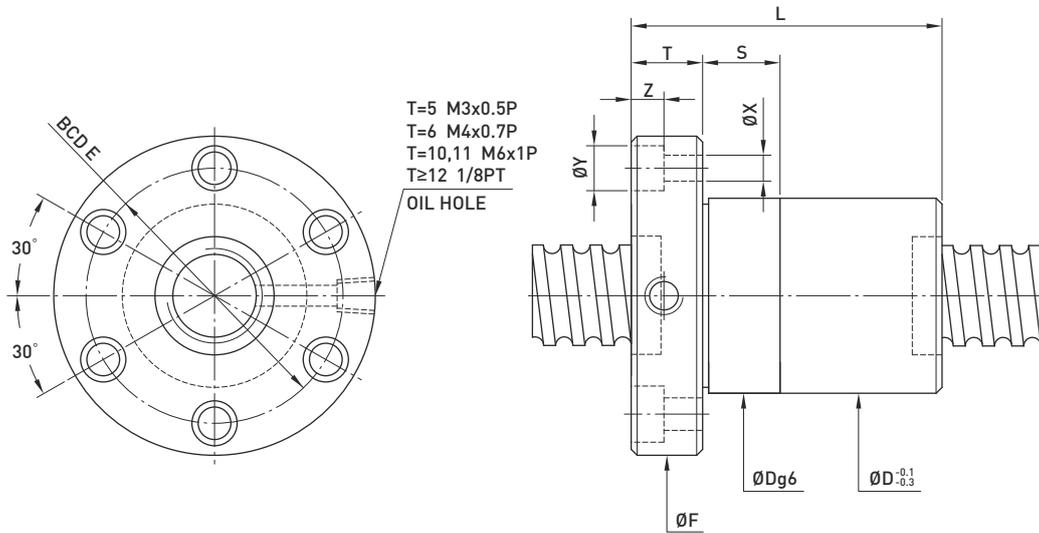
FSI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1×10^6 revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit | | |
|-----------|--------------|--------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|----|--------|-----|-------|------|-----|-----|------|-----|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | | S | |
| 32-5T3 | 32 | 5 | 3.175 | 32.6 | 29.324 | 3 | 33 | 1117 | 3081 | 44 | 48 | 46 | 74 | 12 | 60 | 6.6 | 11 | 6.5 | 12 | |
| 32-5T4 | | | | 32.6 | 29.324 | 4 | 42 | 1431 | 4108 | 44 | 48 | 53 | 74 | 12 | 60 | 6.6 | 11 | 6.5 | 12 | |
| 32-5T6 | | 6 | 3.969 | 32.6 | 29.324 | 6 | 63 | 2027 | 6162 | 44 | 48 | 66 | 74 | 12 | 60 | 6.6 | 11 | 6.5 | 12 | |
| 32-6T3 | | | | 32.8 | 28.744 | 3 | 33 | 1446 | 3620 | 45 | 50 | 51 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 12 | |
| 32-6T4 | | 8 | 4.763 | 3.969 | 32.8 | 28.744 | 4 | 43 | 1852 | 4826 | 45 | 50 | 61 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 12 |
| 32-6T6 | | | | | 32.8 | 28.744 | 6 | 65 | 2625 | 7239 | 45 | 50 | 75 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 12 |
| 32-8T3 | | 10 | 6.350 | 4.763 | 33 | 28.132 | 3 | 35 | 1810 | 4227 | 47 | 52 | 63 | 78 | 16 | 64 | 6.6 | 11 | 6.5 | 12 |
| 32-8T4 | | | | | 33 | 28.132 | 4 | 47 | 2317 | 5635 | 47 | 52 | 74 | 78 | 16 | 64 | 6.6 | 11 | 6.5 | 12 |
| 32-10T3 | | 10 | 6.350 | 6.350 | 33.4 | 26.91 | 3 | 35 | 2539 | 5327 | 51 | 56 | 72 | 82 | 16 | 68 | 6.6 | 11 | 6.5 | 12 |
| 32-10T4 | | | | | 33.4 | 26.91 | 4 | 48 | 3252 | 7102 | 51 | 56 | 83 | 82 | 16 | 68 | 6.6 | 11 | 6.5 | 12 |
| 40-5T4 | 40 | 5 | 3.175 | 40.6 | 37.324 | 4 | 50 | 1599 | 5280 | 51 | 54 | 53 | 80 | 16 | 66 | 6.6 | 11 | 6.5 | 12 | |
| 40-5T6 | | | | 40.6 | 37.324 | 6 | 74 | 2265 | 7919 | 51 | 54 | 66 | 80 | 16 | 66 | 6.6 | 11 | 6.5 | 12 | |
| 40-5.08T6 | | 5.08 | 3.175 | 40.6 | 37.324 | 6 | 74 | 2265 | 7919 | 53 | 56 | 65 | 90 | 15 | 72 | 9 | 14 | 8.5 | 15 | |
| 40-6T4 | | 6 | 3.969 | 3.969 | 40.8 | 36.744 | 4 | 50 | 2136 | 6420 | 53 | 56 | 65 | 88 | 16 | 72 | 9 | 14 | 8.5 | 15 |
| 40-6T6 | | | | | 40.8 | 36.744 | 6 | 74 | 3028 | 9630 | 53 | 56 | 79 | 88 | 16 | 72 | 9 | 14 | 8.5 | 15 |
| 40-8T4 | | 8 | 4.763 | 4.763 | 41 | 36.132 | 4 | 52 | 2728 | 7596 | 55 | 60 | 78 | 92 | 16 | 75 | 9 | 14 | 8.5 | 15 |
| 40-8T6 | | | | | 41 | 36.132 | 6 | 76 | 3866 | 11394 | 55 | 60 | 99 | 92 | 16 | 75 | 9 | 14 | 8.5 | 15 |
| 40-10T3 | | 10 | 6.350 | 6.350 | 41.4 | 34.91 | 3 | 40 | 2959 | 7069 | 60 | 65 | 76 | 96 | 16 | 80 | 9 | 14 | 8.5 | 15 |
| 40-10T4 | | | | | 41.4 | 34.91 | 4 | 51 | 3789 | 9426 | 60 | 65 | 87 | 96 | 16 | 80 | 9 | 14 | 8.5 | 15 |
| 50-5T4 | | 50 | 5 | 3.175 | 50.6 | 47.324 | 4 | 62 | 1757 | 6745 | 62 | 65 | 57 | 96 | 16 | 80 | 9 | 14 | 8.5 | 15 |
| 50-5T6 | 50.6 | | | | 47.324 | 6 | 91 | 2490 | 10117 | 62 | 65 | 70 | 96 | 16 | 80 | 9 | 14 | 8.5 | 15 | |
| 50-6T4 | 6 | | 3.969 | 3.969 | 50.8 | 46.744 | 4 | 62 | 2388 | 8250 | 64 | 68 | 65 | 100 | 16 | 84 | 9 | 14 | 8.5 | 15 |
| 50-6T6 | | | | | 50.8 | 46.744 | 6 | 93 | 3384 | 12375 | 64 | 68 | 79 | 100 | 16 | 84 | 9 | 14 | 8.5 | 15 |
| 50-8T4 | 8 | | 4.763 | 4.763 | 51 | 46.132 | 4 | 62 | 2998 | 9578 | 65 | 70 | 78 | 102 | 16 | 85 | 9 | 14 | 8.5 | 15 |
| 50-8T6 | | | | | 51 | 46.132 | 6 | 92 | 4249 | 14367 | 65 | 70 | 99 | 102 | 16 | 85 | 9 | 14 | 8.5 | 15 |
| 50-10T3 | 10 | | 6.350 | 6.350 | 51.4 | 44.91 | 3 | 50 | 3397 | 9256 | 69 | 74 | 78 | 114 | 18 | 92 | 11 | 17.5 | 11 | 20 |
| 50-10T4 | | | | | 51.4 | 44.91 | 4 | 63 | 4350 | 12341 | 69 | 74 | 89 | 114 | 18 | 92 | 11 | 17.5 | 11 | 20 |
| 50-10T6 | 12 | | 7.938 | 7.938 | 51.4 | 44.91 | 6 | 94 | 6165 | 18511 | 69 | 74 | 112 | 114 | 18 | 92 | 11 | 17.5 | 11 | 20 |
| 50-12T3 | | | | | 51.8 | 43.688 | 3 | 50 | 4420 | 11047 | 73 | 78 | 90 | 118 | 18 | 96 | 11 | 17.5 | 11 | 20 |
| 50-12T4 | 51.8 | 43.688 | 4 | 63 | 5660 | 14730 | 73 | 78 | 103 | 118 | 18 | 96 | 11 | 17.5 | 11 | 20 | | | | |
| 50-20T4 | 20 | 9.525 | 9.525 | 52.2 | 42.466 | 4 | 80 | 9327 | 23955 | 75 | 78 | 186 | 129 | 28 | 105 | 14 | 20 | 13 | 30 | |

Remark : Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

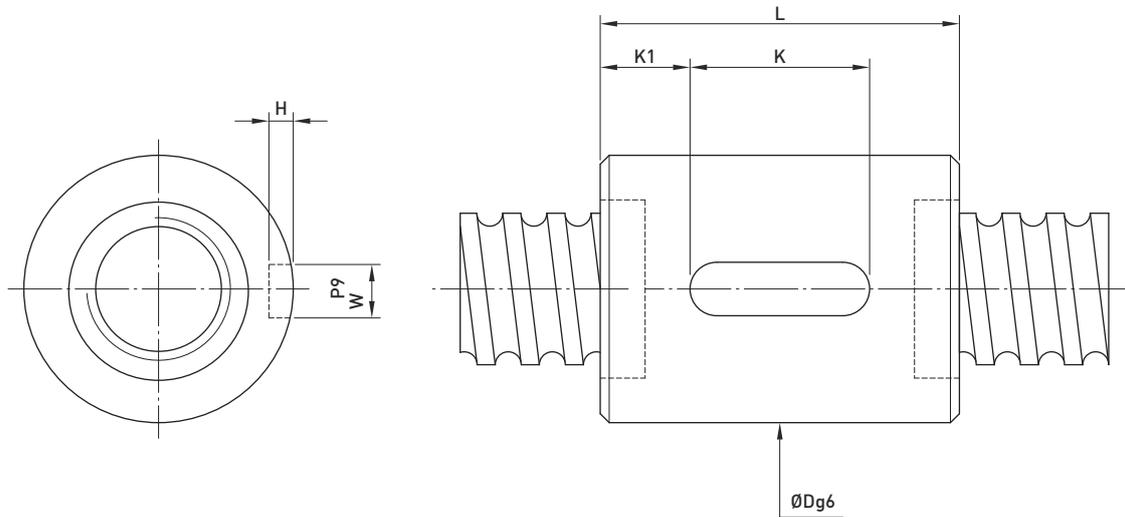
FSI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/µm) | Dynamic Load 1×10^6 revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit | |
|----------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|-----|-----|--------|-----|-------|------|----|------|------|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | | S |
| 63-6T4 | 63 | 6 | 3.969 | 63.8 | 59.744 | 4 | 75 | 2614 | 10542 | 78 | 80 | 66 | 119 | 18 | 98 | 11 | 17.5 | 11 | 20 |
| 63-6T6 | | | | 63.8 | 59.744 | 6 | 113 | 3704 | 15813 | 78 | 80 | 81 | 119 | 18 | 98 | 11 | 17.5 | 11 | 20 |
| 63-8T4 | | 8 | 4.763 | 64 | 59.132 | 4 | 77 | 3395 | 12541 | 79 | 82 | 80 | 122 | 18 | 100 | 11 | 17.5 | 11 | 20 |
| 63-8T6 | | | | 64 | 59.132 | 6 | 114 | 4812 | 18811 | 79 | 82 | 101 | 122 | 18 | 100 | 11 | 17.5 | 11 | 20 |
| 63-10T4 | | 10 | 6.350 | 64.4 | 57.91 | 4 | 79 | 4860 | 15858 | 82 | 88 | 91 | 134 | 20 | 110 | 14 | 20 | 13 | 20 |
| 63-10T6 | | | | 64.4 | 57.91 | 6 | 115 | 6887 | 23786 | 82 | 88 | 114 | 134 | 20 | 110 | 14 | 20 | 13 | 20 |
| 63-12T4 | 12 | 7.938 | 64.8 | 56.688 | 4 | 78 | 6479 | 19293 | 86 | 92 | 105 | 138 | 20 | 114 | 14 | 20 | 13 | 20 | |
| 63-12T6 | | | 64.8 | 56.688 | 6 | 113 | 9182 | 28939 | 86 | 92 | 133 | 138 | 20 | 114 | 14 | 20 | 13 | 20 | |
| 80-10T4 | 80 | 10 | 6.350 | 81.4 | 74.91 | 4 | 96 | 5559 | 21118 | 99 | 105 | 91 | 152 | 20 | 127 | 14 | 20 | 13 | 20 |
| 80-10T6 | | | | 81.4 | 74.91 | 6 | 140 | 7879 | 31677 | 99 | 105 | 114 | 152 | 20 | 127 | 14 | 20 | 13 | 20 |
| 80-12T4 | | 12 | 7.938 | 81.8 | 73.688 | 4 | 97 | 7430 | 25681 | 103 | 110 | 109 | 170 | 24 | 138 | 18 | 26 | 17.5 | 25 |
| 80-12T6 | | | | 81.8 | 73.688 | 6 | 141 | 10530 | 38521 | 103 | 110 | 137 | 170 | 24 | 138 | 18 | 26 | 17.5 | 25 |
| 80-16T3 | | 16 | 9.525 | 82.2 | 72.466 | 3 | 95 | 9663 | 31622 | 108 | 115 | 118 | 174 | 24 | 143 | 18 | 26 | 17.5 | 25 |
| 80-16T4 | | | | 82.2 | 72.466 | 4 | 130 | 12375 | 42162 | 108 | 115 | 136 | 174 | 24 | 143 | 18 | 26 | 17.5 | 25 |
| 80-20T3 | 20 | 9.525 | 82.2 | 72.466 | 3 | 95 | 9663 | 31622 | 108 | 115 | 138 | 174 | 24 | 143 | 18 | 26 | 17.5 | 25 | |
| 80-20T4 | | | 82.2 | 72.466 | 4 | 125 | 12375 | 42162 | 108 | 115 | 161 | 174 | 24 | 143 | 18 | 26 | 17.5 | 25 | |
| 100-12T4 | 100 | 12 | 7.938 | 101.8 | 93.688 | 4 | 105 | 8306 | 33001 | 123 | 130 | 109 | 190 | 24 | 158 | 18 | 26 | 17.5 | 25 |
| 100-12T6 | | | | 101.8 | 93.688 | 6 | 175 | 11772 | 49502 | 123 | 130 | 137 | 190 | 24 | 158 | 18 | 26 | 17.5 | 25 |
| 100-16T4 | | 16 | 9.525 | 102.2 | 92.466 | 4 | 107 | 13569 | 53161 | 125 | 135 | 136 | 194 | 24 | 163 | 18 | 26 | 17.5 | 30 |
| 100-16T6 | | | | 102.2 | 92.466 | 6 | 140 | 19230 | 79741 | 125 | 135 | 173 | 194 | 24 | 163 | 18 | 26 | 17.5 | 30 |
| 100-20T4 | | 20 | 9.525 | 102.2 | 92.466 | 4 | 155 | 13569 | 53161 | 125 | 135 | 161 | 194 | 24 | 163 | 18 | 26 | 17.5 | 30 |

Remark : Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

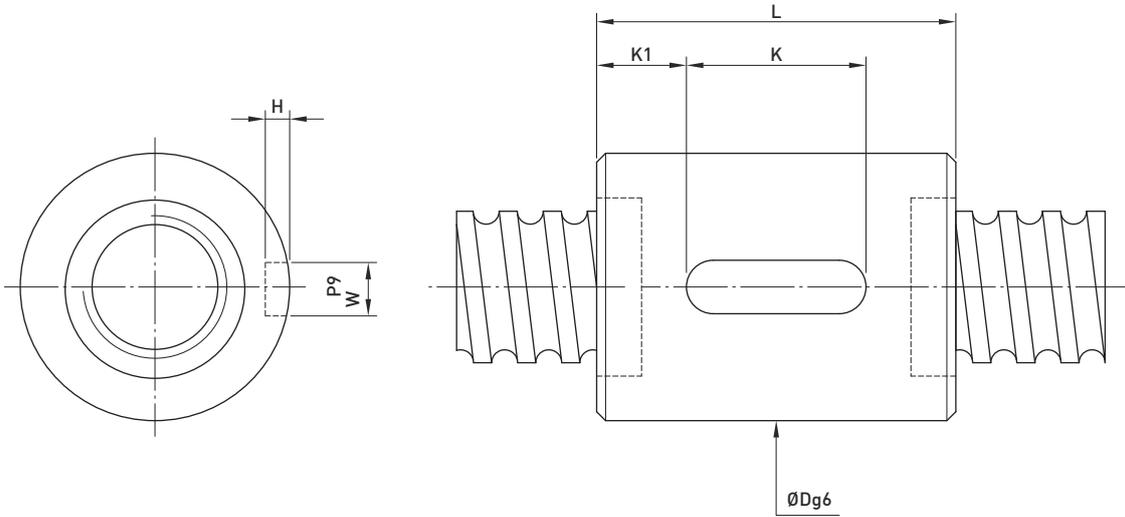
RSI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Keyway | | | | |
|---------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|-----|----|--------|----|-----|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | K | W | H | K1 | |
| 16-2T4 | 16 | 2 | 1.500 | 16.2 | 14.652 | 4 | 15 | 178 | 395 | 25 | 25 | 25 | 20 | 3 | 1.8 | 2.5 |
| 16-5T3 | | 5 | 3.175 | 16.6 | 13.324 | 3 | 11 | 731 | 1331 | 28 | 30 | 40 | 20 | 3 | 1.8 | 10 |
| 16-5T4 | | | | 16.6 | 13.324 | 4 | 12 | 936 | 1775 | 28 | 30 | 46 | 20 | 3 | 1.8 | 13 |
| 20-5T3 | 20 | 5 | 3.175 | 20.6 | 17.324 | 3 | 20 | 852 | 1767 | 32 | 34 | 41 | 20 | 3 | 1.8 | 10.5 |
| 20-5T4 | | | | 20.6 | 17.324 | 4 | 27 | 1091 | 2356 | 32 | 34 | 48 | 20 | 3 | 1.8 | 14 |
| 20-6T3 | | 6 | 3.969 | 20.8 | 16.744 | 3 | 20 | 1091 | 2081 | 34 | 36 | 46 | 20 | 4 | 2.5 | 13 |
| 20-6T4 | 20.8 | | | 16.744 | 4 | 27 | 1398 | 2774 | 34 | 36 | 56 | 25 | 4 | 2.5 | 15.5 | |
| 25-5T3 | 25 | 5 | 3.175 | 25.6 | 22.324 | 3 | 28 | 977 | 2314 | 37 | 40 | 41 | 20 | 4 | 2.5 | 10.5 |
| 25-5T4 | | | | 25.6 | 22.324 | 4 | 37 | 1252 | 3085 | 37 | 40 | 48 | 20 | 4 | 2.5 | 14 |
| 25-6T3 | | 6 | 3.969 | 25.8 | 21.744 | 3 | 28 | 1272 | 2762 | 38 | 42 | 46 | 20 | 4 | 2.5 | 13 |
| 25-6T4 | 25.8 | | | 21.744 | 4 | 37 | 1628 | 3682 | 38 | 42 | 56 | 25 | 4 | 2.5 | 15.5 | |
| 32-5T3 | 32 | 5 | 3.175 | 32.6 | 29.324 | 3 | 33 | 1117 | 3081 | 44 | 48 | 41 | 20 | 4 | 2.5 | 10.5 |
| 32-5T4 | | | | 32.6 | 29.324 | 4 | 42 | 1431 | 4108 | 44 | 48 | 48 | 20 | 4 | 2.5 | 14 |
| 32-5T6 | | | | 32.6 | 29.324 | 6 | 63 | 2027 | 6162 | 44 | 48 | 61 | 25 | 4 | 2.5 | 18 |
| 32-6T3 | | 6 | 3.969 | 32.8 | 28.744 | 3 | 33 | 1446 | 3620 | 45 | 50 | 46 | 20 | 5 | 3 | 13 |
| 32-6T4 | | | | 32.8 | 28.744 | 4 | 43 | 1852 | 4826 | 45 | 50 | 56 | 25 | 5 | 3 | 15.5 |
| 32-6T6 | | | | 32.8 | 28.744 | 6 | 65 | 2625 | 7239 | 45 | 50 | 70 | 32 | 5 | 3 | 19 |
| 32-8T3 | 8 | 4.763 | 33 | 28.132 | 3 | 35 | 1810 | 4227 | 47 | 52 | 59 | 25 | 5 | 3 | 17 | |
| 32-8T4 | | | 33 | 28.132 | 4 | 47 | 2317 | 5635 | 47 | 52 | 70 | 25 | 5 | 3 | 22.5 | |
| 32-10T3 | 10 | 6.350 | 33.4 | 26.91 | 3 | 35 | 2539 | 5327 | 51 | 56 | 68 | 25 | 6 | 3.5 | 21.5 | |
| 32-10T4 | | | 33.4 | 26.91 | 4 | 48 | 3252 | 7102 | 51 | 56 | 79 | 32 | 6 | 3.5 | 23.5 | |
| 40-5T4 | 40 | 5 | 3.175 | 40.6 | 37.324 | 4 | 50 | 1599 | 5280 | 51 | 54 | 48 | 20 | 4 | 2.5 | 14 |
| 40-5T6 | | | | 40.6 | 37.324 | 6 | 74 | 2265 | 7919 | 51 | 54 | 61 | 25 | 4 | 2.5 | 18 |
| 40-6T4 | | 6 | 3.969 | 40.8 | 36.744 | 4 | 50 | 2136 | 6420 | 53 | 56 | 56 | 25 | 5 | 3 | 15.5 |
| 40-6T6 | | | | 40.8 | 36.744 | 6 | 74 | 3028 | 9630 | 53 | 56 | 70 | 32 | 5 | 3 | 19 |
| 40-8T4 | | 8 | 4.763 | 41 | 36.132 | 4 | 52 | 2728 | 7596 | 55 | 60 | 70 | 25 | 5 | 3 | 22.5 |
| 40-8T6 | | | | 41 | 36.132 | 6 | 76 | 3866 | 11394 | 55 | 60 | 91 | 40 | 5 | 3 | 25.5 |
| 40-10T3 | 10 | 6.350 | 41.4 | 34.91 | 3 | 40 | 2959 | 7069 | 60 | 65 | 68 | 25 | 6 | 3.5 | 21.5 | |
| 40-10T4 | | | 41.4 | 34.91 | 4 | 51 | 3789 | 9426 | 60 | 65 | 79 | 32 | 6 | 3.5 | 23.5 | |
| 50-5T4 | 50 | 5 | 3.175 | 50.6 | 47.324 | 4 | 62 | 1757 | 6745 | 62 | 65 | 48 | 20 | 4 | 2.5 | 14 |
| 50-5T6 | | | | 50.6 | 47.324 | 6 | 91 | 2490 | 10117 | 62 | 65 | 61 | 25 | 4 | 2.5 | 18 |
| 50-6T4 | | 6 | 3.969 | 50.8 | 46.744 | 4 | 62 | 2388 | 8250 | 64 | 68 | 56 | 25 | 5 | 3 | 15.5 |
| 50-6T6 | | | | 50.8 | 46.744 | 6 | 93 | 3384 | 12375 | 64 | 68 | 70 | 32 | 5 | 3 | 19 |
| 50-8T4 | | 8 | 4.763 | 51 | 46.132 | 4 | 62 | 2998 | 9578 | 65 | 70 | 70 | 32 | 5 | 3 | 19 |
| 50-8T6 | | | | 51 | 46.132 | 6 | 92 | 4249 | 14367 | 65 | 70 | 91 | 40 | 5 | 3 | 25.5 |
| 50-10T3 | 10 | 6.350 | 51.4 | 44.91 | 3 | 50 | 3397 | 9256 | 69 | 74 | 68 | 32 | 6 | 3.5 | 18 | |
| 50-10T4 | | | 51.4 | 44.91 | 4 | 63 | 4350 | 12341 | 69 | 74 | 79 | 32 | 6 | 3.5 | 23.5 | |

Remark : Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

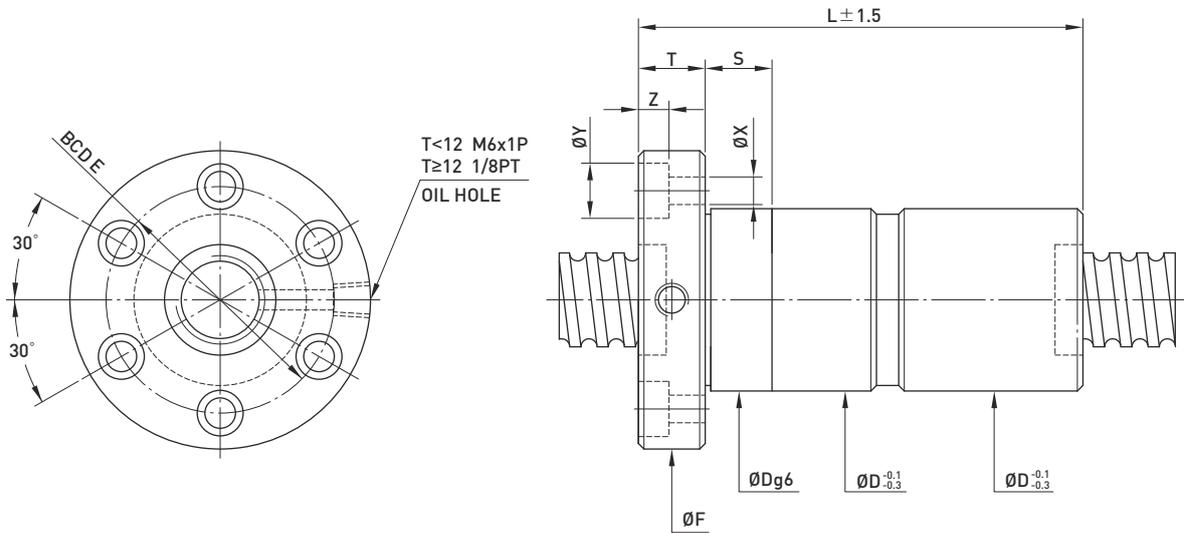
RSI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Keyway | | | | | |
|----------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|-----|--------|-----|----|-----|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | K | W | H | K1 | | |
| 50-10T6 | 50 | 10 | 6.350 | 51.4 | 44.91 | 6 | 94 | 6165 | 18511 | 69 | 74 | 102 | 40 | 6 | 3.5 | 31 | |
| 50-12T3 | | 12 | 7.938 | 51.8 | 43.688 | 3 | 50 | 4420 | 11047 | 73 | 78 | 82 | 40 | 6 | 3.5 | 21 | |
| 50-12T4 | | | | 51.8 | 43.688 | 4 | 63 | 5660 | 14730 | 73 | 78 | 95 | 40 | 6 | 3.5 | 27.5 | |
| 63-6T4 | 63 | 6 | 3.969 | 63.8 | 59.744 | 4 | 75 | 2674 | 10542 | 78 | 80 | 56 | 25 | 6 | 3.5 | 15.5 | |
| 63-6T6 | | | | 63.8 | 59.744 | 6 | 113 | 3704 | 15813 | 78 | 80 | 70 | 32 | 6 | 3.5 | 19 | |
| 63-8T4 | | 8 | 4.763 | 64 | 59.132 | 4 | 77 | 3395 | 12541 | 79 | 82 | 70 | 32 | 6 | 3.5 | 19 | |
| 63-8T6 | | | | | 64 | 59.132 | 6 | 114 | 4812 | 18811 | 79 | 82 | 91 | 40 | 6 | 3.5 | 25.5 |
| 63-10T4 | | 10 | 6.350 | 64.4 | 57.91 | 4 | 79 | 4860 | 15858 | 82 | 88 | 79 | 32 | 8 | 4 | 23.5 | |
| 63-10T6 | | | | | 64.4 | 57.91 | 6 | 115 | 6887 | 23786 | 82 | 88 | 102 | 40 | 8 | 4 | 31 |
| 63-12T4 | 12 | | | 7.938 | 64.8 | 56.688 | 4 | 78 | 6479 | 19293 | 86 | 92 | 95 | 40 | 8 | 4 | 27.5 |
| 63-12T6 | | | 64.8 | | 56.688 | 6 | 113 | 9182 | 28939 | 86 | 92 | 123 | 50 | 8 | 4 | 36.5 | |
| 80-10T4 | 80 | 10 | 6.350 | 81.4 | 74.91 | 4 | 96 | 5559 | 21118 | 99 | 105 | 79 | 32 | 8 | 4 | 23.5 | |
| 80-10T6 | | | | | 81.4 | 74.91 | 6 | 140 | 7879 | 31677 | 99 | 105 | 102 | 40 | 8 | 4 | 31 |
| 80-12T4 | | 12 | 7.938 | 81.8 | 73.688 | 4 | 97 | 7430 | 25681 | 103 | 110 | 95 | 40 | 8 | 4 | 27.5 | |
| 80-12T6 | | | | | 81.8 | 73.688 | 6 | 141 | 10530 | 38521 | 103 | 110 | 123 | 50 | 8 | 4 | 36.5 |
| 80-16T3 | | 16 | 9.525 | 82.2 | 72.466 | 3 | 95 | 9663 | 31622 | 108 | 115 | 106 | 40 | 10 | 5 | 33 | |
| 80-16T4 | | | | | 82.2 | 72.466 | 4 | 130 | 12375 | 42162 | 108 | 115 | 124 | 50 | 10 | 5 | 37 |
| 80-20T3 | 20 | | | 9.525 | 82.2 | 72.466 | 3 | 95 | 9663 | 31622 | 108 | 115 | 126 | 50 | 10 | 5 | 38 |
| 80-20T4 | | | 82.2 | | 72.466 | 4 | 125 | 12375 | 42162 | 108 | 115 | 149 | 63 | 10 | 5 | 43 | |
| 100-12T4 | 100 | 12 | 7.938 | 101.8 | 93.688 | 4 | 105 | 8306 | 33001 | 123 | 130 | 95 | 40 | 8 | 4 | 27.5 | |
| 100-12T6 | | | | | 101.8 | 93.688 | 6 | 175 | 11772 | 49502 | 123 | 130 | 123 | 50 | 8 | 4 | 36.5 |
| 100-16T4 | | 16 | 9.525 | 102.2 | 92.466 | 4 | 107 | 13569 | 53161 | 125 | 135 | 124 | 50 | 10 | 5 | 37 | |
| 100-16T6 | | | | | 102.2 | 92.466 | 6 | 140 | 19230 | 79741 | 125 | 135 | 161 | 63 | 10 | 5 | 49 |
| 100-20T4 | | | | 20 | 102.2 | 92.466 | 4 | 155 | 13569 | 53161 | 125 | 135 | 149 | 63 | 10 | 5 | 43 |

Remark : Stiffness values listed above value are derived from theoretical formula while axial load is 30% of dynamic load rating without preload.

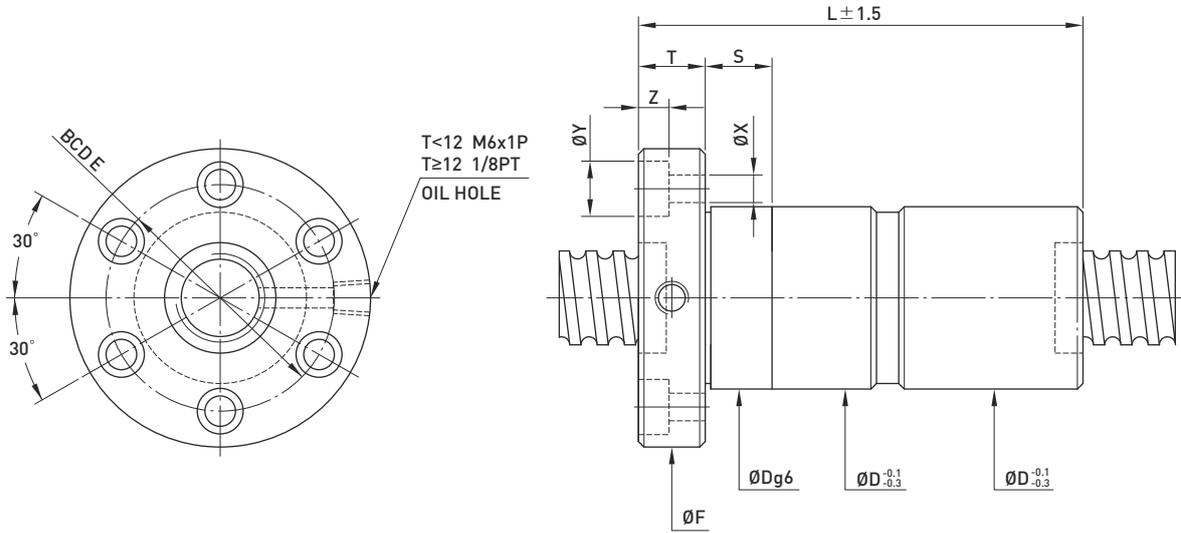
FDI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | | Flange | | | Bolt | | | | Fit | | |
|-----------|--------------|--------|-----------|--------|--------|----------|----------------------|---|----------------------|------|-------|------|--------|-------|-----|------|-----|-----|-----|-----|-----|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | S | | | | |
| 16-5T3 | 16 | 5 | 3.175 | 16.6 | 13.324 | 3 | 20 | 731 | 1331 | 28 | 30 | 78 | 54 | 12 | 41 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 16-5T4 | | | | 16.6 | 13.324 | 4 | 23 | 936 | 1775 | 28 | 30 | 90 | 54 | 12 | 41 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 20-5T3 | | | | 20 | 6 | 3.969 | 20.6 | 17.324 | 3 | 39 | 852 | 1767 | 32 | 34 | 78 | 57 | 12 | 45 | 5.5 | 9.5 | 5.5 | 24 |
| 20-5T4 | | | | | | | 20.6 | 17.324 | 4 | 54 | 1091 | 2356 | 32 | 34 | 92 | 57 | 12 | 45 | 5.5 | 9.5 | 5.5 | 24 |
| 20-6T3 | 20.8 | 16.744 | 3 | | | | 39 | 1091 | 2081 | 34 | 36 | 89 | 60 | 12 | 48 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 20-6T4 | 20.8 | 16.744 | 4 | | | | 54 | 1398 | 2774 | 34 | 36 | 109 | 60 | 12 | 48 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 25-2.5T5 | 25 | 2.5 | 2.000 | 25.2 | 23.136 | 5 | 66 | 716 | 2117 | 35 | 40 | 87 | 65 | 10 | 51 | 6.6 | 11 | 6.5 | 24 | | | |
| 25-5T3 | | 5 | 3.175 | 25.6 | 22.324 | 3 | 55 | 977 | 2314 | 37 | 40 | 78 | 64 | 12 | 52 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 25-5T4 | | | | 20.6 | 22.324 | 4 | 73 | 1252 | 3085 | 37 | 40 | 96 | 64 | 12 | 52 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 25-6T3 | | | | 6 | 3.969 | 25.8 | 21.744 | 3 | 56 | 1272 | 2762 | 38 | 42 | 89 | 65 | 12 | 53 | 5.5 | 9.5 | 5.5 | 24 | |
| 25-6T4 | 25.8 | | | | | 21.744 | 4 | 75 | 1628 | 3682 | 38 | 42 | 109 | 65 | 12 | 53 | 5.5 | 9.5 | 5.5 | 24 | | |
| 25-10T3 | 10 | 4.763 | 26 | 21.132 | 3 | 49 | 1643 | 3265 | 47 | 51 | 140 | 74 | 15 | 60 | 6.6 | 11 | 6.5 | 24 | | | | |
| 28-5T5 | 28 | 5 | 3.175 | 28.6 | 25.324 | 5 | 86 | 1619 | 4404 | 45 | 50 | 110 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 28-10T4 | | 10 | 4.763 | 29 | 24.132 | 4 | 70 | 2199 | 4969 | 45 | 50 | 150 | 74 | 12 | 61 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-2.5T6 | 32 | 2.5 | 2.000 | 32.2 | 30.136 | 6 | 97 | 928 | 3339 | 45 | 51 | 106 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | | | |
| 32-5T3 | | 5 | 3.175 | 32.6 | 29.324 | 3 | 64 | 1117 | 3081 | 44 | 48 | 78 | 74 | 12 | 60 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-5T4 | | | | 32.6 | 29.324 | 4 | 82 | 1431 | 4108 | 44 | 48 | 96 | 74 | 12 | 60 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-5T6 | | | | 32.6 | 29.324 | 6 | 121 | 2027 | 6162 | 44 | 48 | 118 | 74 | 12 | 60 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-5.08T4 | | | | 5.08 | 32.6 | 29.324 | 4 | 82 | 1430 | 4108 | 44 | 48 | 96 | 74 | 12 | 60 | 6.6 | 11 | 6.5 | 24 | | |
| 32-6T3 | | 6 | 3.969 | 32.8 | 28.744 | 3 | 65 | 1446 | 3620 | 45 | 50 | 89 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-6T4 | | | | 32.8 | 28.744 | 4 | 84 | 1852 | 4826 | 45 | 50 | 109 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-6T6 | | | | 32.8 | 28.744 | 6 | 125 | 2625 | 7239 | 45 | 50 | 137 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-8T3 | | | | 8 | 4.763 | 33 | 28.132 | 3 | 68 | 1810 | 4227 | 47 | 52 | 110 | 78 | 16 | 64 | 6.6 | 11 | 6.5 | 24 | |
| 32-8T4 | | 33 | 28.132 | | | 4 | 82 | 2317 | 5635 | 47 | 52 | 136 | 78 | 16 | 64 | 6.6 | 11 | 6.5 | 24 | | | |
| 32-10T3 | 10 | 6.350 | 33.4 | 26.910 | 3 | 68 | 2539 | 5327 | 51 | 56 | 129 | 82 | 16 | 68 | 6.6 | 11 | 6.5 | 24 | | | | |
| 32-10T4 | | | 33.4 | 26.910 | 4 | 82 | 3252 | 7102 | 51 | 56 | 155 | 82 | 16 | 68 | 6.6 | 11 | 6.5 | 24 | | | | |
| 40-5T4 | 40 | 5 | 3.175 | 40.6 | 37.324 | 4 | 99 | 1599 | 5280 | 51 | 54 | 96 | 80 | 16 | 66 | 6.6 | 11 | 6.5 | 24 | | | |
| 40-5T6 | | | | 40.6 | 37.324 | 6 | 146 | 2265 | 7919 | 51 | 54 | 122 | 80 | 16 | 66 | 6.6 | 11 | 6.5 | 24 | | | |
| 40-6T4 | | 6 | 3.969 | 40.8 | 36.744 | 4 | 100 | 2136 | 6420 | 53 | 56 | 113 | 88 | 16 | 72 | 9 | 14 | 8.5 | 30 | | | |
| 40-6T6 | | | | 40.8 | 36.744 | 6 | 148 | 3028 | 9630 | 53 | 56 | 141 | 88 | 16 | 72 | 9 | 14 | 8.5 | 30 | | | |
| 40-8T4 | | | | 8 | 4.763 | 41 | 36.132 | 4 | 102 | 2728 | 7596 | 55 | 60 | 136 | 92 | 16 | 75 | 9 | 14 | 8.5 | 30 | |
| 40-8T6 | | | | | | 41 | 36.132 | 6 | 150 | 3866 | 11394 | 55 | 60 | 178 | 92 | 16 | 75 | 9 | 14 | 8.5 | 30 | |
| 40-10T3 | | 10 | 6.350 | 41.4 | 34.91 | 3 | 76 | 2959 | 7069 | 60 | 65 | 133 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 | | | |
| 40-10T4 | | | | 41.4 | 34.91 | 4 | 101 | 3789 | 9426 | 60 | 65 | 155 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 | | | |
| 40-10T5 | | | | 41.4 | 34.91 | 5 | 119 | 4590 | 11781 | 60 | 65 | 192 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 | | | |
| 40-12T3 | | | | 12 | 6.350 | 41.4 | 34.91 | 3 | 73 | 2958 | 7069 | 58 | 60 | 160 | 96 | 18 | 80 | 9 | 14 | 8.5 | 30 | |
| 40-12T4 | 41.4 | 34.91 | 4 | | | 101 | 3789 | 9425 | 58 | 60 | 186 | 96 | 18 | 80 | 9 | 14 | 8.5 | 30 | | | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

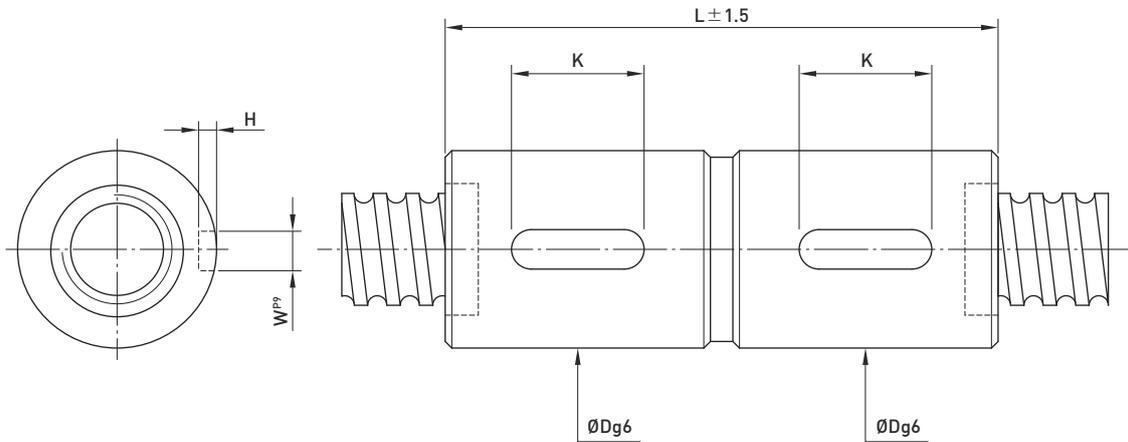
FDI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit | |
|----------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|-----|-----|--------|-----|-------|------|------|------|------|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | | S |
| 45-10T4 | 45 | 10 | 7.144 | 46.6 | 39.299 | 4 | 108 | 4683 | 11930 | 68 | 70 | 160 | 110 | 18 | 90 | 11 | 17.5 | 11 | 30 |
| 45-12T3 | | 12 | 6.350 | 46.4 | 39.91 | 3 | 80 | 3115 | 7952 | 68 | 70 | 183 | 110 | 16 | 90 | 11 | 17.5 | 11 | 30 |
| 45-16T3 | | 16 | 7.144 | 46.6 | 39.299 | 3 | 82 | 3656 | 8947 | 68 | 70 | 183 | 110 | 16 | 90 | 11 | 17.5 | 11 | 30 |
| 50-5T4 | 50 | 5 | 3.175 | 50.6 | 47.324 | 4 | 121 | 1757 | 6745 | 62 | 65 | 96 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 |
| 50-5T6 | | | | 6 | 177 | 2490 | 10117 | 62 | 65 | 122 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 | | |
| 50-6T4 | | 6 | 3.969 | 50.8 | 46.744 | 4 | 123 | 2388 | 8250 | 64 | 68 | 113 | 100 | 16 | 84 | 9 | 14 | 8.5 | 30 |
| 50-6T6 | | | | 6 | 179 | 3384 | 12375 | 64 | 68 | 147 | 100 | 16 | 84 | 9 | 14 | 8.5 | 30 | | |
| 50-8T4 | | 8 | 4.763 | 51 | 46.132 | 4 | 122 | 2998 | 9578 | 65 | 70 | 136 | 102 | 16 | 85 | 9 | 14 | 8.5 | 30 |
| 50-8T6 | | | | 6 | 178 | 4249 | 14367 | 65 | 70 | 178 | 102 | 16 | 85 | 9 | 14 | 8.5 | 30 | | |
| 50-10T3 | 10 | 6.350 | 51.4 | 44.91 | 3 | 95 | 3397 | 9256 | 69 | 74 | 135 | 114 | 18 | 92 | 11 | 17.5 | 11 | 40 | |
| 50-10T4 | | | 4 | 124 | 4350 | 12341 | 69 | 74 | 157 | 114 | 18 | 92 | 11 | 17.5 | 11 | 40 | | | |
| 50-10T6 | | | 6 | 184 | 6165 | 18511 | 69 | 74 | 203 | 114 | 18 | 92 | 11 | 17.5 | 11 | 40 | | | |
| 50-12T3 | 12 | 7.938 | 51.8 | 43.688 | 3 | 94 | 4420 | 11047 | 73 | 78 | 158 | 118 | 18 | 96 | 11 | 17.5 | 11 | 40 | |
| 50-12T4 | | | 4 | 124 | 5660 | 14730 | 73 | 78 | 184 | 118 | 18 | 96 | 11 | 17.5 | 11 | 40 | | | |
| 63-6T4 | 63 | 6 | 3.969 | 63.8 | 59.744 | 4 | 148 | 2674 | 10542 | 78 | 80 | 115 | 119 | 18 | 98 | 11 | 17.5 | 11 | 40 |
| 63-6T6 | | | | 6 | 220 | 3704 | 15813 | 78 | 80 | 143 | 119 | 18 | 98 | 11 | 17.5 | 11 | 40 | | |
| 63-8T4 | | 8 | 4.763 | 64 | 59.132 | 4 | 152 | 3395 | 12541 | 79 | 82 | 138 | 122 | 18 | 100 | 11 | 17.5 | 11 | 40 |
| 63-8T6 | | | | 6 | 222 | 4812 | 18811 | 79 | 82 | 180 | 122 | 18 | 100 | 11 | 17.5 | 11 | 40 | | |
| 63-10T4 | | 10 | 6.350 | 64.4 | 57.91 | 4 | 158 | 4860 | 15858 | 82 | 88 | 159 | 134 | 20 | 110 | 14 | 20 | 13 | 40 |
| 63-10T6 | | | | 6 | 228 | 6887 | 23786 | 82 | 88 | 205 | 134 | 20 | 110 | 14 | 20 | 13 | 40 | | |
| 63-12T4 | 12 | 7.938 | 64.8 | 56.688 | 4 | 152 | 6479 | 19293 | 86 | 92 | 186 | 138 | 20 | 114 | 14 | 20 | 13 | 40 | |
| 63-12T6 | | | 6 | 224 | 9182 | 28939 | 86 | 92 | 242 | 138 | 20 | 114 | 14 | 20 | 13 | 40 | | | |
| 80-10T4 | 80 | 10 | 6.350 | 81.4 | 74.91 | 4 | 190 | 5559 | 21118 | 99 | 105 | 172 | 152 | 20 | 127 | 14 | 20 | 13 | 40 |
| 80-10T6 | | | | 6 | 277 | 7879 | 31677 | 99 | 105 | 214 | 152 | 20 | 127 | 14 | 20 | 13 | 40 | | |
| 80-12T4 | | 12 | 7.938 | 81.8 | 73.688 | 4 | 192 | 7430 | 25681 | 103 | 110 | 190 | 170 | 24 | 138 | 18 | 26 | 17.5 | 50 |
| 80-12T6 | | | | 6 | 280 | 10530 | 38521 | 103 | 110 | 246 | 170 | 24 | 138 | 18 | 26 | 17.5 | 50 | | |
| 80-16T3 | | 16 | 9.525 | 82.2 | 72.466 | 3 | 188 | 9663 | 31622 | 108 | 115 | 208 | 174 | 24 | 143 | 18 | 26 | 17.5 | 50 |
| 80-16T4 | | | | 4 | 254 | 12375 | 42162 | 108 | 115 | 244 | 174 | 24 | 143 | 18 | 26 | 17.5 | 50 | | |
| 80-20T3 | 20 | 9.525 | 82.2 | 72.466 | 3 | 189 | 9663 | 31622 | 108 | 115 | 250 | 174 | 24 | 143 | 18 | 26 | 17.5 | 50 | |
| 80-20T4 | | | 4 | 248 | 12375 | 42162 | 108 | 115 | 296 | 174 | 24 | 143 | 18 | 26 | 17.5 | 50 | | | |
| 100-12T4 | 100 | 12 | 7.938 | 101.8 | 93.688 | 4 | 206 | 8306 | 33001 | 123 | 130 | 190 | 190 | 24 | 158 | 18 | 26 | 17.5 | 50 |
| 100-12T6 | | | | 6 | 343 | 11772 | 49502 | 123 | 130 | 246 | 190 | 24 | 158 | 18 | 26 | 17.5 | 50 | | |
| 100-16T4 | | 16 | 9.525 | 102.2 | 92.466 | 4 | 212 | 13569 | 53161 | 135 | 135 | 244 | 194 | 24 | 163 | 18 | 26 | 17.5 | 60 |
| 100-16T6 | | | | 6 | 276 | 19230 | 79741 | 135 | 135 | 318 | 194 | 24 | 163 | 18 | 26 | 17.5 | 60 | | |
| 100-20T4 | 20 | 102.2 | 92.466 | 4 | 300 | 13569 | 53161 | 135 | 135 | 296 | 194 | 24 | 163 | 18 | 26 | 17.5 | 60 | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

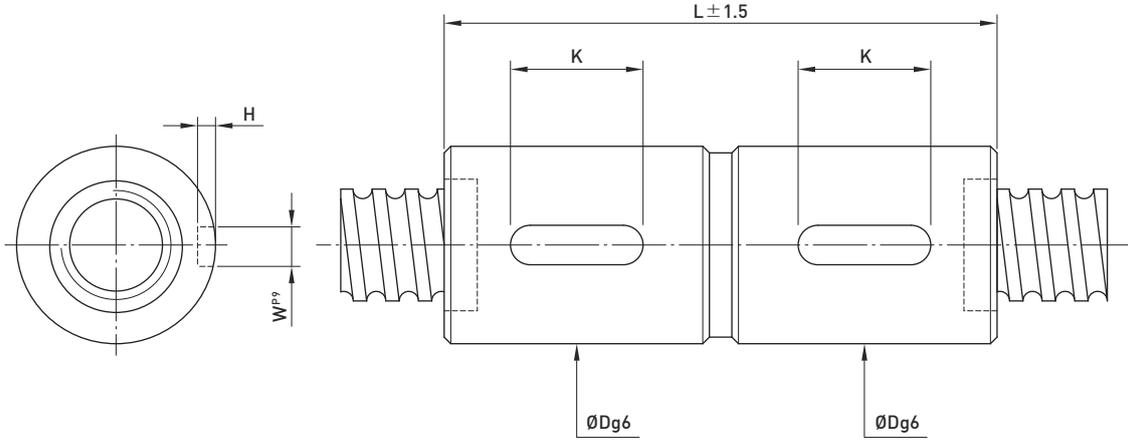
RDI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | | Keyway | | | | |
|---------|--------------|-------|-----------|--------|--------|----------|----------------------|---|----------------------|------|-------|-----|--------|-----|-----|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | K | W | H | | | |
| 16-5T3 | 16 | 5 | 3.175 | 16.6 | 13.324 | 3 | 20 | 731 | 1331 | 28 | 30 | 72 | 20 | 3 | 1.8 | | |
| 16-5T4 | | | | 16.6 | 13.324 | 4 | 23 | 936 | 1775 | 28 | 30 | 85 | 20 | 3 | 1.8 | | |
| 20-5T3 | 20 | 5 | | 20.6 | 17.324 | 3 | 39 | 852 | 1767 | 32 | 34 | 75 | 20 | 3 | 1.8 | | |
| 20-5T4 | | | | 20.6 | 17.324 | 4 | 54 | 1091 | 2356 | 32 | 34 | 85 | 20 | 3 | 1.8 | | |
| 20-6T3 | | 6 | 3.969 | 20.8 | 16.744 | 3 | 39 | 1091 | 2081 | 34 | 36 | 87 | 20 | 4 | 2.5 | | |
| 20-6T4 | | | | 20.8 | 16.744 | 4 | 54 | 1398 | 2774 | 34 | 36 | 103 | 25 | 4 | 2.5 | | |
| 25-5T3 | 25 | 5 | | 25.6 | 22.324 | 3 | 55 | 977 | 2314 | 37 | 40 | 75 | 20 | 4 | 2.5 | | |
| 25-5T4 | | | | 25.6 | 22.324 | 4 | 73 | 1252 | 3085 | 37 | 40 | 85 | 20 | 4 | 2.5 | | |
| 25-6T3 | | 6 | 3.969 | 25.8 | 21.744 | 3 | 56 | 1272 | 2762 | 38 | 42 | 87 | 20 | 4 | 2.5 | | |
| 25-6T4 | | | | 25.8 | 21.744 | 4 | 75 | 1628 | 3682 | 38 | 42 | 103 | 25 | 4 | 2.5 | | |
| 32-5T3 | 32 | 5 | | 3.175 | 32.6 | 29.324 | 3 | 64 | 1117 | 3081 | 44 | 48 | 75 | 20 | 4 | 2.5 | |
| 32-5T4 | | | | | 32.6 | 29.324 | 4 | 82 | 1431 | 4108 | 44 | 48 | 85 | 20 | 4 | 2.5 | |
| 32-5T6 | | | 32.6 | | 29.324 | 6 | 121 | 2027 | 6162 | 44 | 48 | 105 | 25 | 4 | 2.5 | | |
| 32-6T3 | | | 6 | | 3.969 | 32.8 | 28.744 | 3 | 65 | 1446 | 3620 | 45 | 50 | 87 | 20 | 5 | 3 |
| 32-6T4 | | 32.8 | | 28.744 | | 4 | 84 | 1852 | 4826 | 45 | 50 | 103 | 25 | 5 | 3 | | |
| 32-6T6 | | 32.8 | | 28.744 | | 6 | 125 | 2625 | 7239 | 45 | 50 | 127 | 32 | 5 | 3 | | |
| 32-8T3 | | 8 | | 4.763 | | 33 | 28.132 | 3 | 68 | 1810 | 4227 | 47 | 52 | 109 | 25 | 5 | 3 |
| 32-8T4 | | | 33 | | | 28.132 | 4 | 82 | 2317 | 5635 | 47 | 52 | 127 | 25 | 5 | 3 | |
| 32-10T3 | 10 | 6.350 | 33.4 | | | 26.91 | 3 | 68 | 2539 | 5327 | 51 | 56 | 135 | 25 | 6 | 3.5 | |
| 32-10T4 | | | 33.4 | | | 26.91 | 4 | 82 | 3252 | 7102 | 51 | 56 | 155 | 32 | 6 | 3.5 | |
| 40-5T4 | 40 | | 5 | 3.175 | | 40.6 | 37.324 | 4 | 99 | 1599 | 5280 | 51 | 54 | 85 | 20 | 4 | 2.5 |
| 40-5T6 | | | | | 40.6 | 37.324 | 6 | 146 | 2265 | 7919 | 51 | 54 | 105 | 25 | 4 | 2.5 | |
| 40-6T4 | | 6 | | | 3.969 | 40.8 | 36.744 | 4 | 100 | 2136 | 6420 | 53 | 56 | 103 | 25 | 5 | 3 |
| 40-6T6 | | | | | | 40.8 | 36.744 | 6 | 148 | 3028 | 9630 | 53 | 56 | 127 | 32 | 5 | 3 |
| 40-8T4 | | | 8 | 4.763 | | 41 | 36.132 | 4 | 102 | 2728 | 7596 | 55 | 60 | 127 | 25 | 5 | 3 |
| 40-8T6 | | | | | | 41 | 36.132 | 6 | 150 | 3866 | 11394 | 55 | 60 | 161 | 40 | 5 | 3 |
| 40-10T3 | | 10 | 6.350 | | | 41.4 | 34.91 | 3 | 76 | 2959 | 7069 | 60 | 65 | 135 | 25 | 6 | 3.5 |
| 40-10T4 | | | | | | 41.4 | 34.91 | 4 | 101 | 3789 | 9426 | 60 | 65 | 155 | 32 | 6 | 3.5 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

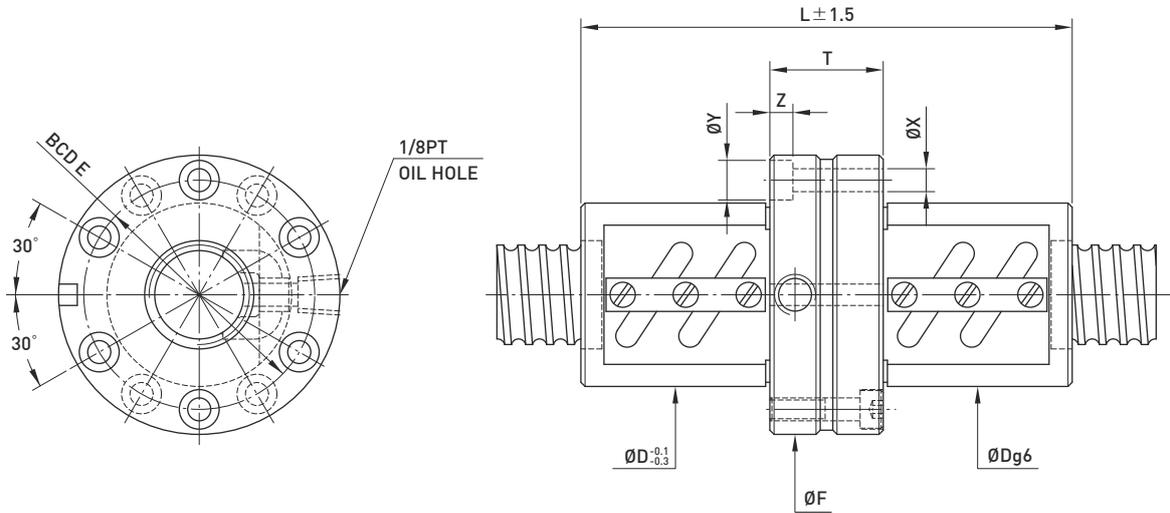
RDI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Keyway | | | | |
|----------|--------------|------|-----------|--------|--------|----------|----------------------|---|----------------------|-------|-----|--------|-----|-----|-----|---|
| | Nominal Dia. | Lead | | | | | | | | D | L | K | W | H | | |
| 50-5T4 | 50 | 5 | 3.175 | 50.6 | 47.324 | 4 | 121 | 1757 | 6745 | 62 | 65 | 85 | 20 | 4 | 2.5 | |
| 50-5T6 | | | | 50.6 | 47.324 | 6 | 177 | 2490 | 10117 | 62 | 65 | 105 | 25 | 4 | 2.5 | |
| 50-6T4 | | 6 | 3.969 | 50.8 | 46.744 | 4 | 123 | 2388 | 8250 | 64 | 68 | 103 | 25 | 5 | 3 | |
| 50-6T6 | | | | 50.8 | 46.744 | 6 | 179 | 3384 | 12375 | 64 | 68 | 127 | 32 | 5 | 3 | |
| 50-8T4 | | 8 | 4.763 | 51 | 46.132 | 4 | 122 | 2998 | 9578 | 65 | 70 | 127 | 32 | 5 | 3 | |
| 50-8T6 | | | | 51 | 46.132 | 6 | 178 | 4249 | 14367 | 65 | 70 | 161 | 40 | 5 | 3 | |
| 50-10T3 | | 10 | 6.350 | 51.4 | 44.91 | 3 | 95 | 3397 | 9256 | 69 | 74 | 135 | 32 | 6 | 3.5 | |
| 50-10T4 | | | | 51.4 | 44.91 | 4 | 124 | 4350 | 12341 | 69 | 74 | 155 | 32 | 6 | 3.5 | |
| 50-10T6 | | 51.4 | 44.91 | 6 | 184 | 6165 | 18511 | 69 | 74 | 197 | 40 | 6 | 3.5 | | | |
| 50-12T3 | | 12 | 7.938 | 51.8 | 43.688 | 3 | 94 | 4420 | 11047 | 73 | 78 | 161 | 40 | 6 | 3.5 | |
| 50-12T4 | 51.8 | | | 43.688 | 4 | 124 | 5660 | 14730 | 73 | 78 | 185 | 40 | 6 | 3.5 | | |
| 63-6T4 | 63 | 6 | 3.969 | 63.8 | 59.744 | 4 | 148 | 2614 | 10542 | 78 | 80 | 106 | 25 | 6 | 3.5 | |
| 63-6T6 | | | | 63.8 | 59.744 | 6 | 220 | 3704 | 15813 | 78 | 80 | 130 | 32 | 6 | 3.5 | |
| 63-8T4 | | 8 | 4.763 | 64 | 59.132 | 4 | 152 | 3395 | 12541 | 79 | 82 | 131 | 32 | 6 | 3.5 | |
| 63-8T6 | | | | 64 | 59.132 | 6 | 222 | 4812 | 18811 | 79 | 82 | 165 | 40 | 6 | 3.5 | |
| 63-10T4 | | 10 | 6.350 | 64.4 | 57.91 | 4 | 158 | 4860 | 15858 | 82 | 88 | 160 | 32 | 8 | 4 | |
| 63-10T6 | | | | 64.4 | 57.91 | 6 | 228 | 6887 | 23786 | 82 | 88 | 202 | 40 | 8 | 4 | |
| 63-12T4 | | 12 | 7.938 | 64.8 | 56.688 | 4 | 152 | 6479 | 19293 | 86 | 92 | 185 | 40 | 8 | 4 | |
| 63-12T6 | | | | 64.8 | 56.688 | 6 | 224 | 9182 | 28939 | 86 | 92 | 238 | 50 | 8 | 4 | |
| 63-20T4 | | 20 | 9.525 | 65.2 | 55.466 | 4 | 189 | 10657 | 31251 | 90 | 95 | 260 | 50 | 8 | 4 | |
| 80-10T4 | | 80 | 10 | 6.350 | 81.4 | 74.91 | 4 | 190 | 5559 | 21118 | 99 | 105 | 160 | 32 | 8 | 4 |
| 80-10T6 | 81.4 | | | | 74.91 | 6 | 277 | 7879 | 31677 | 99 | 105 | 202 | 40 | 8 | 4 | |
| 80-12T4 | 12 | | 7.938 | 81.8 | 73.688 | 4 | 192 | 7430 | 25681 | 103 | 110 | 185 | 40 | 8 | 4 | |
| 80-12T6 | | | | 81.8 | 73.688 | 6 | 280 | 10530 | 38521 | 103 | 110 | 238 | 50 | 8 | 4 | |
| 80-16T3 | 16 | | 9.525 | 82.2 | 72.466 | 3 | 188 | 9663 | 31622 | 108 | 115 | 200 | 40 | 10 | 5 | |
| 80-16T4 | | | | 82.2 | 72.466 | 4 | 254 | 12375 | 42162 | 108 | 115 | 236 | 50 | 10 | 5 | |
| 80-20T3 | 20 | | 9.525 | 82.2 | 72.466 | 3 | 189 | 9663 | 31622 | 108 | 115 | 245 | 50 | 10 | 5 | |
| 80-20T4 | | | | 82.2 | 72.466 | 4 | 248 | 12375 | 42162 | 108 | 115 | 289 | 63 | 10 | 5 | |
| 100-12T4 | 100 | | 12 | 7.938 | 101.8 | 93.688 | 4 | 206 | 8306 | 33001 | 123 | 130 | 185 | 40 | 8 | 4 |
| 100-12T6 | | | | | 101.8 | 93.688 | 6 | 343 | 11772 | 49502 | 123 | 130 | 238 | 50 | 8 | 4 |
| 100-16T4 | | 16 | 9.525 | 102.2 | 92.466 | 4 | 212 | 13569 | 53161 | 125 | 135 | 236 | 50 | 10 | 5 | |
| 100-16T6 | | | | 102.2 | 92.466 | 6 | 276 | 19230 | 79741 | 125 | 135 | 310 | 63 | 10 | 5 | |
| 100-20T4 | | 20 | 9.525 | 102.2 | 92.466 | 4 | 300 | 13569 | 53161 | 125 | 135 | 289 | 63 | 10 | 5 | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

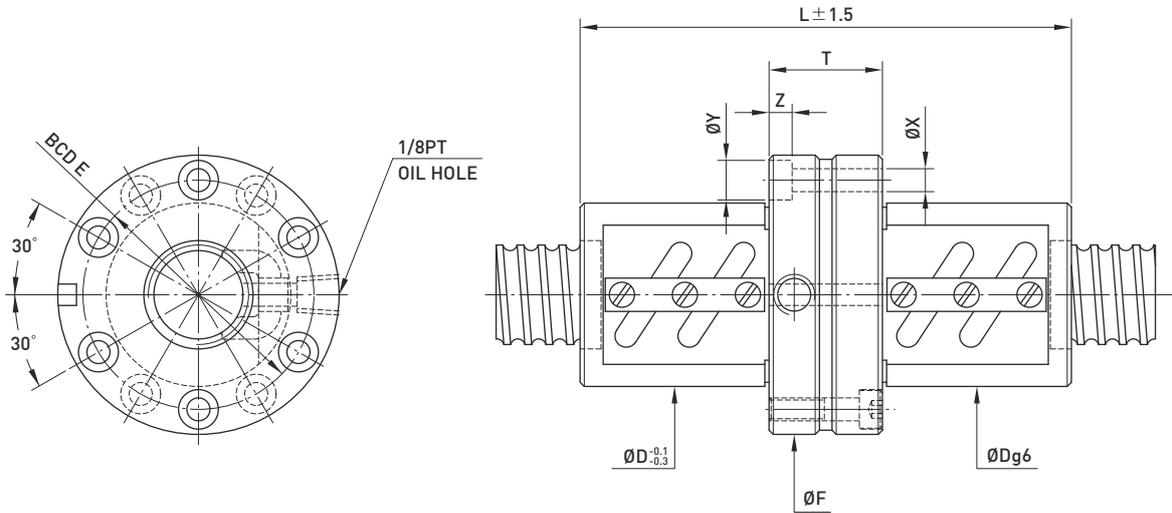
PFDW Type 1 ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | | |
|---------|--------------|--------|-----------|------|--------|----------|----------------------|---|----------------------|------|-------|--------|------|-------|------|------|-----|------|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | T | F | BCD-E | X | Y | Z | | |
| 20-5B1 | 20 | 5 | 3.175 | 20.6 | 17.324 | 2.5x1 | 38 | 837 | 1733 | 44 | 87 | 27 | 67 | 55 | 5.5 | 9.5 | 5.5 | | |
| 20-5B2 | | | | 20.6 | 17.324 | 2.5x2 | 76 | 1519 | 3465 | 44 | 117 | 27 | 67 | 55 | 5.5 | 9.5 | 5.5 | | |
| 20-6B1 | | 6 | 3.969 | 20.8 | 16.744 | 2.5x1 | 40 | 1139 | 2187 | 48 | 95 | 29 | 71 | 59 | 5.5 | 9.5 | 5.5 | | |
| 20-6C1 | | | | 20.8 | 16.744 | 3.5x1 | 55 | 1512 | 3041 | 48 | 107 | 29 | 71 | 59 | 5.5 | 9.5 | 5.5 | | |
| 25-5B1 | 25 | 5 | 3.175 | 25.6 | 22.324 | 2.5x1 | 46 | 939 | 2209 | 50 | 86 | 28 | 73 | 61 | 5.5 | 9.5 | 5.5 | | |
| 25-5B2 | | | | 25.6 | 22.324 | 2.5x2 | 90 | 1704 | 4417 | 50 | 116 | 28 | 73 | 61 | 5.5 | 9.5 | 5.5 | | |
| 25-5C1 | | 6 | 3.969 | 25.6 | 22.324 | 3.5x1 | 68 | 1252 | 3085 | 50 | 96 | 28 | 73 | 61 | 5.5 | 9.5 | 5.5 | | |
| 25-6B2 | | | | 25.8 | 21.744 | 2.5x2 | 94 | 2308 | 5523 | 56 | 131 | 29 | 82 | 69 | 5.5 | 9.5 | 5.5 | | |
| 25-6C1 | 25.8 | 21.744 | 3.5x1 | 66 | 1690 | 3844 | 56 | 107 | 29 | 82 | 69 | 5.5 | 9.5 | 5.5 | | | | | |
| 32-5B1 | 32 | 5 | 3.175 | 32.6 | 29.324 | 2.5x1 | 55 | 1039 | 2833 | 58 | 91 | 33 | 85 | 71 | 6.6 | 11 | 6.5 | | |
| 32-5B2 | | | | 32.6 | 29.324 | 2.5x2 | 109 | 1886 | 5666 | 58 | 121 | 33 | 85 | 71 | 6.6 | 11 | 6.5 | | |
| 32-6B1 | | 6 | 3.969 | 32.8 | 28.744 | 2.5x1 | 57 | 1409 | 3510 | 62 | 95 | 29 | 89 | 75 | 6.6 | 11 | 6.5 | | |
| 32-6B2 | | | | 32.8 | 28.744 | 2.5x2 | 112 | 2556 | 7020 | 62 | 131 | 29 | 89 | 75 | 6.6 | 11 | 6.5 | | |
| 32-8B1 | 8 | 4.763 | 3.175 | 33 | 28.132 | 2.5x1 | 58 | 1810 | 4227 | 66 | 125 | 39 | 100 | 82 | 9 | 14 | 8.5 | | |
| 32-8B2 | | | | 33 | 28.132 | 2.5x2 | 115 | 3284 | 8453 | 66 | 173 | 39 | 100 | 82 | 9 | 14 | 8.5 | | |
| 32-10B1 | | | | 10 | 6.350 | 33.4 | 26.91 | 2.5x1 | 58 | 2651 | 5600 | 74 | 185 | 38 | 108 | 90 | 9 | 14 | 8.5 |
| 32-10B2 | | | | | | 33.4 | 26.91 | 2.5x2 | 118 | 4810 | 11199 | 74 | 208 | 38 | 108 | 90 | 9 | 14 | 8.5 |
| 32-10C1 | 33.4 | 26.91 | 3.5x1 | 86 | 3519 | 7785 | 74 | 168 | 38 | 108 | 90 | 9 | 14 | 8.5 | | | | | |
| 40-5B1 | 40 | 5 | 3.175 | 40.6 | 37.324 | 2.5x1 | 65 | 1141 | 3567 | 68 | 96 | 38 | 101 | 83 | 9 | 14 | 8.5 | | |
| 40-5B2 | | | | 40.6 | 37.324 | 2.5x2 | 132 | 2071 | 7134 | 68 | 126 | 38 | 101 | 83 | 9 | 14 | 8.5 | | |
| 40-6B1 | | 6 | 3.969 | 40.8 | 36.744 | 2.5x1 | 67 | 1552 | 4428 | 70 | 101 | 35 | 104 | 86 | 9 | 14 | 8.5 | | |
| 40-6B2 | | | | 40.8 | 36.744 | 2.5x2 | 136 | 2817 | 8855 | 70 | 137 | 35 | 104 | 86 | 9 | 14 | 8.5 | | |
| 40-8B1 | 8 | 4.763 | 3.175 | 41 | 36.132 | 2.5x1 | 69 | 2003 | 5302 | 74 | 125 | 39 | 108 | 90 | 9 | 14 | 8.5 | | |
| 40-8B2 | | | | 41 | 36.132 | 2.5x2 | 137 | 3634 | 10603 | 74 | 173 | 39 | 108 | 90 | 9 | 14 | 8.5 | | |
| 40-10B1 | | | | 10 | 6.350 | 41.4 | 34.91 | 2.5x1 | 72 | 2959 | 7069 | 84 | 158 | 48 | 124 | 102 | 11 | 17.5 | 11 |
| 40-10B2 | | | | | | 41.4 | 34.91 | 2.5x2 | 145 | 5370 | 14138 | 84 | 218 | 48 | 124 | 102 | 11 | 17.5 | 11 |
| 40-10C1 | 41.4 | 34.91 | 3.5x1 | 102 | 3932 | 9841 | 84 | 178 | 48 | 124 | 102 | 11 | 17.5 | 11 | | | | | |
| 40-12B1 | 12 | 7.144 | 3.175 | 41.6 | 34.299 | 2.5x1 | 70 | 3425 | 7837 | 86 | 174 | 48 | 128 | 106 | 11 | 17.5 | 11 | | |
| 40-12B2 | | | | 41.6 | 34.299 | 2.5x2 | 141 | 6217 | 15674 | 86 | 246 | 48 | 128 | 106 | 11 | 17.5 | 11 | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

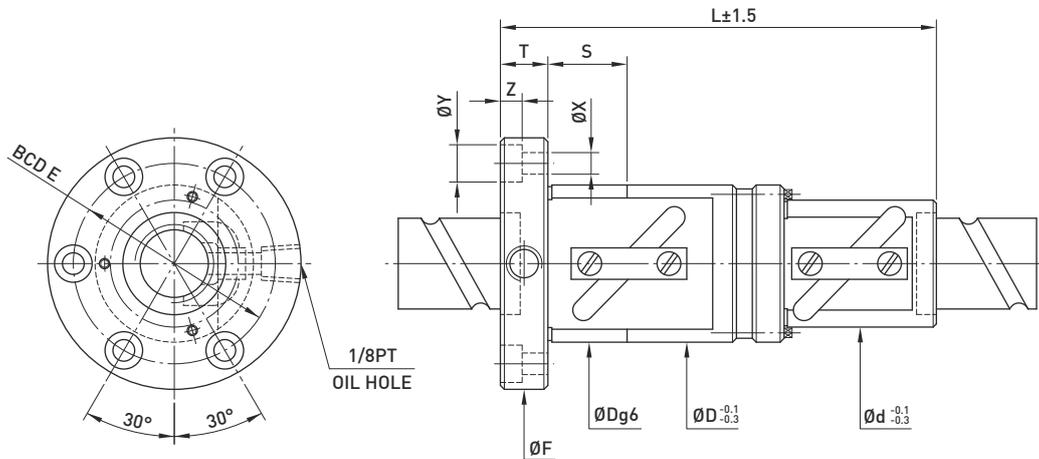
PFDW Type 1 ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | |
|----------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-----|-----|--------|-----|-------|------|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | T | F | BCD-E | X | Y | Z |
| 50-8B1 | 50 | 8 | 4.763 | 51 | 46.132 | 2.5x1 | 81 | 2206 | 6705 | 87 | 133 | 47 | 129 | 107 | 11 | 17.5 | 11 |
| 50-8B2 | | | | 51 | 46.132 | 2.5x2 | 165 | 4004 | 13409 | 87 | 181 | 47 | 129 | 107 | 11 | 17.5 | 11 |
| 50-10B1 | | 10 | 6.350 | 51.4 | 44.91 | 2.5x1 | 87 | 3264 | 8835 | 94 | 158 | 48 | 135 | 113 | 11 | 17.5 | 11 |
| 50-10B2 | | | | 51.4 | 44.91 | 2.5x2 | 173 | 5923 | 17670 | 94 | 218 | 48 | 135 | 113 | 11 | 17.5 | 11 |
| 50-12B2 | | 12 | 7.938 | 51.8 | 43.688 | 2.5x2 | 178 | 8022 | 22094 | 102 | 260 | 58 | 146 | 122 | 14 | 20 | 13 |
| 50-12C1 | | | | | 43.688 | 3.5x1 | 123 | 5875 | 15380 | 102 | 200 | 58 | 146 | 122 | 14 | 20 | 13 |
| 63-10B2 | 63 | 10 | 6.350 | 64.4 | 57.91 | 2.5x2 | 206 | 6533 | 22371 | 110 | 228 | 58 | 154 | 130 | 14 | 20 | 13 |
| 63-10B3 | | | | 64.4 | 57.91 | 2.5x3 | 305 | 9258 | 33556 | 110 | 288 | 58 | 154 | 130 | 14 | 20 | 13 |
| 63-12B2 | | 12 | 7.938 | 64.8 | 56.688 | 2.5x2 | 214 | 8943 | 28062 | 118 | 260 | 58 | 166 | 141 | 14 | 20 | 13 |
| 80-12B2 | 73.688 | | | | 2.5x2 | 257 | 9797 | 35422 | 136 | 260 | 58 | 185 | 159 | 14 | 20 | 13 | |
| 80-12B3 | 80 | 20 | 9.525 | 81.8 | 73.688 | 2.5x3 | 380 | 13884 | 53132 | 136 | 340 | 58 | 185 | 159 | 14 | 20 | 13 |
| 80-20B2 | | | | 82.2 | 72.466 | 2.5x2 | 338 | 16485 | 58851 | 145 | 404 | 66 | 204 | 172 | 18 | 26 | 17.5 |
| 100-20B2 | 100 | | | 102.2 | 92.466 | 2.5x2 | 400 | 18123 | 74425 | 170 | 404 | 86 | 243 | 205 | 22 | 32 | 21.5 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

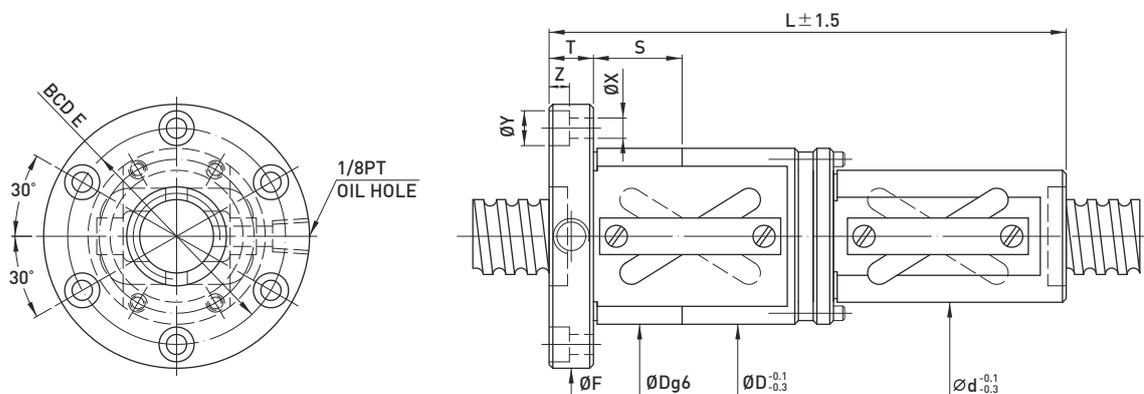
PFDW Type 2 ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | | Flange | | | Bolt | | | Fit |
|---------|--------------|------|-----------|------|--------|----------|----------------------|---|----------------------|-----|----|-----|--------|----|-------|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | d | L | F | T | BCD-E | X | Y | Z | |
| 20-20A1 | 20 | 20 | 3.969 | 20.8 | 16.744 | 1.5x1 | 26 | 719 | 1281 | 48 | 36 | 140 | 72 | 12 | 59 | 5.5 | 9.5 | 5.5 | 24 |
| 25-16B1 | 25 | 16 | 4.763 | 26 | 21.132 | 2.5x1 | 56 | 1592 | 3237 | 62 | 45 | 148 | 89 | 16 | 75 | 6.6 | 11 | 6.5 | 24 |
| 25-20B1 | | 20 | | 26 | 21.132 | 2.5x1 | 56 | 1592 | 3237 | 62 | 45 | 178 | 89 | 16 | 75 | 6.6 | 11 | 6.5 | 24 |
| 25-25A1 | | 25 | | 26 | 21.132 | 1.5x1 | 32 | 1019 | 1927 | 62 | 45 | 166 | 89 | 16 | 75 | 6.6 | 11 | 6.5 | 24 |
| 32-20B1 | 32 | 20 | 4.763 | 33 | 28.132 | 2.5x1 | 66 | 1810 | 4227 | 68 | 54 | 181 | 102 | 16 | 84 | 9 | 14 | 8.5 | 30 |
| 32-25B1 | | 25 | | 33 | 28.132 | 2.5x1 | 66 | 1810 | 4227 | 68 | 54 | 218 | 102 | 16 | 84 | 9 | 14 | 8.5 | 30 |
| 32-32A1 | | 32 | | 33 | 28.132 | 1.5x1 | 36 | 1154 | 2505 | 68 | 54 | 205 | 102 | 16 | 84 | 9 | 14 | 8.5 | 30 |
| 40-25B1 | 40 | 25 | 6.350 | 41.4 | 34.91 | 2.5x1 | 78 | 2959 | 7069 | 84 | 65 | 224 | 126 | 18 | 104 | 11 | 17.5 | 11 | 30 |
| 40-32B1 | | 32 | | 41.4 | 34.91 | 2.5x1 | 78 | 2959 | 7069 | 84 | 65 | 276 | 126 | 18 | 104 | 11 | 17.5 | 11 | 30 |
| 40-40A1 | | 40 | | 41.4 | 34.91 | 1.5x1 | 48 | 1875 | 4159 | 84 | 65 | 274 | 126 | 18 | 104 | 11 | 17.5 | 11 | 30 |
| 50-40A1 | 50 | 40 | 7.938 | 51.8 | 43.688 | 1.5x1 | 54 | 2801 | 6499 | 106 | 82 | 264 | 152 | 22 | 128 | 13 | 20 | 13 | 40 |
| 50-50A1 | | 50 | | 51.8 | 43.688 | 1.5x1 | 60 | 2801 | 6499 | 106 | 82 | 320 | 152 | 22 | 128 | 13 | 20 | 13 | 40 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

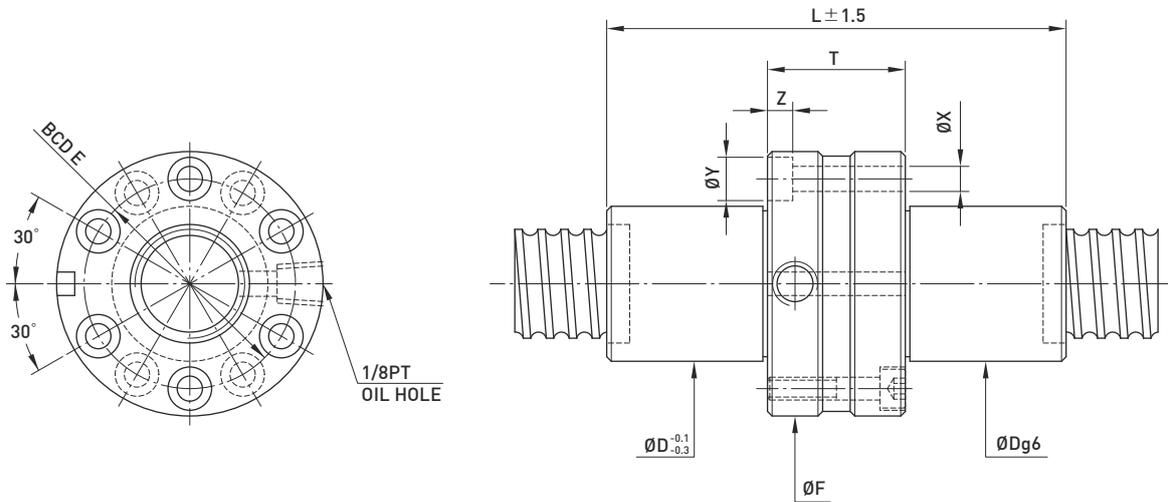
PFDW Type 2 ◀ Standard Product



| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Start type | D | d | L | F | T | BCD-E | X | Y | Z | S |
|---------|--------------|------|------|--------|-----------|----------|----------------------|---|----------------------|------------|-----|----|-----|-----|----|-------|----|------|----|----|
| | Nominal Dia. | Lead | | | | | | | | | | | | | | | | | | |
| 36-20B2 | 36 | 20 | 37.4 | 30.91 | 6.35 | 2.5x2 | 87.6 | 4569 | 11820 | 2 | 94 | 76 | 191 | 136 | 18 | 114 | 11 | 17.5 | 11 | 30 |
| 40-25B2 | 40 | 25 | 41.6 | 34.299 | 7.144 | 2.5x2 | 96.6 | 5565 | 14624 | 2 | 98 | 80 | 230 | 140 | 18 | 118 | 11 | 17.5 | 11 | 30 |
| 40-30B2 | | 30 | 41.6 | 34.299 | 7.144 | 2.5x2 | 96 | 5565 | 14624 | 2 | 98 | 80 | 250 | 140 | 18 | 118 | 11 | 17.5 | 11 | 30 |
| 45-25B2 | 45 | 25 | 46.6 | 39.299 | 7.144 | 2.5x2 | 106.5 | 5939 | 16696 | 2 | 101 | 83 | 230 | 143 | 18 | 121 | 11 | 17.5 | 11 | 30 |
| 45-30B2 | | 30 | 46.6 | 39.299 | 7.144 | 2.5x2 | 105.9 | 5939 | 16696 | 2 | 101 | 83 | 250 | 143 | 18 | 121 | 11 | 17.5 | 11 | 30 |
| 50-25B2 | 50 | 25 | 51.6 | 44.299 | 7.144 | 2.5x2 | 115.2 | 6190 | 18441 | 2 | 103 | 85 | 230 | 145 | 18 | 123 | 11 | 17.5 | 11 | 40 |
| 50-30B2 | | 30 | 51.6 | 44.299 | 7.144 | 2.5x2 | 118.2 | 6190 | 18441 | 2 | 103 | 85 | 250 | 145 | 18 | 123 | 11 | 17.5 | 11 | 40 |
| 55-25B2 | 55 | 25 | 56.6 | 49.299 | 7.144 | 2.5x2 | 127.5 | 6519 | 20515 | 2 | 105 | 87 | 230 | 147 | 18 | 125 | 11 | 17.5 | 11 | 40 |
| 55-30B2 | | 30 | 56.6 | 49.299 | 7.144 | 2.5x2 | 127.2 | 6519 | 20515 | 2 | 105 | 87 | 250 | 147 | 18 | 125 | 11 | 17.5 | 11 | 40 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

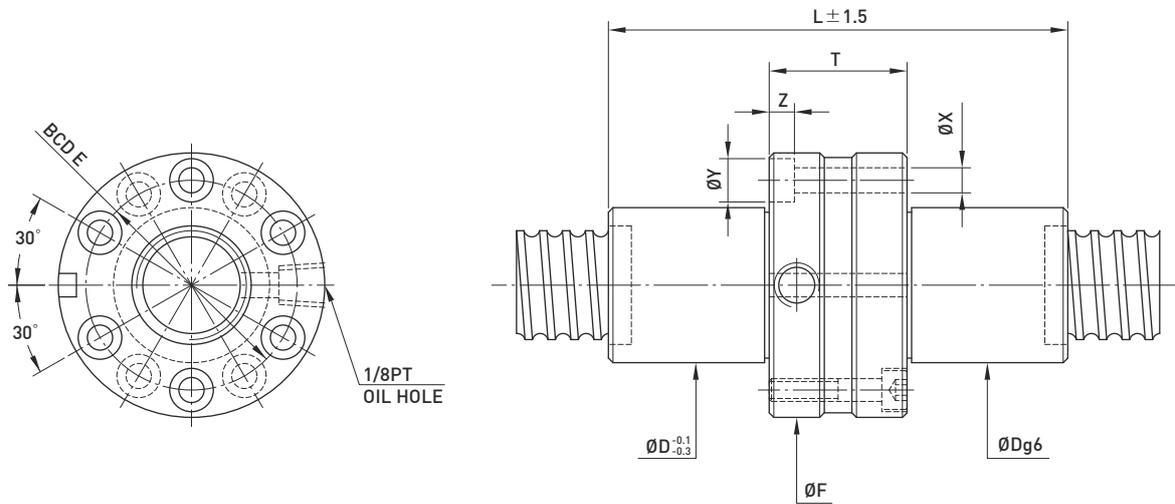
PFDI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | |
|---------|--------------|-------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|-----|--------|-----|-------|------|------|------|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | |
| 20-5T3 | 20 | 5 | 3.175 | 20.6 | 17.324 | 3 | 39 | 852 | 1767 | 34 | 100 | 58 | 30 | 46 | 5.5 | 9.5 | 5.5 | |
| 20-5T4 | | | | 20.6 | 17.324 | 4 | 54 | 1091 | 2356 | 34 | 110 | 58 | 30 | 46 | 5.5 | 9.5 | 5.5 | |
| 20-6T3 | | 6 | | 3.969 | 20.8 | 16.744 | 3 | 39 | 1091 | 2081 | 36 | 111 | 58 | 29 | 46 | 5.5 | 9.5 | 5.5 |
| 20-6T4 | | | | | 20.8 | 16.744 | 4 | 54 | 1398 | 2774 | 36 | 127 | 58 | 29 | 46 | 5.5 | 9.5 | 5.5 |
| 25-5T3 | 25 | 5 | 25.6 | | 22.324 | 3 | 55 | 977 | 2314 | 40 | 100 | 63 | 30 | 51 | 5.5 | 9.5 | 5.5 | |
| 25-5T4 | | | 25.6 | | 22.324 | 4 | 73 | 1252 | 3085 | 40 | 110 | 63 | 30 | 51 | 5.5 | 9.5 | 5.5 | |
| 25-6T3 | | 6 | 3.969 | 25.8 | 21.744 | 3 | 56 | 1272 | 2762 | 40 | 111 | 63 | 29 | 51 | 5.5 | 9.5 | 5.5 | |
| 25-6T4 | | | | 25.8 | 21.744 | 4 | 75 | 1628 | 3682 | 40 | 127 | 63 | 29 | 51 | 5.5 | 9.5 | 5.5 | |
| 32-5T3 | 32 | 5 | | 32.6 | 29.324 | 3 | 64 | 1117 | 3081 | 48 | 100 | 75 | 30 | 61 | 6.6 | 11 | 6.5 | |
| 32-5T4 | | | | 32.6 | 29.324 | 4 | 82 | 1431 | 4108 | 48 | 110 | 75 | 30 | 61 | 6.6 | 11 | 6.5 | |
| 32-6T3 | | 6 | 3.969 | 32.8 | 28.744 | 3 | 65 | 1446 | 3620 | 50 | 111 | 75 | 29 | 61 | 6.6 | 11 | 6.5 | |
| 32-6T4 | | | | 32.8 | 28.744 | 4 | 84 | 1852 | 4826 | 50 | 127 | 75 | 29 | 61 | 6.6 | 11 | 6.5 | |
| 32-8T3 | | 8 | | 4.763 | 33 | 28.132 | 3 | 68 | 1810 | 4227 | 52 | 139 | 84 | 35 | 68 | 9 | 14 | 8.5 |
| 32-8T4 | | | | | 33 | 28.132 | 4 | 82 | 2317 | 5635 | 52 | 157 | 84 | 35 | 68 | 9 | 14 | 8.5 |
| 32-10T3 | | 10 | 6.350 | | 33.4 | 26.91 | 3 | 68 | 2539 | 5327 | 56 | 165 | 88 | 35 | 70 | 9 | 14 | 8.5 |
| 32-10T4 | | | | | 33.4 | 26.91 | 4 | 82 | 3252 | 7102 | 56 | 185 | 88 | 35 | 70 | 9 | 14 | 8.5 |
| 40-5T4 | 40 | 5 | | 40.6 | 37.324 | 4 | 99 | 1599 | 5280 | 54 | 115 | 90 | 35 | 72 | 9 | 14 | 8.5 | |
| 40-5T6 | | | | 40.6 | 37.324 | 6 | 146 | 2265 | 7919 | 54 | 135 | 90 | 35 | 72 | 9 | 14 | 8.5 | |
| 40-6T4 | | 6 | 3.969 | 40.8 | 36.744 | 4 | 100 | 2136 | 6420 | 56 | 133 | 90 | 35 | 72 | 9 | 14 | 8.5 | |
| 40-6T6 | | | | 40.8 | 36.744 | 6 | 148 | 3028 | 9630 | 56 | 157 | 90 | 35 | 72 | 9 | 14 | 8.5 | |
| 40-8T4 | | 8 | | 4.763 | 41 | 36.132 | 4 | 102 | 2728 | 7596 | 60 | 157 | 94 | 35 | 76 | 9 | 14 | 8.5 |
| 40-8T6 | | | | | 41 | 36.132 | 6 | 150 | 3866 | 11394 | 60 | 191 | 94 | 35 | 76 | 9 | 14 | 8.5 |
| 40-10T3 | | 10 | 6.350 | | 41.4 | 34.91 | 3 | 76 | 2529 | 7069 | 62 | 175 | 104 | 45 | 82 | 11 | 17.5 | 11 |
| 40-10T4 | | | | | 41.4 | 34.91 | 4 | 101 | 3789 | 9426 | 62 | 195 | 104 | 45 | 82 | 11 | 17.5 | 11 |
| 50-5T4 | 50 | 5 | | 50.6 | 47.324 | 4 | 121 | 1757 | 6745 | 65 | 115 | 100 | 35 | 82 | 9 | 14 | 8.5 | |
| 50-5T6 | | | | 50.6 | 47.324 | 6 | 177 | 2490 | 10117 | 65 | 135 | 100 | 35 | 82 | 9 | 14 | 8.5 | |
| 50-6T4 | | 6 | 3.969 | 50.8 | 46.744 | 4 | 123 | 2388 | 8250 | 68 | 136 | 100 | 38 | 82 | 9 | 14 | 8.5 | |
| 50-6T6 | | | | 50.8 | 46.744 | 6 | 179 | 3384 | 12375 | 68 | 160 | 100 | 38 | 82 | 9 | 14 | 8.5 | |
| 50-8T4 | | 8 | | 4.763 | 51 | 46.132 | 4 | 122 | 2998 | 9578 | 70 | 165 | 112 | 43 | 90 | 11 | 17.5 | 11 |
| 50-8T6 | | | | | 51 | 46.132 | 6 | 178 | 4249 | 14367 | 70 | 199 | 112 | 43 | 90 | 11 | 17.5 | 11 |
| 50-10T3 | | 10 | 6.350 | | 51.4 | 44.91 | 3 | 95 | 3397 | 9256 | 74 | 175 | 114 | 45 | 92 | 11 | 17.5 | 11 |
| 50-10T4 | | | | | 51.4 | 44.91 | 4 | 124 | 4350 | 12341 | 74 | 195 | 114 | 45 | 92 | 11 | 17.5 | 11 |
| 50-10T6 | 12 | 7.938 | | 51.4 | 44.91 | 6 | 184 | 6165 | 18511 | 74 | 235 | 114 | 43 | 92 | 11 | 17.5 | 11 | |
| 50-12T3 | | | | 51.8 | 43.688 | 3 | 94 | 4420 | 11047 | 75 | 203 | 121 | 49 | 97 | 14 | 20 | 13 | |
| 50-12T4 | 51.8 | | 43.688 | 4 | 124 | 5660 | 14730 | 75 | 227 | 121 | 49 | 97 | 14 | 20 | 13 | | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

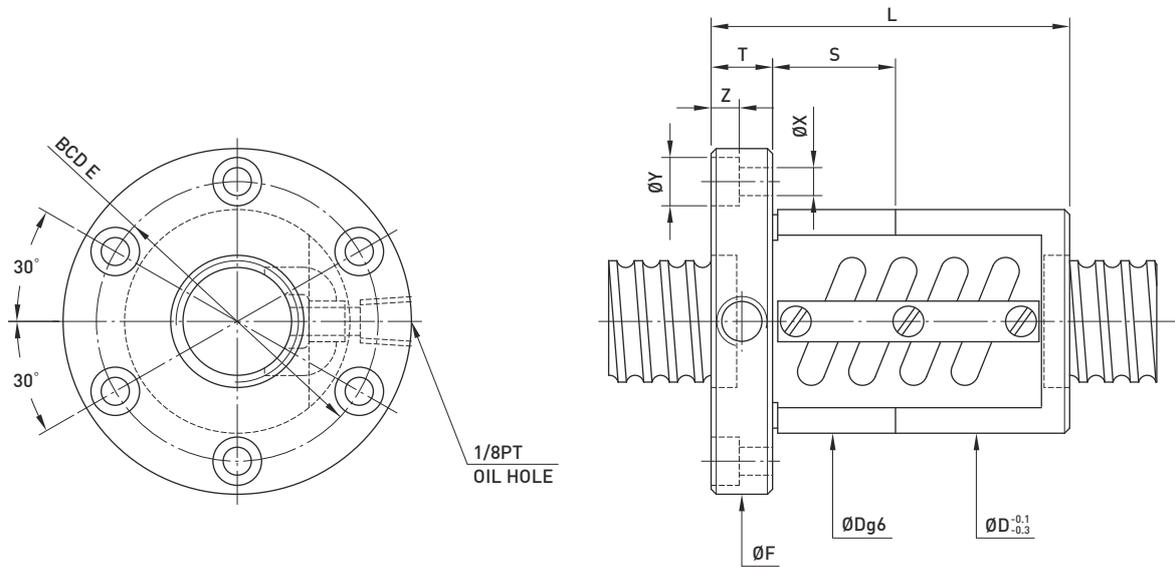
PFDI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | |
|----------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-----|-----|--------|----|-------|------|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z |
| 63-6T4 | 63 | 6 | 3.969 | 63.8 | 59.744 | 4 | 148 | 2614 | 10542 | 80 | 142 | 122 | 44 | 100 | 11 | 17.5 | 11 |
| 63-6T6 | | | | 63.8 | 59.744 | 6 | 220 | 3704 | 15813 | 80 | 166 | 122 | 44 | 100 | 11 | 17.5 | 11 |
| 63-8T4 | | 8 | 4.763 | 64 | 59.132 | 4 | 152 | 3395 | 12541 | 82 | 165 | 124 | 43 | 102 | 11 | 17.5 | 11 |
| 63-8T6 | | | | 64 | 59.132 | 6 | 222 | 4812 | 18811 | 82 | 199 | 124 | 43 | 102 | 11 | 17.5 | 11 |
| 63-10T4 | | 10 | 6.350 | 64.4 | 57.91 | 4 | 158 | 4860 | 15858 | 85 | 205 | 131 | 55 | 107 | 14 | 20 | 13 |
| 63-10T6 | | | | 64.4 | 57.91 | 6 | 228 | 6887 | 23786 | 85 | 245 | 131 | 53 | 107 | 14 | 20 | 13 |
| 63-12T4 | 12 | | 7.938 | 64.8 | 56.688 | 4 | 152 | 6479 | 19293 | 90 | 230 | 136 | 52 | 112 | 14 | 20 | 13 |
| 63-12T6 | | | | 64.8 | 56.688 | 6 | 224 | 9182 | 28939 | 90 | 280 | 136 | 52 | 112 | 14 | 20 | 13 |
| 80-10T4 | 80 | 10 | 6.350 | 81.4 | 74.91 | 4 | 190 | 5559 | 21118 | 105 | 205 | 151 | 55 | 127 | 14 | 20 | 13 |
| 80-10T6 | | | | 81.4 | 74.91 | 6 | 277 | 7879 | 31677 | 105 | 245 | 151 | 53 | 127 | 14 | 20 | 13 |
| 80-12T4 | | 12 | 7.938 | 81.8 | 73.688 | 4 | 192 | 7430 | 25681 | 110 | 230 | 156 | 52 | 132 | 14 | 20 | 13 |
| 80-12T6 | | | | 81.8 | 73.688 | 6 | 280 | 10530 | 38521 | 110 | 280 | 156 | 52 | 132 | 14 | 20 | 13 |
| 80-20T3 | | 20 | 9.525 | 82.2 | 72.466 | 3 | 189 | 9663 | 31622 | 115 | 301 | 173 | 65 | 143 | 18 | 26 | 17.5 |
| 80-20T4 | | | | 82.2 | 72.466 | 4 | 248 | 12375 | 42162 | 115 | 346 | 173 | 66 | 143 | 18 | 26 | 17.5 |
| 100-10T6 | 100 | 10 | 6.350 | 101.4 | 94.91 | 6 | 236 | 8662 | 40469 | 125 | 245 | 171 | 53 | 147 | 14 | 20 | 13 |
| 100-12T6 | | 12 | 9.525 | 102.2 | 92.466 | 6 | 343 | 19230 | 79741 | 130 | 292 | 188 | 64 | 158 | 18 | 26 | 17.5 |
| 100-20T4 | | | | 102.2 | 92.466 | 4 | 300 | 13569 | 53161 | 135 | 356 | 205 | 76 | 169 | 22 | 32 | 21.5 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

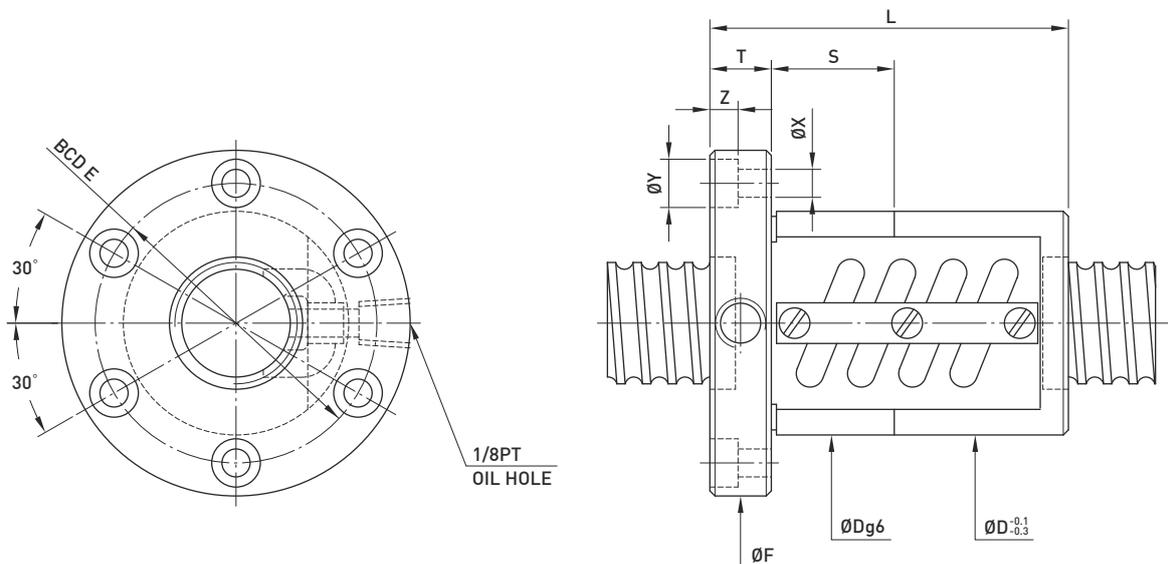
OFSW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/µm) | Dynamic Load 1×10^6 revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | | Fit |
|---------|--------------|--------|-----------|-------|--------|----------|----------------------|---|----------------------|-----|-----|--------|----|-------|------|-----|-----|----|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | S | |
| 16-5B1 | 16 | 5 | 3.175 | 16.6 | 13.324 | 2.5x1 | 32 | 763 | 1400 | 40 | 58 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 24 | |
| 16-5A1 | | | | 16.6 | 13.324 | 1.5x1 | 20 | 482 | 820 | 40 | 50 | 64 | 12 | 51 | 5.5 | 9.5 | 5.5 | 24 | |
| 20-5B1 | 20 | 5 | 3.175 | 20.6 | 17.324 | 2.5x1 | 38 | 837 | 1733 | 44 | 60 | 68 | 12 | 55 | 5.5 | 9.5 | 5.5 | 24 | |
| 20-5A2 | | | | 20.6 | 17.324 | 1.5x2 | 46 | 979 | 2079 | 44 | 70 | 68 | 12 | 55 | 5.5 | 9.5 | 5.5 | 24 | |
| 20-6B1 | 20 | 6 | 3.969 | 20.8 | 16.744 | 2.5x1 | 40 | 1139 | 2187 | 48 | 69 | 72 | 12 | 59 | 5.5 | 9.5 | 5.5 | 24 | |
| 25-4B1 | 25 | 4 | 2.381 | 25.25 | 22.792 | 2.5x1 | 38 | 544 | 1376 | 46 | 48 | 69 | 12 | 57 | 5.5 | 9.5 | 5.5 | 12 | |
| 25-4B2 | | | | 25.25 | 22.792 | 2.5x2 | 74 | 988 | 2752 | 46 | 72 | 69 | 12 | 57 | 5.5 | 9.5 | 5.5 | 12 | |
| 25-5B1 | | 5 | 3.175 | 25.6 | 22.324 | 2.5x1 | 46 | 939 | 2209 | 50 | 60 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | |
| 25-5A2 | | | | 25.6 | 22.324 | 1.5x2 | 48 | 1078 | 2594 | 50 | 70 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | |
| 25-5C1 | | 6 | 3.969 | 25.6 | 22.324 | 3.5x1 | 68 | 1252 | 3085 | 50 | 72 | 74 | 12 | 62 | 5.5 | 9.5 | 5.5 | 24 | |
| 25-6A2 | | | | 25.8 | 21.744 | 1.5x2 | 56 | 1462 | 3249 | 56 | 82 | 82 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | |
| 25-6C1 | 25.8 | 21.744 | 3.5x1 | 66 | 1690 | 3844 | 56 | 81 | 82 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | | | | |
| 25-10A1 | 25 | 10 | 4.763 | 26 | 21.132 | 1.5x1 | 29 | 1019 | 1927 | 60 | 81 | 86 | 16 | 73 | 6.6 | 11 | 6.5 | 24 | |
| 28-5B1 | 28 | 5 | 3.175 | 28.6 | 25.324 | 2.5x1 | 51 | 984 | 2466 | 55 | 60 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | |
| 28-5B2 | | | | 28.6 | 25.324 | 2.5x2 | 98 | 1785 | 4932 | 55 | 96 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | |
| 28-6A2 | 28 | 6 | 3.969 | 28.6 | 25.324 | 1.5x2 | 59 | 1150 | 2960 | 55 | 80 | 85 | 12 | 69 | 6.6 | 11 | 6.5 | 24 | |
| 32-5B1 | 32 | 5 | 3.175 | 32.6 | 29.324 | 2.5x1 | 55 | 1039 | 2833 | 58 | 62 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 24 | |
| 32-5A2 | | | | 32.6 | 29.324 | 1.5x2 | 65 | 1216 | 3400 | 58 | 70 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 24 | |
| 32-5C1 | | 6 | 3.969 | 32.6 | 29.324 | 3.5x1 | 76 | 1388 | 3967 | 58 | 72 | 84 | 12 | 71 | 6.6 | 11 | 6.5 | 24 | |
| 32-6B1 | | | | 32.8 | 28.744 | 2.5x1 | 57 | 1409 | 3510 | 62 | 70 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 24 | |
| 32-6A2 | | 8 | 4.763 | 32.8 | 28.744 | 1.5x2 | 67 | 1633 | 4168 | 62 | 81 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 24 | |
| 32-6C1 | | | | 32.8 | 28.744 | 3.5x1 | 78 | 1888 | 4936 | 62 | 83 | 88 | 12 | 75 | 6.6 | 11 | 6.5 | 24 | |
| 32-8B1 | 32 | 8 | 4.763 | 33 | 28.132 | 2.5x1 | 58 | 1810 | 4227 | 66 | 92 | 100 | 16 | 82 | 9 | 14 | 8.5 | 30 | |
| 32-8A2 | | | | 33 | 28.132 | 1.5x2 | 69 | 2094 | 5009 | 66 | 106 | 100 | 16 | 82 | 9 | 14 | 8.5 | 30 | |
| 32-8C1 | | 10 | 6.350 | 33 | 28.132 | 3.5x1 | 82 | 2428 | 5948 | 66 | 108 | 100 | 16 | 82 | 9 | 14 | 8.5 | 30 | |
| 32-10B1 | | | | 33.4 | 26.91 | 2.5x1 | 58 | 2651 | 5600 | 74 | 110 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | |
| 32-10A1 | 12 | 6.350 | 33.4 | 26.91 | 1.5x1 | 36 | 1673 | 3278 | 74 | 90 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | |
| 32-12A1 | | | 33.4 | 26.91 | 1.5x1 | 37 | 1672 | 3278 | 74 | 97 | 108 | 18 | 90 | 9 | 14 | 8.5 | 15 | | |
| 32-12B1 | 33.4 | 26.91 | 2.5x1 | 61 | 2650 | 5599 | 74 | 117 | 108 | 18 | 90 | 9 | 14 | 8.5 | 15 | | | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

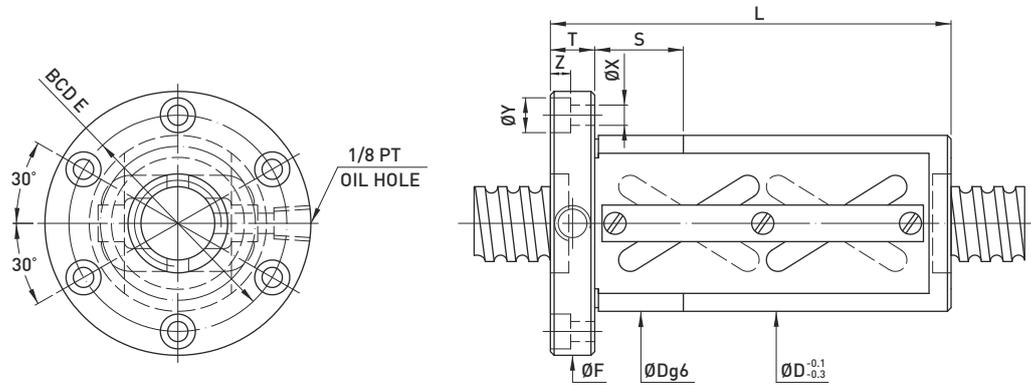
OFSW Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1×10^6 revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit | | |
|---------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|-------|--------|-----|-------|------|------|------|------|------|----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | | S | |
| 36-6B1 | 36 | 6 | 3.175 | 36.6 | 33.324 | 2.5x1 | 62 | 1486 | 3969 | 65 | 68 | 100 | 12 | 82 | 6.6 | 11 | 6.5 | 24 | | |
| 36-6B2 | | 10 | | 36.6 | 33.324 | 2.5x2 | 121 | 2696 | 7937 | 65 | 103 | 100 | 12 | 82 | 6.6 | 11 | 6.5 | 24 | | |
| 36-10A1 | | 16 | 6.350 | 37.4 | 30.91 | 1.5x1 | 40 | 1779 | 3718 | 75 | 90 | 120 | 18 | 98 | 11 | 17.5 | 11 | 30 | | |
| 36-16B1 | | | | 37.4 | 30.91 | 2.5x1 | 67 | 2812 | 6334 | 74 | 136 | 114 | 18 | 90 | 9 | 14 | 8.5 | 15 | | |
| 40-5B1 | 40 | 5 | 3.175 | 40.6 | 37.324 | 2.5x1 | 65 | 1141 | 3567 | 68 | 65 | 102 | 16 | 84 | 9 | 14 | 8.5 | 30 | | |
| 40-5B2 | | | | 40.6 | 37.324 | 2.5x2 | 132 | 2071 | 7134 | 68 | 95 | 102 | 16 | 84 | 9 | 14 | 8.5 | 30 | | |
| 40-6B2 | | 6 | 3.969 | 40.8 | 36.744 | 2.5x2 | 136 | 2817 | 8855 | 70 | 109 | 104 | 16 | 86 | 9 | 14 | 8.5 | 30 | | |
| 40-8B1 | | 8 | 4.763 | 41 | 36.132 | 2.5x1 | 69 | 2003 | 5302 | 74 | 90 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | |
| 40-8C1 | | | | 41 | 36.132 | 3.5x1 | 96 | 2679 | 7438 | 74 | 108 | 108 | 16 | 90 | 9 | 14 | 8.5 | 30 | | |
| 40-10B1 | | 10 | 6.350 | 41.4 | 34.91 | 2.5x1 | 72 | 2959 | 7069 | 84 | 110 | 125 | 18 | 104 | 11 | 17.5 | 11 | 30 | | |
| 40-10C1 | | | | 41.4 | 34.91 | 3.5x1 | 102 | 3932 | 9841 | 84 | 132 | 125 | 18 | 104 | 11 | 17.5 | 11 | 30 | | |
| 40-12B1 | | | | 12 | 7.144 | 41.6 | 34.299 | 2.5x1 | 72 | 3425 | 7837 | 86 | 117 | 128 | 18 | 106 | 11 | 17.5 | 11 | 40 |
| 40-16A1 | | | | 16 | 7.144 | 41.6 | 34.299 | 1.5x1 | 46 | 2208 | 4703 | 86 | 117 | 128 | 18 | 106 | 11 | 17.5 | 11 | 40 |
| 45-10B1 | | 45 | 10 | 6.350 | 46.4 | 39.91 | 2.5x1 | 76 | 3111 | 7953 | 88 | 110 | 132 | 18 | 110 | 11 | 17.5 | 11 | 30 | |
| 45-12B1 | 12 | | 7.938 | 46.8 | 38.688 | 2.5x1 | 81 | 4202 | 9900 | 96 | 132 | 142 | 22 | 117 | 13 | 20 | 13 | 40 | | |
| 50-5A2 | 50 | 5 | 3.175 | 50.6 | 47.324 | 1.5x2 | 96 | 1447 | 5382 | 80 | 74 | 114 | 16 | 96 | 9 | 14 | 8.5 | 30 | | |
| 50-5A3 | | | | 50.6 | 47.324 | 1.5x3 | 143 | 2051 | 8072 | 80 | 103 | 114 | 16 | 96 | 9 | 14 | 8.5 | 30 | | |
| 50-6B2 | | 6 | 3.969 | 50.8 | 46.744 | 2.5x2 | 161 | 3093 | 11149 | 84 | 110 | 118 | 16 | 100 | 9 | 14 | 8.5 | 30 | | |
| 50-8B1 | | 8 | 4.763 | 51 | 46.132 | 2.5x1 | 81 | 2206 | 6705 | 87 | 92 | 128 | 18 | 107 | 11 | 17.5 | 11 | 30 | | |
| 50-8B2 | | | | 51 | 46.132 | 2.5x2 | 165 | 4004 | 13409 | 87 | 140 | 128 | 18 | 107 | 11 | 17.5 | 11 | 30 | | |
| 50-10B2 | | 10 | 6.350 | 51.4 | 44.91 | 2.5x2 | 173 | 5923 | 17670 | 94 | 170 | 135 | 18 | 114 | 11 | 17.5 | 11 | 30 | | |
| 50-10C1 | | | | 51.4 | 44.91 | 3.5x1 | 120 | 4393 | 12481 | 94 | 130 | 135 | 18 | 114 | 11 | 17.5 | 11 | 30 | | |
| 50-12B1 | | | | 12 | 7.938 | 51.8 | 43.688 | 2.5x1 | 123 | 4420 | 11047 | 102 | 132 | 150 | 22 | 125 | 13 | 20 | 13 | 40 |
| 55-10C1 | | | | 55 | 10 | 6.350 | 56.4 | 49.91 | 3.5x1 | 132 | 4562 | 13661 | 100 | 130 | 140 | 18 | 118 | 11 | 17.5 | 11 |
| 55-12B1 | | 12 | 7.938 | | 56.8 | 48.688 | 2.5x1 | 128 | 4624 | 12195 | 105 | 132 | 154 | 22 | 127 | 13 | 20 | 13 | 40 | |
| 63-8A2 | 63 | 8 | 4.763 | 64 | 59.132 | 1.5x2 | 107 | 2826 | 10129 | 104 | 108 | 146 | 18 | 124 | 11 | 17.5 | 11 | 40 | | |
| 63-10B2 | | 10 | 6.350 | 64.4 | 57.91 | 2.5x2 | 206 | 6533 | 22371 | 110 | 172 | 152 | 20 | 130 | 11 | 17.5 | 11 | 40 | | |
| 63-12B1 | | 12 | 7.938 | 64.8 | 56.688 | 2.5x1 | 107 | 4927 | 14031 | 118 | 135 | 166 | 22 | 141 | 13 | 20 | 13 | 40 | | |
| 63-16B1 | | 16 | 9.525 | 65.2 | 55.466 | 2.5x1 | 140 | 8189 | 23005 | 124 | 158 | 172 | 22 | 147 | 13 | 20 | 13 | 40 | | |
| 63-20A1 | | | | 20 | 9.525 | 65.2 | 55.466 | 1.5x1 | 84 | 5306 | 13890 | 124 | 147 | 172 | 22 | 147 | 13 | 20 | 13 | 40 |
| 70-10B1 | 70 | 10 | 6.350 | 71.4 | 64.91 | 2.5x1 | 114 | 3770 | 12506 | 124 | 112 | 170 | 20 | 145 | 13 | 20 | 13 | 40 | | |
| 70-12B1 | | 12 | 7.938 | 71.8 | 63.688 | 2.5x1 | 118 | 5169 | 15638 | 130 | 132 | 178 | 22 | 152 | 13 | 20 | 13 | 40 | | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

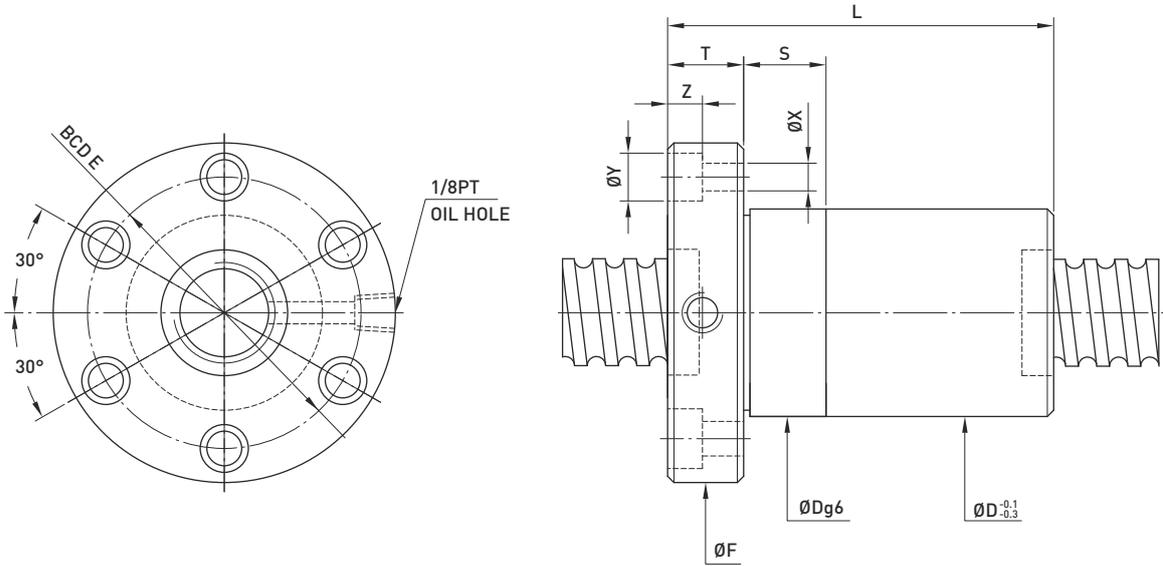
OFSW Type ◀ Standard Product



| Model | Size | | PCD | RD | Ball Dia. | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁴ revs C (kgf) | Static Load Co (kgf) | Start type | D | L | F | T | BCD-E | X | Y | Z | S |
|---------|--------------|------|--------|--------|-----------|----------|----------------------|---|----------------------|------------|-----|-----|-----|-----|-------|------|------|----|----|
| | Nominal Dia. | Lead | | | | | | | | | | | | | | | | | |
| 36-20C1 | 36 | 20 | 37.4 | 30.91 | 6.35 | 3.5x1 | 62.2 | 3344 | 8223 | 2 | 94 | 121 | 136 | 18 | 114 | 11 | 17.5 | 11 | 30 |
| 40-20C1 | 40 | 20 | 41.4 | 34.91 | 6.35 | 3.5x1 | 68 | 3519 | 9182 | 2 | 96 | 121 | 138 | 18 | 116 | 11 | 17.5 | 11 | 30 |
| 40-20B2 | | 20 | 41.4 | 34.91 | 6.35 | 2.5x2 | 95.7 | 4805 | 13191 | 2 | 96 | 161 | 138 | 18 | 116 | 11 | 17.5 | 11 | 30 |
| 45-20C1 | 45 | 20 | 46.4 | 39.91 | 6.35 | 3.5x1 | 76.1 | 3732 | 10413 | 2 | 98 | 122 | 140 | 18 | 118 | 11 | 17.5 | 11 | 30 |
| 45-20B2 | | 20 | 46.4 | 39.91 | 6.35 | 2.5x2 | 106.8 | 5060 | 14839 | 2 | 98 | 162 | 140 | 18 | 118 | 11 | 17.5 | 11 | 30 |
| 45-25C1 | 45 | 25 | 46.6 | 39.299 | 7.144 | 3.5x1 | 75.7 | 4349 | 11622 | 2 | 101 | 141 | 143 | 18 | 121 | 11 | 17.5 | 11 | 30 |
| 50-20C1 | | 20 | 51.4 | 44.91 | 6.35 | 3.5x1 | 81.7 | 3931 | 11645 | 2 | 101 | 122 | 143 | 18 | 121 | 11 | 17.5 | 11 | 40 |
| 50-20B2 | 50 | 20 | 51.4 | 44.91 | 6.35 | 2.5x2 | 114.6 | 5301 | 16486 | 2 | 101 | 162 | 143 | 18 | 121 | 11 | 17.5 | 11 | 40 |
| 50-25C1 | | 25 | 51.6 | 44.299 | 7.144 | 3.5x1 | 82.1 | 4584 | 13008 | 2 | 103 | 141 | 145 | 18 | 123 | 11 | 17.5 | 11 | 40 |
| 50-30C1 | 50 | 30 | 51.6 | 44.299 | 7.144 | 3.5x1 | 84.2 | 4584 | 13008 | 2 | 103 | 160 | 145 | 18 | 123 | 11 | 17.5 | 11 | 40 |
| 55-20C1 | | 20 | 56.4 | 49.91 | 6.35 | 3.5x1 | 88.9 | 4083 | 12746 | 2 | 103 | 122 | 145 | 18 | 123 | 11 | 17.5 | 11 | 40 |
| 55-20B2 | 55 | 20 | 56.4 | 49.91 | 6.35 | 2.5x2 | 124.9 | 5529 | 18133 | 2 | 103 | 162 | 145 | 18 | 123 | 11 | 17.5 | 11 | 40 |
| 55-25C1 | | 25 | 56.6 | 49.299 | 7.144 | 3.5x1 | 90.7 | 4806 | 14393 | 2 | 105 | 141 | 147 | 18 | 125 | 11 | 17.5 | 11 | 40 |
| 55-30C1 | 30 | 56.6 | 49.299 | 7.144 | 3.5x1 | 90.6 | 4806 | 14393 | 2 | 105 | 160 | 147 | 18 | 125 | 11 | 17.5 | 11 | 40 | |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

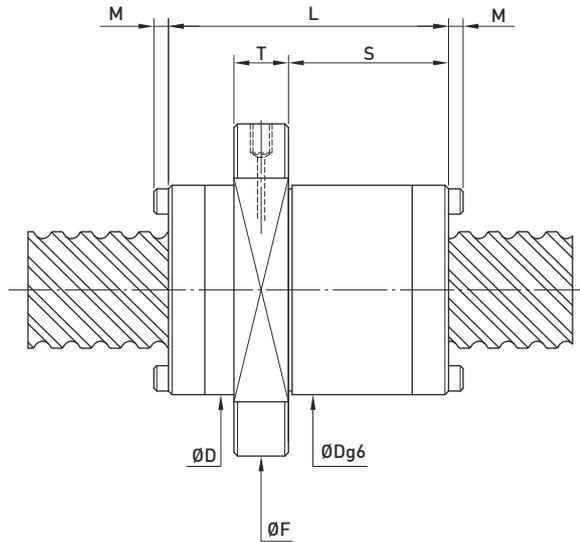
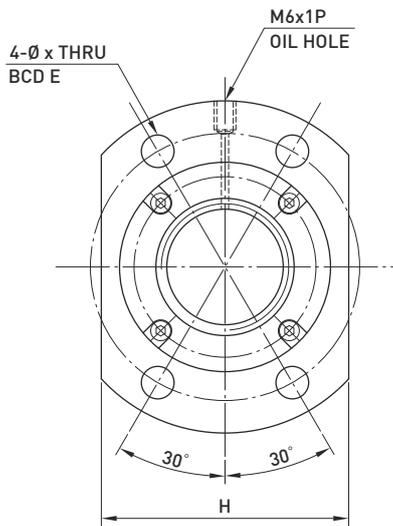
OFSI Type ◀ Standard Product



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt | | | Fit |
|---------|--------------|------|-----------|-------|--------|----------|----------------------|---|----------------------|-------|-------|--------|-----|-------|------|------|------|------|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | X | Y | Z | |
| 20-5T3 | 20 | 5 | 3.175 | 20.6 | 17.324 | 3 | 39 | 852 | 1767 | 34 | 67 | 57 | 12 | 45 | 5.5 | 9.5 | 5.5 | 24 |
| 20-6T3 | | 6 | 3.969 | 20.8 | 16.744 | 3 | 39 | 1091 | 2081 | 36 | 77 | 60 | 12 | 48 | 5.5 | 9.5 | 5.5 | 24 |
| 25-5T3 | | 25 | 5 | 3.175 | 25.6 | 22.324 | 3 | 55 | 977 | 2314 | 40 | 67 | 64 | 12 | 52 | 5.5 | 9.5 | 5.5 |
| 25-6T3 | 6 | | 3.969 | 25.8 | 21.744 | 3 | 56 | 1272 | 2762 | 42 | 77 | 65 | 12 | 53 | 5.5 | 9.5 | 5.5 | 24 |
| 32-5T3 | 32 | 5 | 3.175 | 32.6 | 29.324 | 3 | 64 | 1117 | 3081 | 48 | 67 | 74 | 12 | 60 | 6.5 | 11 | 6.5 | 24 |
| 32-5T4 | | | | 32.6 | 29.324 | 4 | 82 | 1431 | 4108 | 48 | 77 | 74 | 12 | 60 | 6.5 | 11 | 6.5 | 24 |
| 32-6T3 | | 6 | 3.969 | 32.8 | 28.744 | 3 | 65 | 1446 | 3620 | 50 | 67 | 76 | 12 | 62 | 6.5 | 11 | 6.5 | 24 |
| 32-6T4 | | | | 32.8 | 28.744 | 4 | 84 | 1852 | 4826 | 50 | 90 | 76 | 12 | 62 | 6.5 | 11 | 6.5 | 24 |
| 32-8T3 | | 8 | 4.763 | 33 | 28.132 | 3 | 68 | 1810 | 4227 | 52 | 100 | 78 | 16 | 64 | 6.6 | 11 | 6.5 | 24 |
| 32-8T4 | | | | 33 | 28.132 | 4 | 82 | 2317 | 5635 | 52 | 117 | 78 | 16 | 64 | 6.6 | 11 | 6.5 | 24 |
| 32-10T3 | | | | 10 | 6.350 | 33.4 | 26.91 | 3 | 68 | 2539 | 5327 | 56 | 120 | 82 | 16 | 68 | 6.6 | 11 |
| 36-8T4 | 36 | 8 | 4.763 | 37 | 32.132 | 4 | 88 | 2531 | 6614 | 56 | 116 | 86 | 15 | 70 | 9 | 14 | 8.5 | 25 |
| 40-5T4 | 40 | 5 | 3.175 | 40.6 | 37.324 | 4 | 99 | 1599 | 5280 | 54 | 81 | 80 | 16 | 66 | 6.6 | 11 | 6.5 | 24 |
| 40-5T6 | | | | 40.6 | 37.324 | 6 | 146 | 2265 | 7919 | 54 | 102 | 80 | 16 | 66 | 6.6 | 11 | 6.5 | 24 |
| 40-6T4 | | 6 | 3.969 | 40.8 | 36.744 | 4 | 100 | 2136 | 6420 | 56 | 94 | 88 | 16 | 72 | 9 | 14 | 8.5 | 30 |
| 40-6T6 | | | | 40.8 | 36.744 | 6 | 148 | 3028 | 9630 | 56 | 119 | 88 | 16 | 72 | 9 | 14 | 8.5 | 30 |
| 40-8T4 | | 8 | 4.763 | 41 | 36.132 | 4 | 102 | 2728 | 7596 | 60 | 117 | 92 | 16 | 75 | 9 | 14 | 8.5 | 30 |
| 40-10T3 | | 10 | 6.350 | 41.4 | 34.91 | 3 | 76 | 2959 | 7069 | 65 | 123 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 |
| 40-10T4 | | | | 41.4 | 34.91 | 4 | 101 | 3789 | 9426 | 65 | 143 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 |
| 50-5T4 | 50 | 5 | 3.175 | 50.6 | 47.324 | 4 | 121 | 1757 | 6745 | 65 | 81 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 |
| 50-5T6 | | | | 50.6 | 47.324 | 6 | 177 | 2490 | 10117 | 65 | 102 | 96 | 16 | 80 | 9 | 14 | 8.5 | 30 |
| 50-6T4 | | 6 | 3.969 | 50.8 | 46.744 | 4 | 123 | 2388 | 8250 | 68 | 94 | 100 | 16 | 84 | 9 | 14 | 8.5 | 30 |
| 50-6T6 | | | | 50.8 | 46.744 | 6 | 179 | 3384 | 12375 | 68 | 119 | 100 | 16 | 84 | 9 | 14 | 8.5 | 30 |
| 50-8T4 | | 8 | 4.763 | 51 | 46.132 | 4 | 122 | 2998 | 9578 | 70 | 120 | 102 | 16 | 85 | 9 | 14 | 8.8 | 30 |
| 50-10T3 | | 10 | 6.350 | 51.4 | 44.91 | 3 | 95 | 3397 | 9256 | 74 | 123 | 114 | 18 | 92 | 11 | 17.5 | 11 | 40 |
| 50-10T4 | | | | 51.4 | 44.91 | 4 | 124 | 4350 | 12341 | 74 | 143 | 114 | 18 | 92 | 11 | 17.5 | 11 | 40 |
| 50-12T3 | | | | 12 | 7.938 | 51.8 | 43.688 | 3 | 94 | 4420 | 11047 | 78 | 147 | 118 | 18 | 96 | 11 | 17.5 |
| 63-6T4 | | 63 | 6 | 3.969 | 63.8 | 59.744 | 4 | 148 | 2614 | 10542 | 80 | 96 | 119 | 18 | 98 | 11 | 17.5 | 11 |
| 63-6T3 | 63.8 | | | | 59.744 | 3 | 220 | 3704 | 15813 | 80 | 121 | 119 | 18 | 98 | 11 | 17.5 | 11 | 40 |
| 63-8T4 | 8 | | 4.763 | 64 | 59.132 | 4 | 152 | 3395 | 12541 | 82 | 119 | 122 | 18 | 100 | 11 | 17.5 | 11 | 40 |
| 63-10T4 | | | | 10 | 6.350 | 64.4 | 57.91 | 4 | 158 | 4860 | 15858 | 88 | 147 | 134 | 20 | 110 | 14 | 20 |
| 63-12T3 | 12 | | 7.938 | 64.8 | 56.688 | 3 | 114 | 5059 | 14470 | 92 | 150 | 138 | 20 | 114 | 14 | 20 | 13 | 40 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 10% of dynamic load rating.

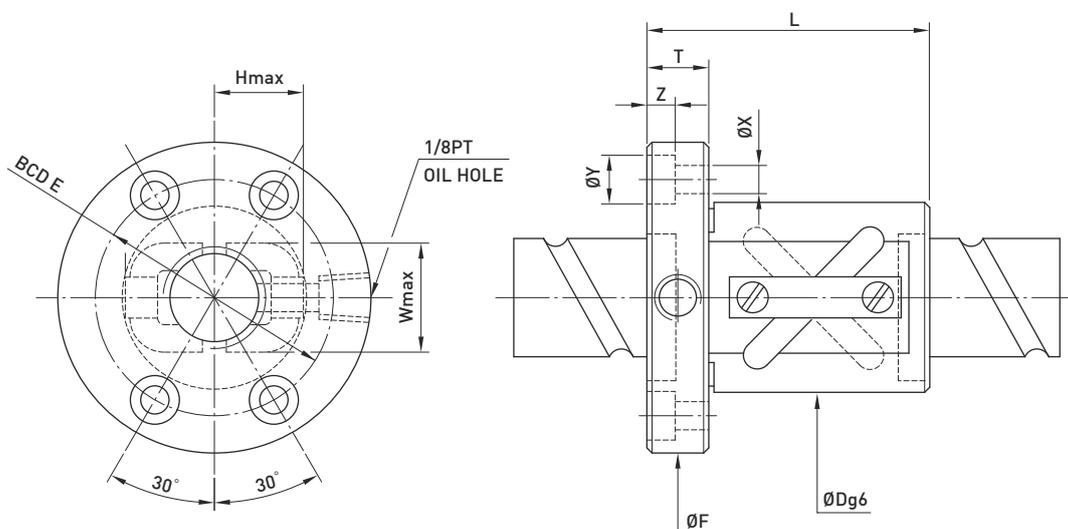
FSH Type ◀ High Lead



| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/µm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Bolt X | Fit | | |
|---------|--------------|------|-----------|--------|--------|----------|----------------------|---|----------------------|-----|-----|--------|----|-------|--------|------|------|---|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | | H | S | M |
| 15-20S1 | 15 | 20 | 3.175 | 15.6 | 12.324 | 1.8x1 | 18 | 540 | 1030 | 34 | 45 | 55 | 10 | 45 | 36 | 5.5 | 24 | 0 |
| 16-16S2 | 16 | 16 | | 16.6 | 13.324 | 1.8x2 | 35 | 1060 | 2280 | 32 | 48 | 53 | 10 | 42 | 38 | 4.5 | 26 | 0 |
| 16-16S4 | | | | 16.6 | 13.324 | 1.8x4 | 68 | 1930 | 4560 | 33 | 48 | 58 | 10 | 45 | 38 | 6.6 | 26 | 0 |
| 16-16S2 | | | | 16.6 | 13.324 | 1.8x2 | 35 | 1060 | 2280 | 32 | 48 | 53 | 10 | 42 | 38 | 4.5 | 26 | 0 |
| 16-16S4 | | | | 16.6 | 13.324 | 1.8x4 | 68 | 1930 | 4560 | 33 | 48 | 58 | 10 | 45 | 38 | 6.6 | 26 | 0 |
| 20-20S2 | 20 | 20 | | 20.6 | 17.324 | 1.8x2 | 42 | 1180 | 2860 | 39 | 48 | 62 | 10 | 50 | 46 | 5.5 | 27.5 | 0 |
| 20-20S4 | | | 20.6 | 17.324 | 1.8x4 | 81 | 2150 | 5720 | 38 | 58 | 62 | 10 | 50 | 46 | 5.5 | 32.5 | 3 | |
| 25-25S2 | 25 | 25 | 3.969 | 25.8 | 21.744 | 1.8x2 | 53 | 1770 | 4470 | 47 | 67 | 74 | 12 | 60 | 56 | 6.6 | 39.5 | 3 |
| 25-25S4 | | | | 25.8 | 21.744 | 1.8x4 | 105 | 3220 | 8940 | 47 | 67 | 74 | 12 | 60 | 56 | 6.6 | 39.5 | 3 |
| 32-32S2 | 32 | 32 | 4.763 | 33 | 28.132 | 1.8x2 | 66 | 2510 | 6770 | 58 | 85 | 92 | 15 | 74 | 68 | 9 | 48 | 0 |
| 32-32S4 | | | | 33 | 28.132 | 1.8x4 | 128 | 4550 | 13540 | 58 | 85 | 92 | 15 | 74 | 68 | 9 | 48 | 0 |
| 40-40S2 | 40 | 40 | 6.350 | 41.4 | 34.91 | 1.8x2 | 82 | 4130 | 11450 | 72 | 102 | 114 | 17 | 93 | 84 | 11 | 60 | 0 |
| 40-40S4 | | | | 41.4 | 34.91 | 1.8x4 | 159 | 7500 | 22910 | 72 | 102 | 114 | 17 | 93 | 84 | 11 | 60 | 0 |
| 50-50S2 | 50 | 50 | 7.938 | 51.8 | 43.688 | 1.8x2 | 100 | 6170 | 17900 | 90 | 125 | 135 | 20 | 112 | 104 | 14 | 83.5 | 0 |
| 50-50S4 | | | | 51.8 | 43.688 | 1.8x4 | 193 | 11210 | 35800 | 90 | 125 | 135 | 20 | 112 | 104 | 14 | 83.5 | 0 |

Remark : Stiffness values listed above are derived from theoretical formula while preload is 5% of dynamic load rating.

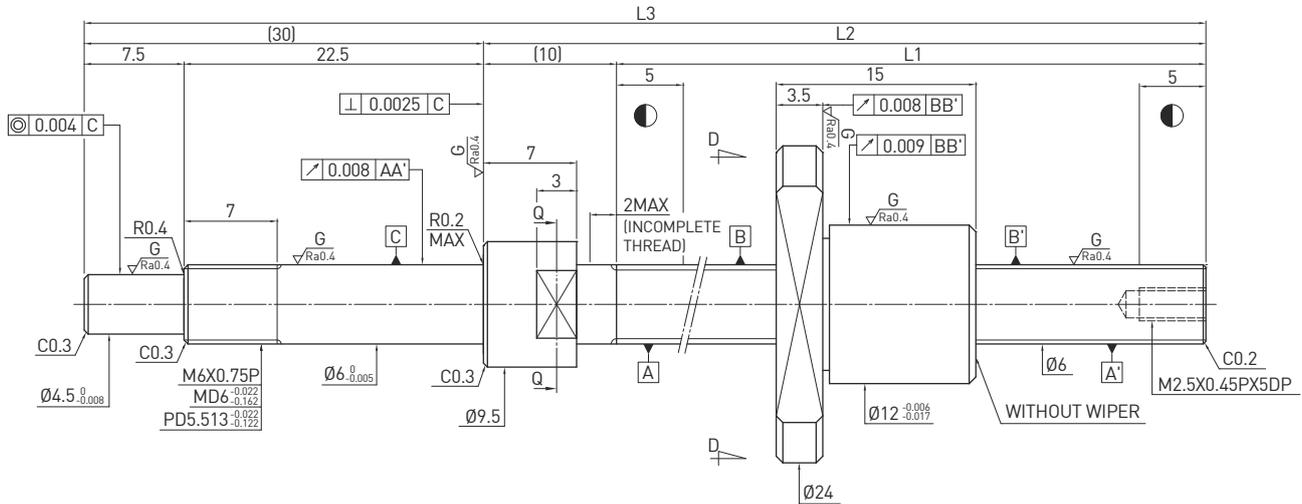
DFSV Type ◀ High Lead



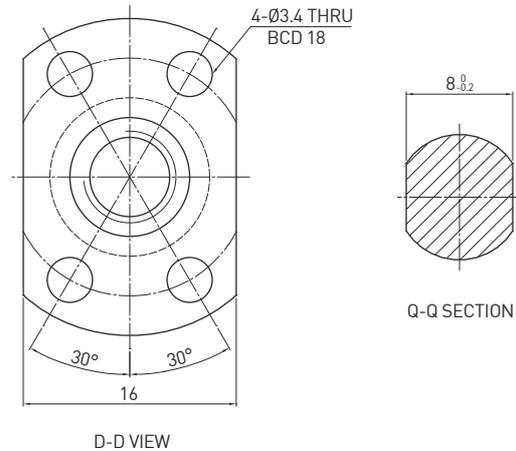
| Model | Size | | Ball Dia. | PCD | RD | Circuits | Stiffness K (kgf/μm) | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | Return Tube | | Bolt | | |
|---------|--------------|------|-----------|------|--------|----------|----------------------|---|----------------------|-----|-----|--------|----|-------|-------------|----|------|------|-----|
| | Nominal Dia. | Lead | | | | | | | | D | L | F | T | BCD-E | W | H | X | Y | Z |
| 16-16A2 | 16 | 16 | 3.175 | 16.6 | 13.324 | 1.5x2 | 17.9 | 704 | 1376 | 32 | 60 | 55 | 12 | 43 | 22 | 22 | 5.5 | 9.5 | 5.5 |
| 20-20A2 | 20 | 20 | | 20.6 | 17.324 | 1.5x2 | 21.4 | 793 | 1745 | 36 | 69 | 60 | 12 | 47 | 28 | 27 | 5.5 | 9.5 | 5.5 |
| 25-25A2 | 25 | 25 | 3.969 | 25.8 | 21.744 | 1.5x2 | 28.3 | 1174 | 2730 | 42 | 69 | 70 | 12 | 55 | 32 | 28 | 6.6 | 11 | 6.5 |
| 32-32A2 | 32 | 32 | 4.763 | 33 | 28.132 | 1.5x2 | 35 | 1682 | 4208 | 54 | 94 | 100 | 15 | 80 | 40 | 37 | 9 | 14 | 8.5 |
| 40-40A2 | 40 | 40 | 6.350 | 41.4 | 34.91 | 1.5x2 | 43.8 | 2806 | 7222 | 65 | 115 | 106 | 18 | 85 | 52 | 42 | 11 | 17.5 | 11 |

6.3 Miniature Ground Ballscrew

FSI Type (SHAFT OD 6, LEAD 1) ◀ Miniature



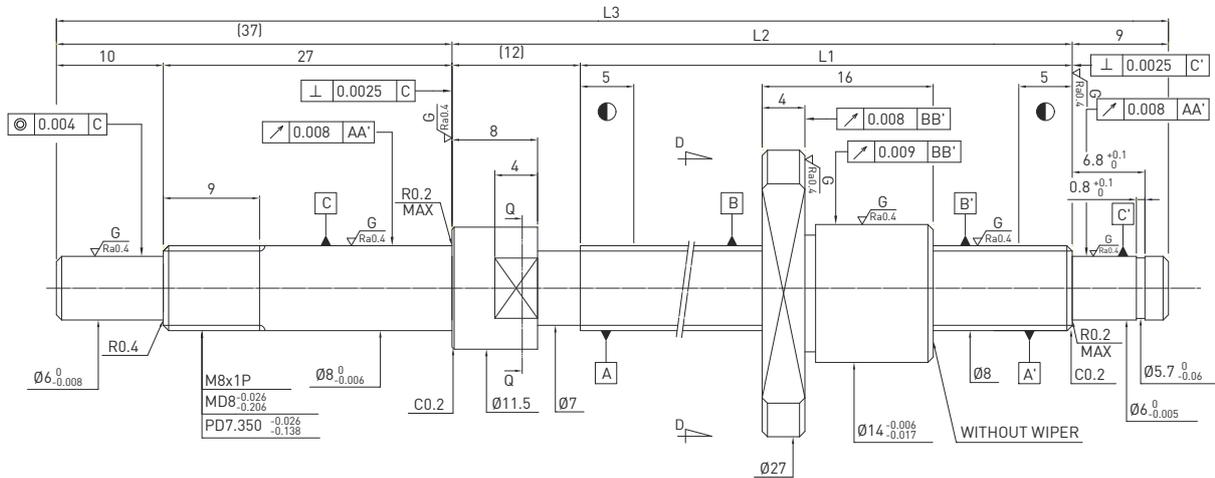
| Ballscrew Data | | |
|----------------------|------------|-----------|
| Direction | Right Hand | |
| Lead (mm) | 1.0 | |
| Lead Angle | 2.99° | |
| P.C.D (mm) | 6.1 | |
| Screw P.C.D (mm) | 6.1 | |
| RD (mm) | 5.261 | |
| Steel Ball (mm) | Ø0.8 | |
| Circuits | 1x3 | |
| Dynamic Load C (kgf) | 66 | |
| Static Load Co (kgf) | 111 | |
| Axial Play (mm) | 0 | 0.005 MAX |
| Drag Torque (kgf-cm) | 0.13 MAX | 0.03 MAX |
| Spacer Ball | - | - |



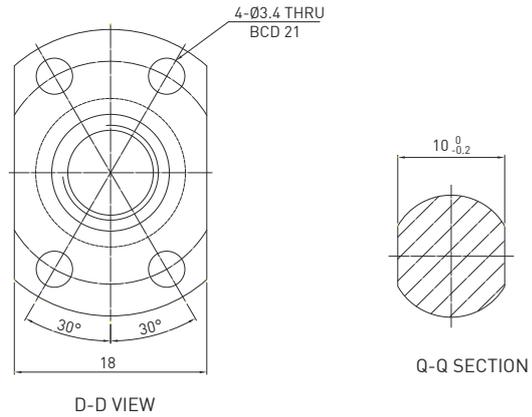
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|----------------------------|-----|-----|-----|----------------|
| 40 | R6-1.0T3-FSI-65-105-0.008 | 65 | 75 | 105 | C3 |
| 70 | R6-1.0T3-FSI-95-135-0.008 | 95 | 105 | 135 | C3 |
| 100 | R6-1.0T3-FSI-125-165-0.008 | 125 | 135 | 165 | C3 |

FSI Type (SHAFT OD 8, LEAD 1) ◀ Miniature



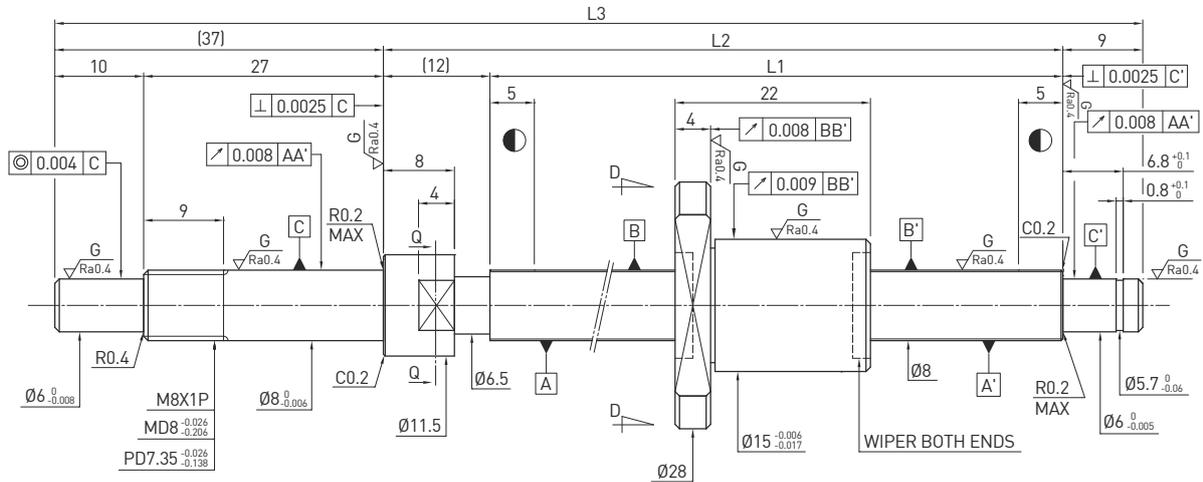
| Ball screw Data | |
|----------------------|----------------------|
| Direction | Right Hand |
| Lead (mm) | 1.0 |
| Lead Angle | 2.25° |
| P.C.D (mm) | 8.1 |
| Screw P.C.D (mm) | 8.1 |
| RD (mm) | 7.261 |
| Steel Ball (mm) | Ø0.8 |
| Circuits | 1x3 |
| Dynamic Load C (kgf) | 79 |
| Static Load Co (kgf) | 157 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.18 MAX 0.05 MAX |
| Spacer Ball | - - |



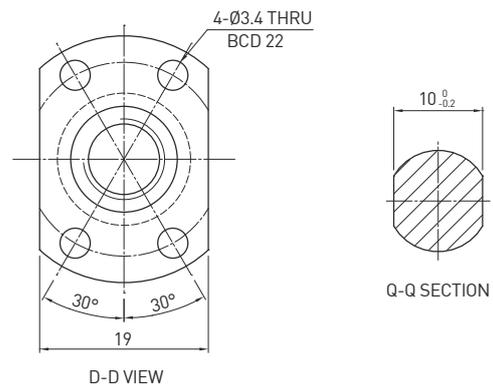
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|----------------------------|-----|-----|-----|----------------|
| 40 | R8-1.0T3-FSI-80-138-0.008 | 80 | 92 | 138 | C3 |
| 70 | R8-1.0T3-FSI-110-168-0.008 | 110 | 122 | 168 | C3 |
| 100 | R8-1.0T3-FSI-140-198-0.008 | 140 | 152 | 198 | C3 |
| 150 | R8-1.0T3-FSI-190-248-0.008 | 190 | 202 | 248 | C3 |

FSI Type (SHAFT OD 8, LEAD 1.5) ◀ Miniature



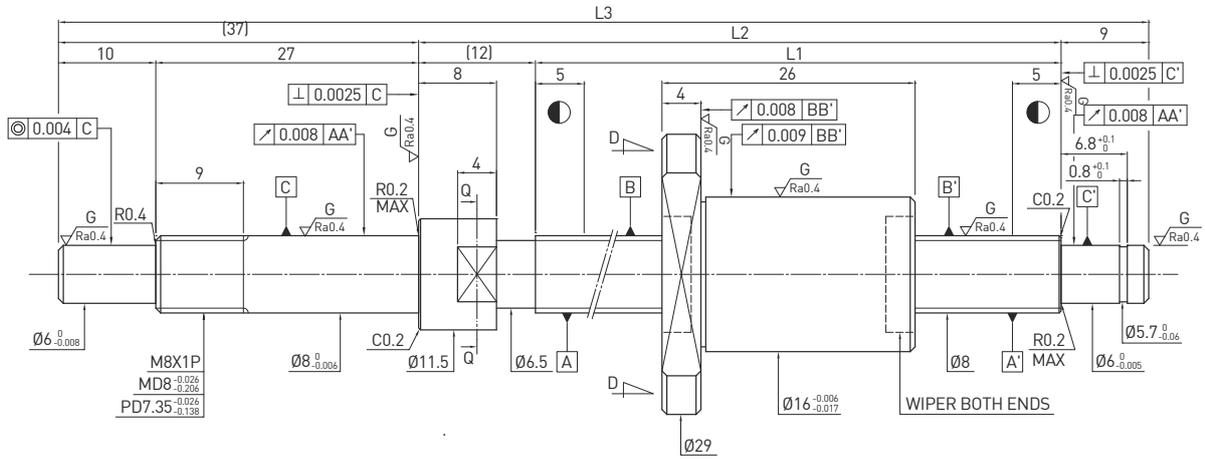
| Ball screw Data | |
|----------------------|-----------------------|
| Direction | Right Hand |
| Lead (mm) | 1.5 |
| Lead Angle | 3.37° |
| P.C.D (mm) | 8.1 |
| Screw P.C.D (mm) | 8.1 |
| RD (mm) | 7.050 |
| Steel Ball (mm) | Ø1 |
| Circuits | 1x3 |
| Dynamic Load C (kgf) | 105 |
| Static Load Co (kgf) | 191 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.2 MAX 0.05 MAX |
| Spacer Ball | - - |



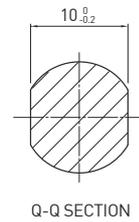
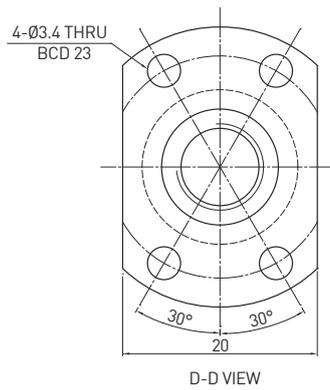
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|----------------------------|-----|-----|-----|----------------|
| 40 | R8-1.5T3-FSI-80-138-0.008 | 80 | 92 | 138 | C3 |
| 70 | R8-1.5T3-FSI-110-168-0.008 | 110 | 122 | 168 | C3 |
| 100 | R8-1.5T3-FSI-140-198-0.008 | 140 | 152 | 198 | C3 |
| 150 | R8-1.5T3-FSI-190-248-0.008 | 190 | 202 | 248 | C3 |

FSI Type (SHAFT OD 8, LEAD 2) ◀ Miniature



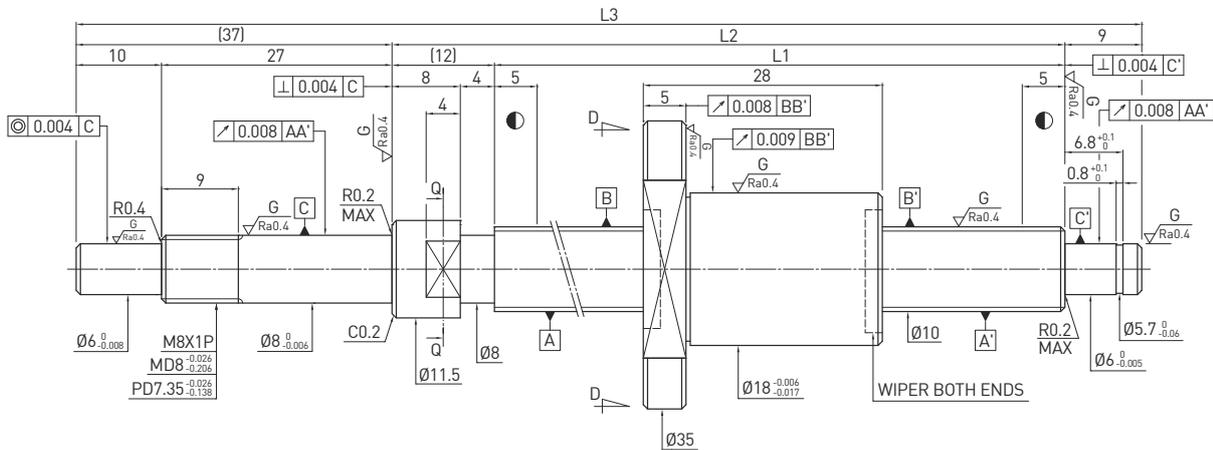
| Ball screw Data | | |
|----------------------|------------|-----------|
| Direction | Right Hand | |
| Lead (mm) | 2 | |
| Lead Angle | 4.44° | |
| P.C.D (mm) | 8.2 | |
| Screw P.C.D (mm) | 8.2 | |
| RD (mm) | 6.652 | |
| Steel Ball (mm) | Ø1.5 | |
| Circuits | 1x3 | |
| Dynamic Load C (kgf) | 170 | |
| Static Load Co (kgf) | 267 | |
| Axial Play (mm) | 0 | 0.005 MAX |
| Drag Torque (kgf-cm) | 0.20 MAX | 0.03 MAX |
| Spacer Ball | - | - |



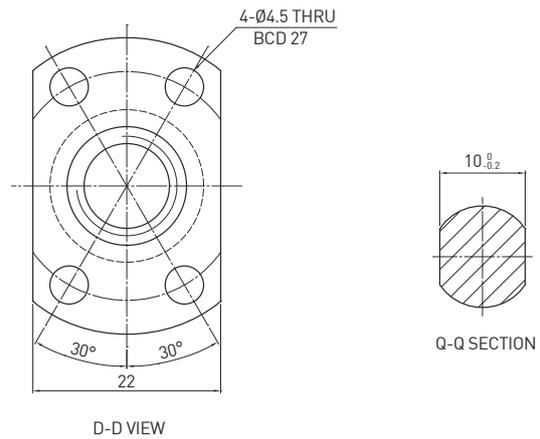
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|--------------------------|-----|-----|-----|----------------|
| 40 | R8-2T3-FSI-80-138-0.008 | 80 | 92 | 138 | C3 |
| 70 | R8-2T3-FSI-110-168-0.008 | 110 | 122 | 168 | C3 |
| 100 | R8-2T3-FSI-140-198-0.008 | 140 | 152 | 198 | C3 |
| 150 | R8-2T3-FSI-190-248-0.008 | 190 | 202 | 248 | C3 |

FSI Type (SHAFT OD 10, LEAD 2) ◀ Miniature



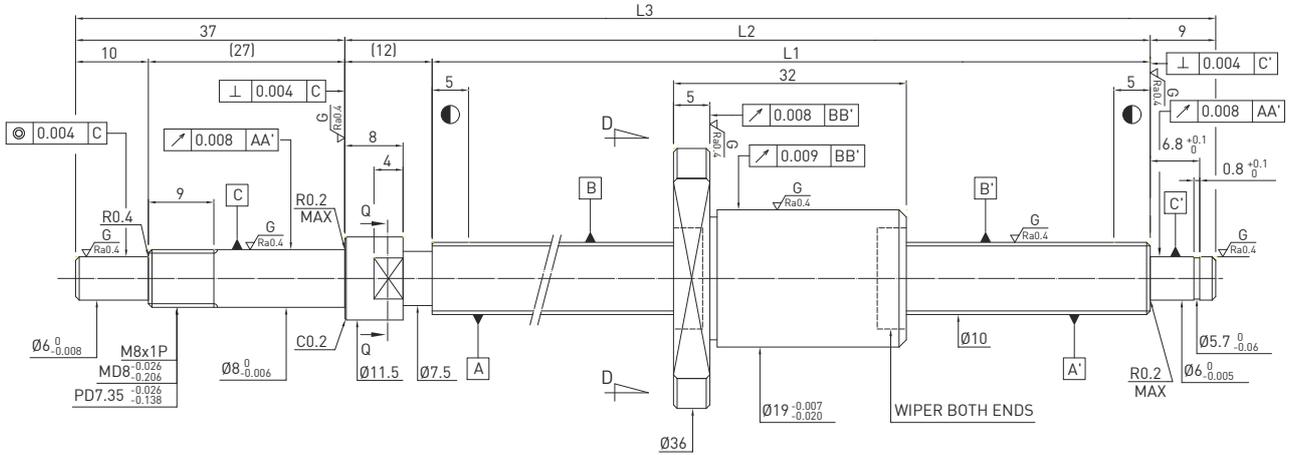
| Ball screw Data | |
|----------------------|-------------------------|
| Direction | Right Hand |
| Lead (mm) | 2 |
| Lead Angle | 3.57° |
| P.C.D (mm) | 10.2 |
| Screw P.C.D (mm) | 10.2 |
| RD (mm) | 8.652 |
| Steel Ball (mm) | Ø1.5 |
| Circuits | 1x3 |
| Dynamic Load C (kgf) | 196 |
| Static Load Co (kgf) | 348 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.01-0.24 0.05 MAX |
| Spacer Ball | - - |



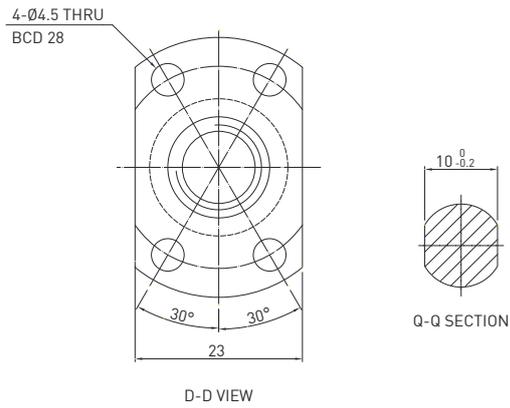
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 50 | R10-2T3-FSI-100-158-0.008 | 100 | 112 | 158 | C3 |
| 100 | R10-2T3-FSI-150-208-0.008 | 150 | 162 | 208 | C3 |
| 150 | R10-2T3-FSI-200-258-0.008 | 200 | 212 | 258 | C3 |
| 200 | R10-2T3-FSI-250-308-0.008 | 250 | 262 | 308 | C3 |

FSI Type (SHAFT OD 10, LEAD 2.5) ◀ Miniature



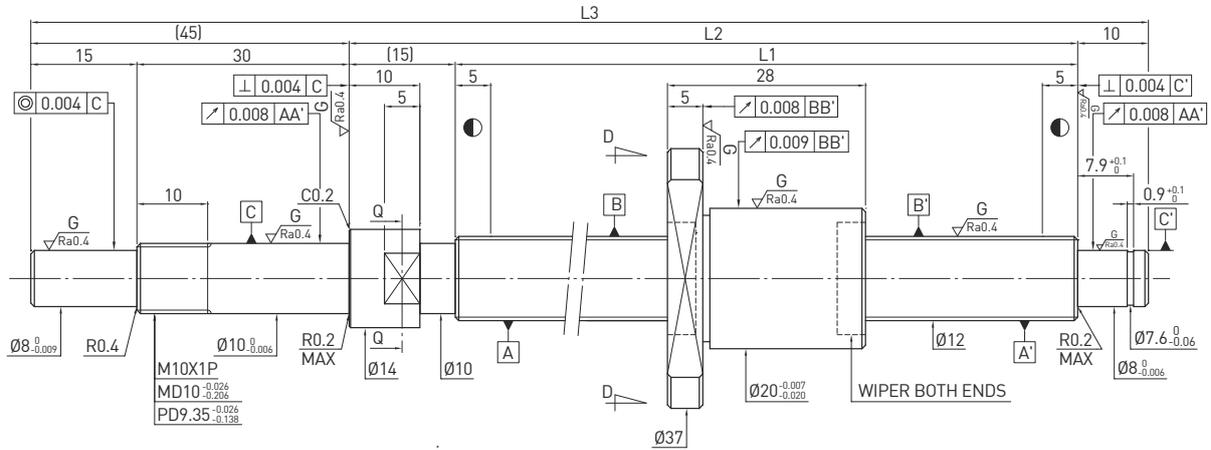
| Ball screw Data | | |
|----------------------|------------|-----------|
| Direction | Right Hand | |
| Lead (mm) | 2.5 | |
| Lead Angle | 4.46° | |
| P.C.D (mm) | 10.2 | |
| Screw P.C.D (mm) | 10.2 | |
| RD (mm) | 8.136 | |
| Steel Ball (mm) | Ø2 | |
| Circuits | 1x3 | |
| Dynamic Load C (kgf) | 274 | |
| Static Load Co (kgf) | 438 | |
| Axial Play (mm) | 0 | 0.005 MAX |
| Drag Torque (kgf-cm) | 0.02-0.3 | 0.05 MAX |
| Spacer Ball | - | - |



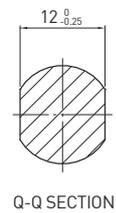
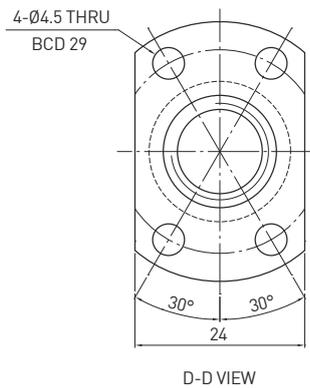
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-----------------------------|-----|-----|-----|----------------|
| 50 | R10-2.5T3-FSI-100-158-0.008 | 100 | 112 | 158 | C3 |
| 100 | R10-2.5T3-FSI-150-208-0.008 | 150 | 162 | 208 | C3 |
| 150 | R10-2.5T3-FSI-200-258-0.008 | 200 | 212 | 258 | C3 |
| 200 | R10-2.5T3-FSI-250-308-0.008 | 250 | 262 | 308 | C3 |

FSI Type (SHAFT OD 12, LEAD 2) ◀ Miniature



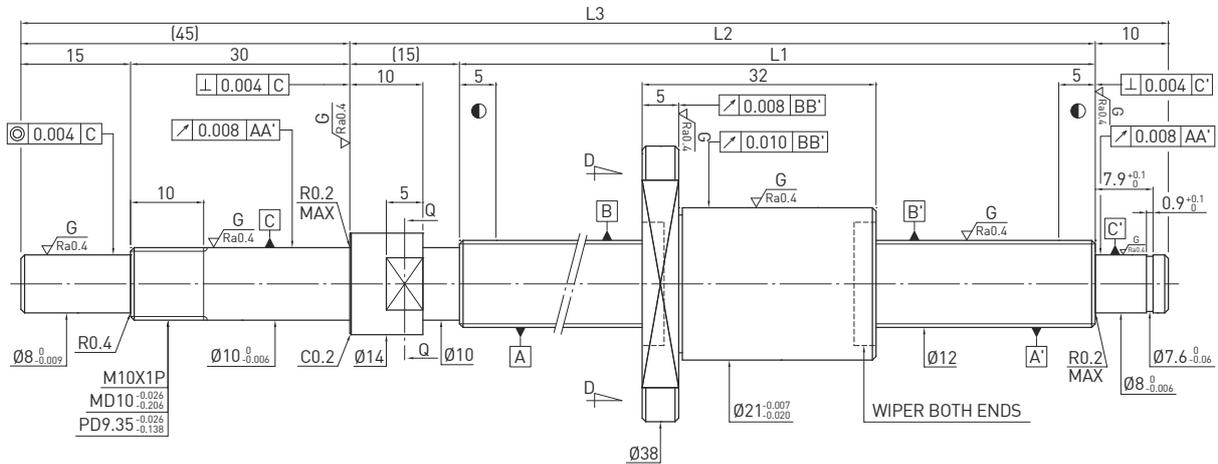
| Ball screw Data | |
|----------------------|------------------------|
| Direction | Right Hand |
| Lead (mm) | 2 |
| Lead Angle | 2.99° |
| P.C.D (mm) | 12.2 |
| Screw P.C.D (mm) | 12.2 |
| RD (mm) | 10.652 |
| Steel Ball (mm) | Ø1.5 |
| Circuits | 1x3 |
| Dynamic Load C (kgf) | 217 |
| Static Load Co (kgf) | 430 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.04-0.35 0.1 MAX |
| Spacer Ball | - - |



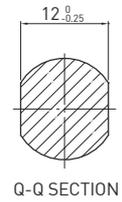
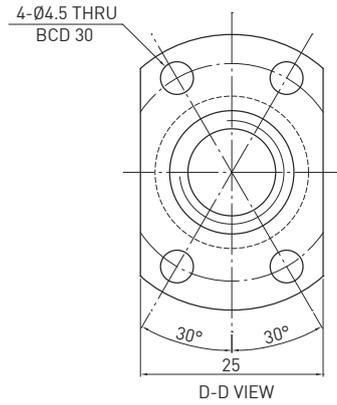
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 50 | R12-2T3-FSI-110-180-0.008 | 110 | 125 | 180 | C3 |
| 100 | R12-2T3-FSI-160-230-0.008 | 160 | 175 | 230 | C3 |
| 150 | R12-2T3-FSI-210-280-0.008 | 210 | 225 | 280 | C3 |
| 200 | R12-2T3-FSI-260-330-0.008 | 260 | 275 | 330 | C3 |
| 250 | R12-2T3-FSI-310-380-0.008 | 310 | 325 | 380 | C3 |

FSI Type (SHAFT OD 12, LEAD 2.5) ◀ Miniature



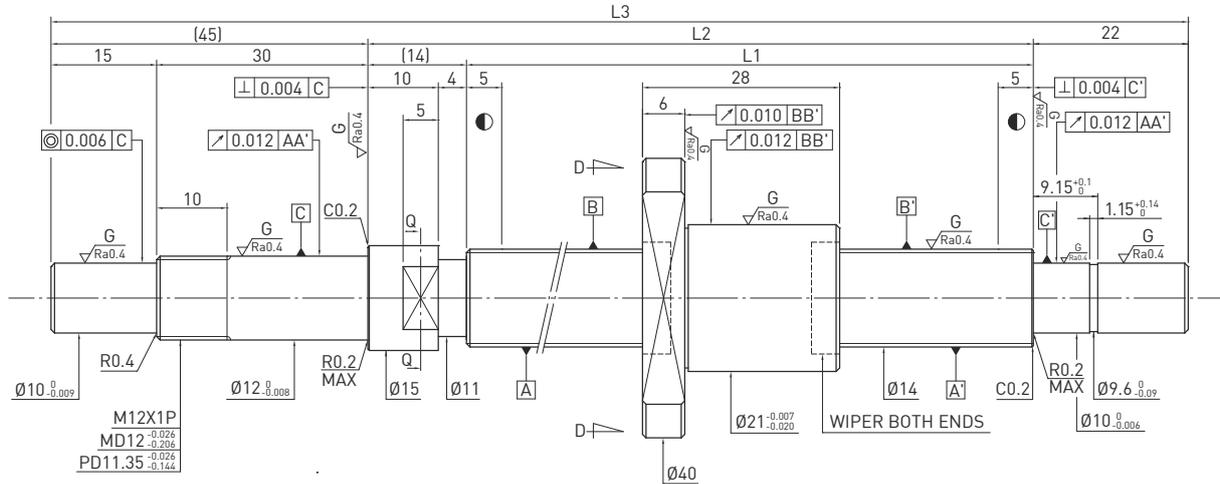
| Ball screw Data | | |
|----------------------|------------|-----------|
| Direction | Right Hand | |
| Lead (mm) | 2.5 | |
| Lead Angle | 3.73° | |
| P.C.D (mm) | 12.2 | |
| Screw P.C.D (mm) | 12.2 | |
| RD (mm) | 10.136 | |
| Steel Ball (mm) | Ø2 | |
| Circuits | 1x3 | |
| Dynamic Load C (kgf) | 309 | |
| Static Load Co (kgf) | 546 | |
| Axial Play (mm) | 0 | 0.005 MAX |
| Drag Torque (kgf-cm) | 0.04-0.35 | 0.1 MAX |
| Spacer Ball | - | - |



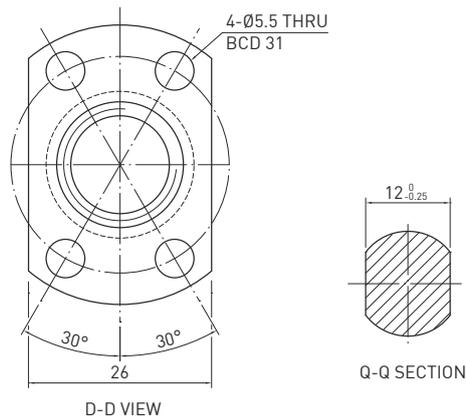
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-----------------------------|-----|-----|-----|----------------|
| 50 | R12-2.5T3-FSI-110-180-0.008 | 110 | 125 | 180 | C3 |
| 100 | R12-2.5T3-FSI-160-230-0.008 | 160 | 175 | 230 | C3 |
| 150 | R12-2.5T3-FSI-210-280-0.008 | 210 | 225 | 280 | C3 |
| 200 | R12-2.5T3-FSI-260-330-0.008 | 260 | 275 | 330 | C3 |
| 250 | R12-2.5T3-FSI-310-380-0.008 | 310 | 325 | 380 | C3 |

FSI Type (SHAFT OD 14, LEAD 2) ◀ Miniature



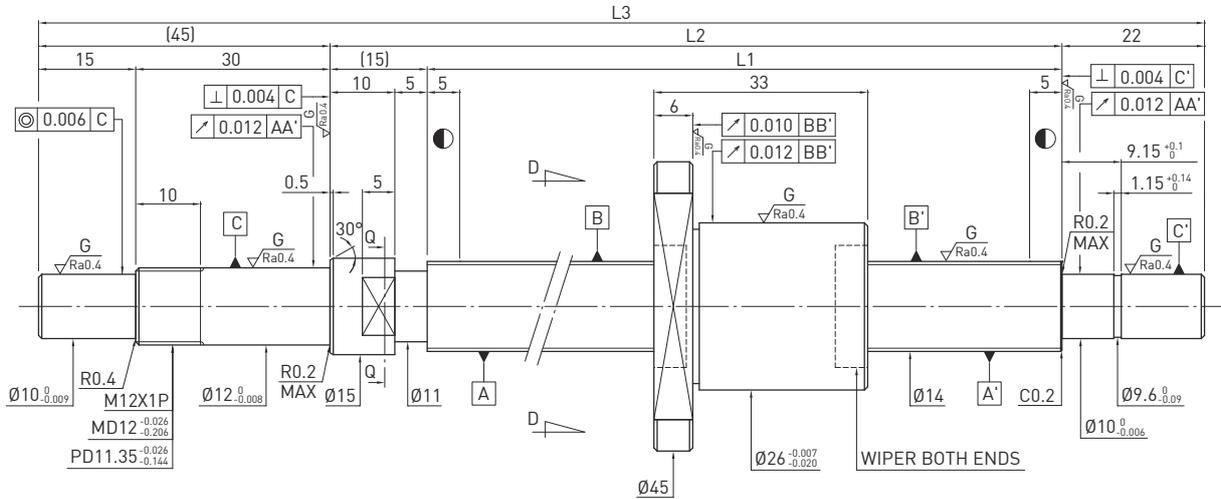
| Ball screw Data | |
|----------------------|------------------|
| Direction | Right Hand |
| Lead (mm) | 2 |
| Lead Angle | 2.57° |
| P.C.D (mm) | 14.2 |
| Screw P.C.D (mm) | 14.2 |
| RD (mm) | 12.652 |
| Steel Ball (mm) | Ø1.5 |
| Circuits | 1x3 |
| Dynamic Load C (kgf) | 236 |
| Static Load Co (kgf) | 511 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.05-0.5 - |
| Spacer Ball | - - |



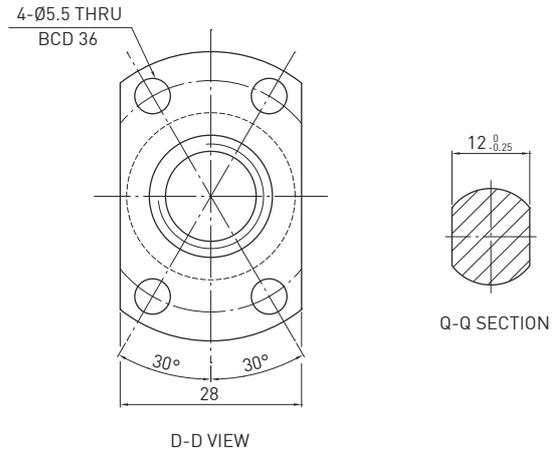
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 50 | R14-2T3-FSI-85-166-0.008 | 85 | 99 | 166 | C3 |
| 100 | R14-2T3-FSI-135-216-0.008 | 135 | 149 | 216 | C3 |
| 150 | R14-2T3-FSI-185-266-0.008 | 185 | 199 | 266 | C3 |
| 200 | R14-2T3-FSI-235-316-0.008 | 235 | 249 | 316 | C3 |
| 250 | R14-2T3-FSI-335-416-0.008 | 335 | 349 | 416 | C3 |

FSI Type (SHAFT OD 14, LEAD 4) ◀ Miniature



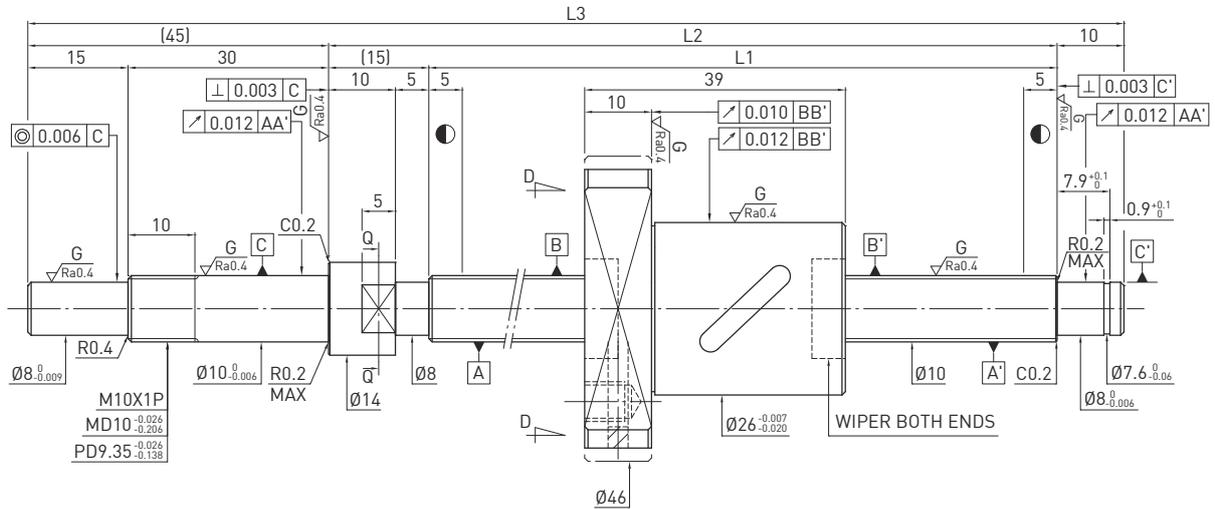
| Ball screw Data | |
|----------------------|------------------|
| Direction | Right Hand |
| Lead (mm) | 4 |
| Lead Angle | 5.11° |
| P.C.D (mm) | 14.25 |
| Screw P.C.D (mm) | 14.25 |
| RD (mm) | 11.792 |
| Steel Ball (mm) | Ø2.381 |
| Circuits | 1x3 |
| Dynamic Load C (kgf) | 403 |
| Static Load Co (kgf) | 725 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.1-0.7 - |
| Spacer Ball | - - |



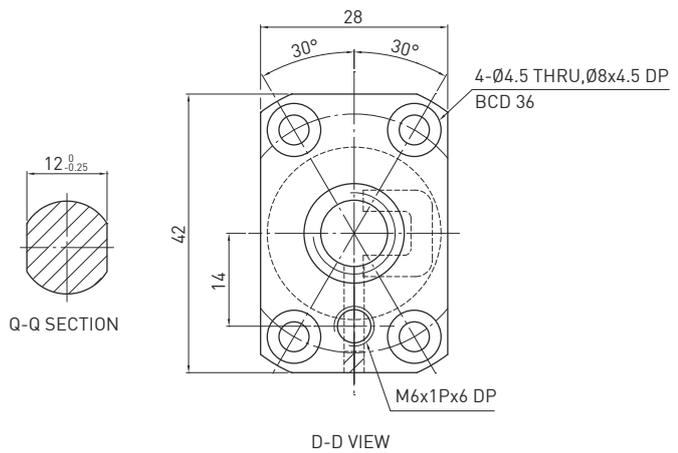
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 100 | R14-4T3-FSI-148-230-0.008 | 148 | 163 | 230 | C3 |
| 150 | R14-4T3-FSI-198-280-0.008 | 198 | 213 | 280 | C3 |
| 200 | R14-4T3-FSI-248-330-0.008 | 248 | 263 | 330 | C3 |
| 300 | R14-4T3-FSI-348-430-0.008 | 348 | 363 | 430 | C3 |
| 400 | R14-4T3-FSI-448-530-0.008 | 448 | 463 | 530 | C3 |

FSB Type (SHAFT OD 10, LEAD 4) ◀ Miniature



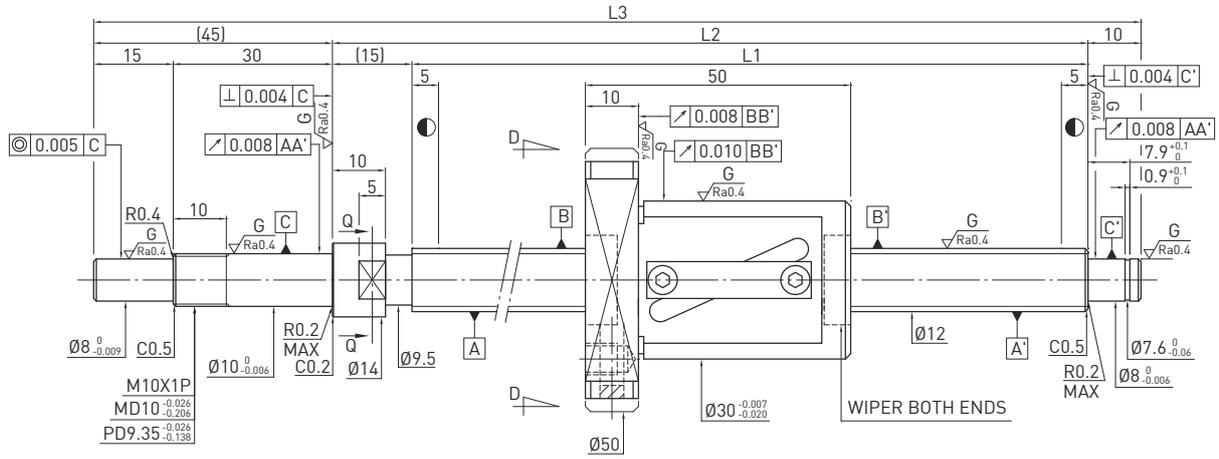
| Ball screw Data | |
|----------------------|-----------------------|
| Direction | Right Hand |
| Lead (mm) | 4 |
| Lead Angle | 7.11° |
| P.C.D (mm) | 10.2 |
| Screw P.C.D (mm) | 10.2 |
| RD (mm) | 8.136 |
| Steel Ball (mm) | Ø2 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 176 280 |
| Static Load Co (kgf) | 225 449 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.05-0.4 0.1 MAX |
| Spacer Ball | 1 : 1 - |



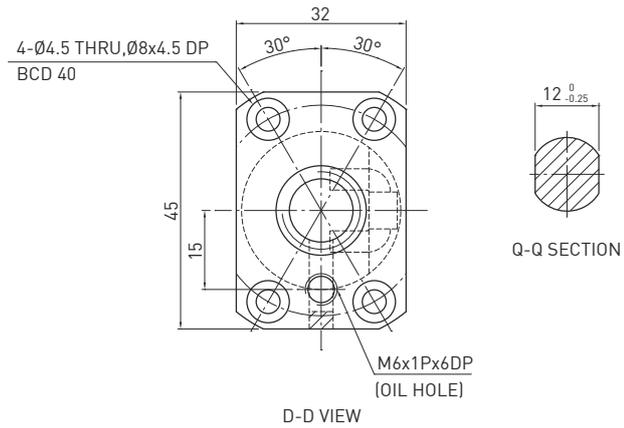
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 50 | R10-4B1-FSB-110-180-0.008 | 110 | 125 | 180 | C3 |
| 100 | R10-4B1-FSB-160-230-0.008 | 160 | 175 | 230 | C3 |
| 150 | R10-4B1-FSB-210-280-0.008 | 210 | 225 | 280 | C3 |
| 200 | R10-4B1-FSB-260-330-0.008 | 260 | 275 | 330 | C3 |
| 250 | R10-4B1-FSB-310-380-0.008 | 310 | 325 | 380 | C3 |
| 300 | R10-4B1-FSB-360-430-0.008 | 360 | 375 | 430 | C3 |

FSW Type (SHAFT OD 12, LEAD 10) ◀ Miniature



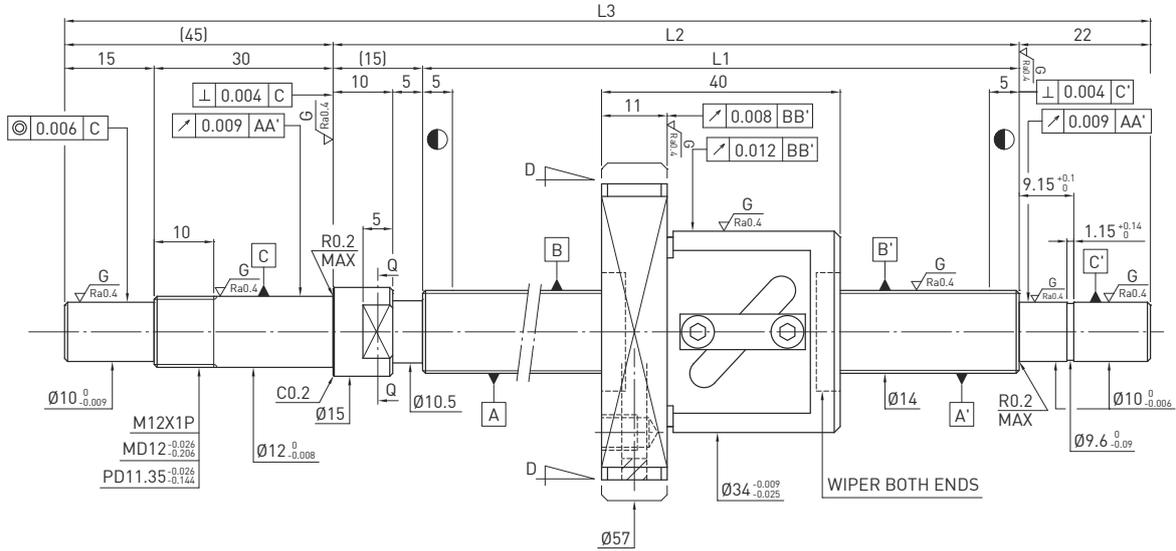
| Ball screw Data | |
|----------------------|----------------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 14.57° |
| P.C.D (mm) | 12.25 |
| Screw P.C.D (mm) | 12.25 |
| RD (mm) | 9.792 |
| Steel Ball (mm) | Ø2.381 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 241 382 |
| Static Load Co (kgf) | 319 637 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.1-0.5 0.5 MAX |
| Spacer Ball | 1 : 1 - |



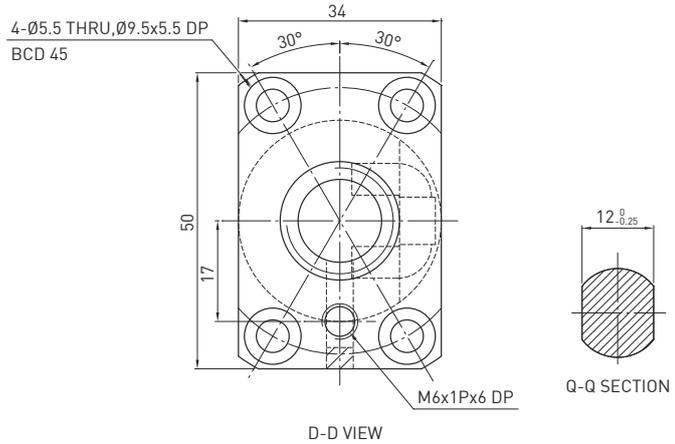
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|----------------------------|-----|-----|-----|----------------|
| 100 | R12-10B1-FSW-160-230-0.008 | 160 | 175 | 230 | C3 |
| 150 | R12-10B1-FSW-210-280-0.008 | 210 | 225 | 280 | C3 |
| 250 | R12-10B1-FSW-310-380-0.008 | 310 | 325 | 380 | C3 |
| 350 | R12-10B1-FSW-410-480-0.008 | 410 | 425 | 480 | C3 |
| 450 | R12-10B1-FSW-510-580-0.008 | 510 | 525 | 580 | C3 |

FSW Type (SHAFT OD 14, LEAD 5) ◀ Miniature



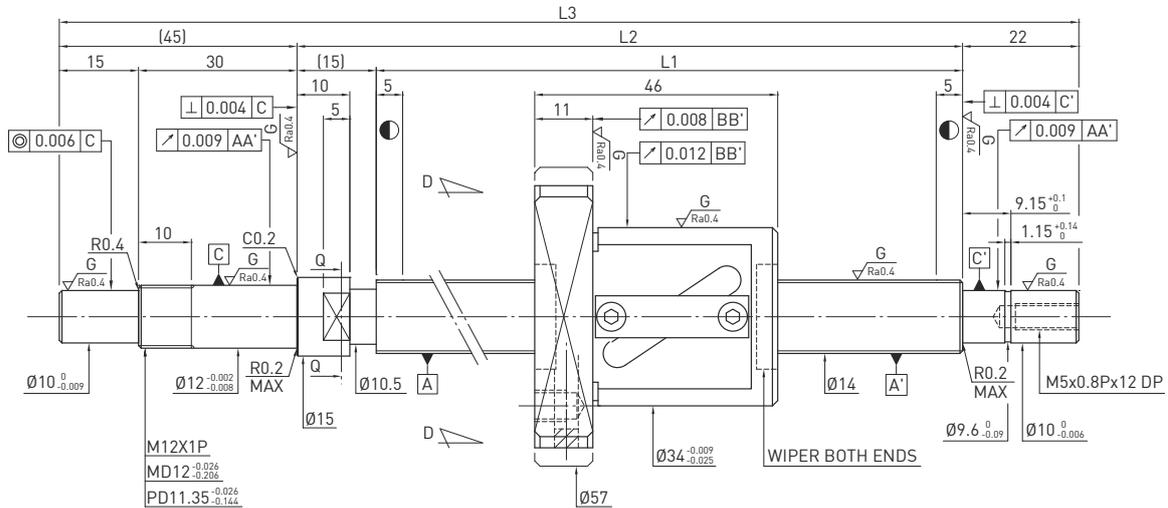
| Ball screw Data | | |
|----------------------|------------|-----------|
| Direction | Right Hand | |
| Lead (mm) | 5 | |
| Lead Angle | 6.22° | |
| P.C.D (mm) | 14.6 | |
| Screw P.C.D (mm) | 14.6 | |
| RD (mm) | 11.324 | |
| Steel Ball (mm) | Ø3.175 | |
| Circuits | 2.5x1 | |
| Dynamic Load C (kgf) | 448 | 710 |
| Static Load Co (kgf) | 608 | 1215 |
| Axial Play (mm) | 0 | 0.005 MAX |
| Drag Torque (kgf-cm) | 0.15~0.70 | 0.2 MAX |
| Spacer Ball | 1 : 1 | - |



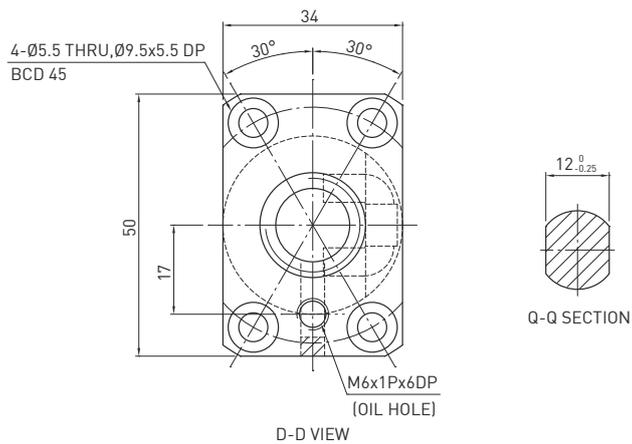
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 100 | R14-5B1-FSW-189-271-0.008 | 189 | 204 | 271 | C3 |
| 150 | R14-5B1-FSW-239-321-0.008 | 239 | 254 | 321 | C3 |
| 250 | R14-5B1-FSW-339-421-0.008 | 339 | 354 | 421 | C3 |
| 350 | R14-5B1-FSW-439-521-0.008 | 439 | 454 | 521 | C3 |
| 450 | R14-5B1-FSW-539-621-0.008 | 539 | 554 | 621 | C3 |
| 600 | R14-5B1-FSW-689-771-0.008 | 689 | 704 | 771 | C3 |

FSW Type (SHAFT OD 14, LEAD 8) ◀ Miniature



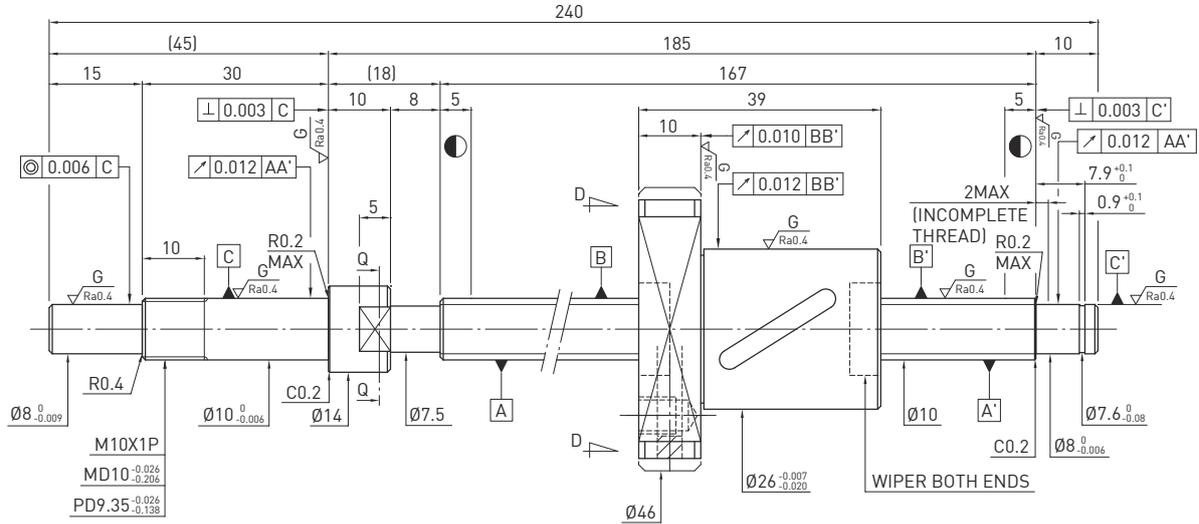
| Ball screw Data | |
|----------------------|-------------------------|
| Direction | Right Hand |
| Lead (mm) | 8 |
| Lead Angle | 9.89° |
| P.C.D (mm) | 14.6 |
| Screw P.C.D (mm) | 14.6 |
| RD (mm) | 11.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 448 710 |
| Static Load Co (kgf) | 608 1215 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.15~0.79 0.24 MAX |
| Spacer Ball | 1 : 1 - |



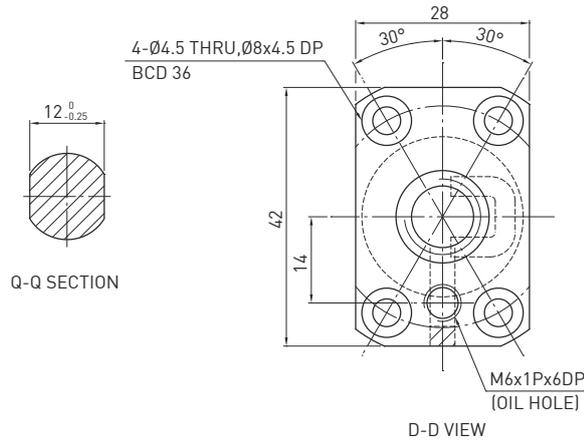
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 100 | R14-8B1-FSW-189-271-0.008 | 189 | 204 | 271 | C3 |
| 150 | R14-8B1-FSW-239-321-0.008 | 239 | 254 | 321 | C3 |
| 200 | R14-8B1-FSW-289-371-0.008 | 289 | 304 | 371 | C3 |
| 250 | R14-8B1-FSW-339-421-0.008 | 339 | 354 | 421 | C3 |
| 300 | R14-8B1-FSW-389-471-0.008 | 389 | 404 | 471 | C3 |
| 350 | R14-8B1-FSW-439-521-0.008 | 439 | 454 | 521 | C3 |
| 400 | R14-8B1-FSW-489-571-0.008 | 489 | 504 | 571 | C3 |
| 450 | R14-8B1-FSW-539-621-0.008 | 539 | 554 | 621 | C3 |
| 500 | R14-8B1-FSW-589-671-0.008 | 589 | 604 | 671 | C3 |
| 550 | R14-8B1-FSW-639-721-0.008 | 639 | 654 | 721 | C3 |
| 600 | R14-8B1-FSW-689-771-0.008 | 689 | 704 | 771 | C3 |
| 700 | R14-8B1-FSW-789-871-0.008 | 789 | 804 | 871 | C3 |

FSB Type (SHAFT OD 10, LEAD 10) ◀ Miniature



| Ball screw Data | |
|----------------------|------------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 16.71° |
| P.C.D (mm) | 10.6 |
| Screw P.C.D (mm) | 10.6 |
| RD (mm) | 7.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 1.5x1 |
| Dynamic Load C (kgf) | 223 354 |
| Static Load Co (kgf) | 245 489 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.1~0.5 - |
| Spacer Ball | 1 : 1 - |

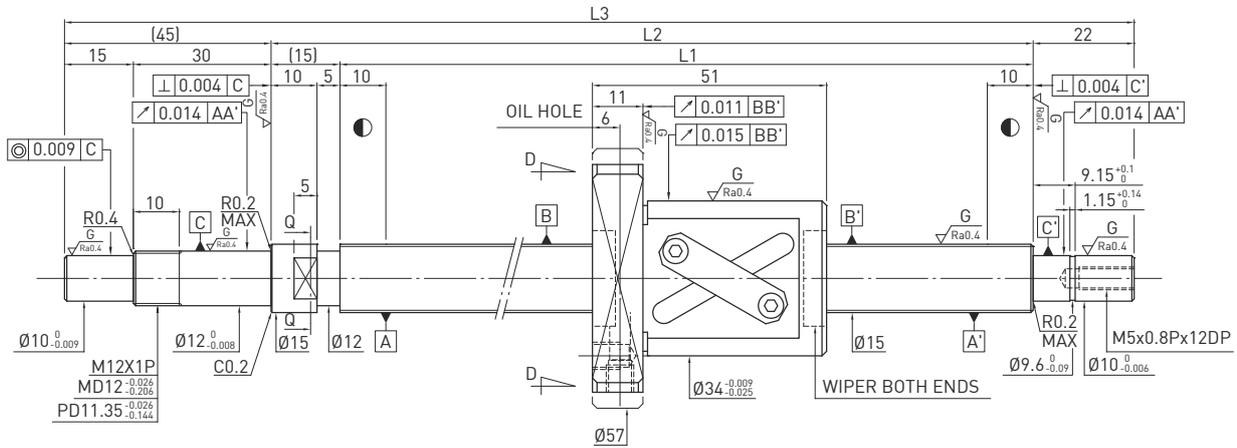


Unit : mm

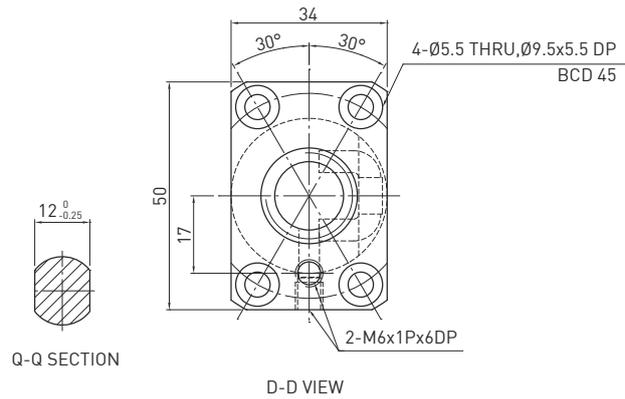
| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|----------------------------|-----|-----|-----|----------------|
| 100 | R10-10A1-FSB-167-240-0.008 | 167 | 185 | 240 | C3 |
| 150 | R10-10A1-FSB-217-290-0.008 | 217 | 235 | 290 | C3 |
| 200 | R10-10A1-FSB-267-340-0.008 | 267 | 285 | 340 | C3 |
| 250 | R10-10A1-FSB-317-390-0.008 | 317 | 335 | 390 | C3 |
| 300 | R10-10A1-FSB-367-440-0.008 | 367 | 385 | 440 | C3 |

6.4 End Machining Ground Ballscrew Series

FSW Type (SHAFT OD 15, LEAD 10) ◀ Standard



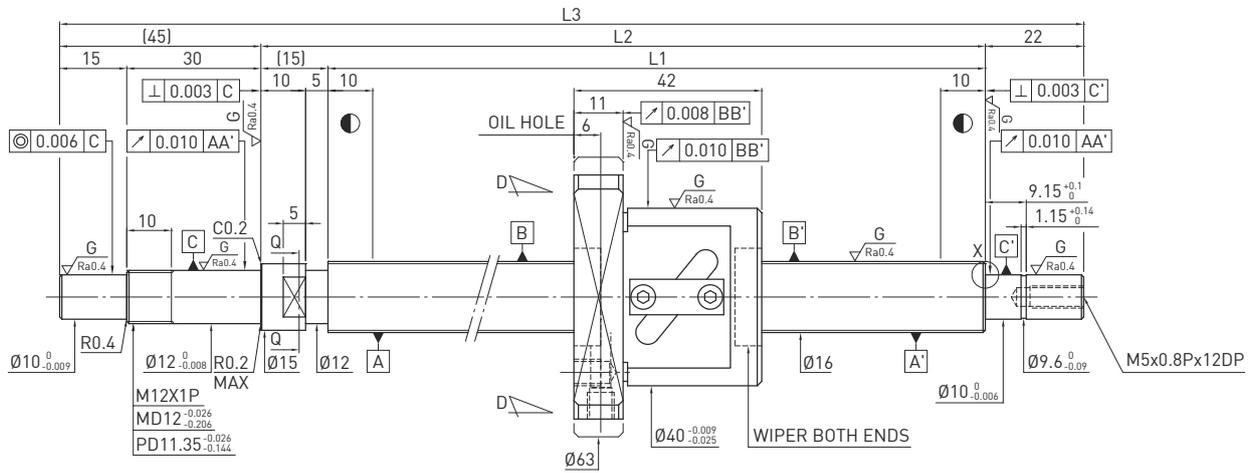
| Ball screw Data | |
|----------------------|-------------------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 11.53° |
| P.C.D (mm) | 15.6 |
| Screw P.C.D (mm) | 15.6 |
| RD (mm) | 12.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 460 729 |
| Static Load Co (kgf) | 645 1290 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.15-0.79 0.24 MAX |
| Spacer Ball | 1 : 1 - |



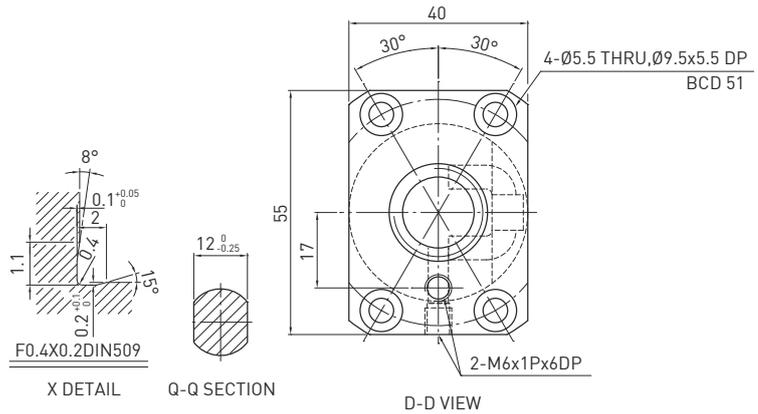
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 100 | R15-10B1-FSW-189-271-0.018 | 189 | 204 | 271 | C5 |
| 150 | R15-10B1-FSW-239-321-0.018 | 239 | 254 | 321 | C5 |
| 200 | R15-10B1-FSW-289-371-0.018 | 289 | 304 | 371 | C5 |
| 250 | R15-10B1-FSW-339-421-0.018 | 339 | 354 | 421 | C5 |
| 300 | R15-10B1-FSW-389-471-0.018 | 389 | 404 | 471 | C5 |
| 350 | R15-10B1-FSW-439-521-0.018 | 439 | 454 | 521 | C5 |
| 400 | R15-10B1-FSW-489-571-0.018 | 489 | 504 | 571 | C5 |
| 450 | R15-10B1-FSW-539-621-0.018 | 539 | 554 | 621 | C5 |
| 500 | R15-10B1-FSW-589-671-0.018 | 589 | 604 | 671 | C5 |
| 550 | R15-10B1-FSW-639-721-0.018 | 639 | 654 | 721 | C5 |
| 600 | R15-10B1-FSW-689-771-0.018 | 689 | 704 | 771 | C5 |
| 700 | R15-10B1-FSW-789-871-0.018 | 789 | 804 | 871 | C5 |
| 800 | R15-10B1-FSW-889-971-0.018 | 889 | 904 | 971 | C5 |
| 1000 | R15-10B1-FSW-1089-1171-0.018 | 1089 | 1104 | 1171 | C5 |

FSW Type (SHAFT OD 16, LEAD 5) ◀ Standard



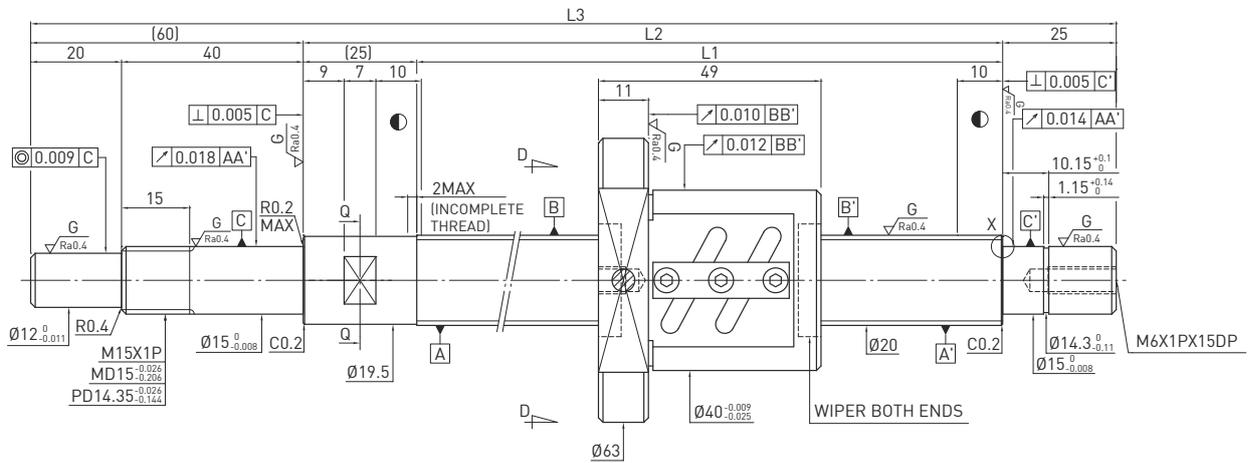
| Ball screw Data | |
|----------------------|----------------------|
| Direction | Right Hand |
| Lead (mm) | 5 |
| Lead Angle | 5.48° |
| P.C.D (mm) | 16.6 |
| Screw P.C.D (mm) | 16.2 |
| RD (mm) | 13.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 481 763 |
| Static Load Co (kgf) | 700 1399 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.15~0.8 0.2MAX |
| Spacer Ball | 1 : 1 - |



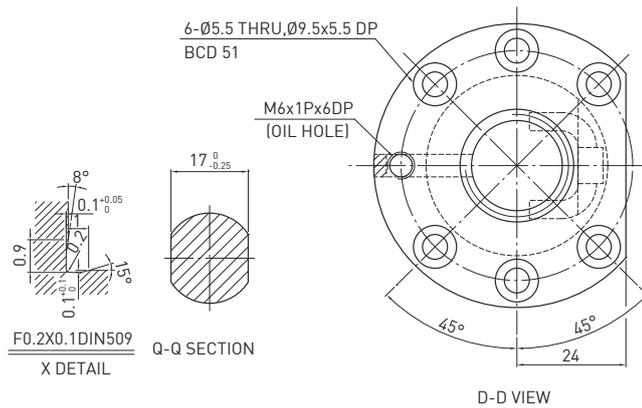
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 100 | R16-5B1-FSW-189-271-0.018 | 189 | 204 | 271 | C5 |
| 200 | R16-5B1-FSW-289-371-0.018 | 289 | 304 | 371 | C5 |
| 300 | R16-5B1-FSW-389-471-0.018 | 389 | 404 | 471 | C5 |
| 400 | R16-5B1-FSW-489-571-0.018 | 489 | 504 | 571 | C5 |
| 600 | R16-5B1-FSW-689-771-0.018 | 689 | 704 | 771 | C5 |
| 800 | R16-5B1-FSW-889-971-0.018 | 889 | 904 | 971 | C5 |

FSW Type (SHAFT OD 20, LEAD 4) ◀ Standard



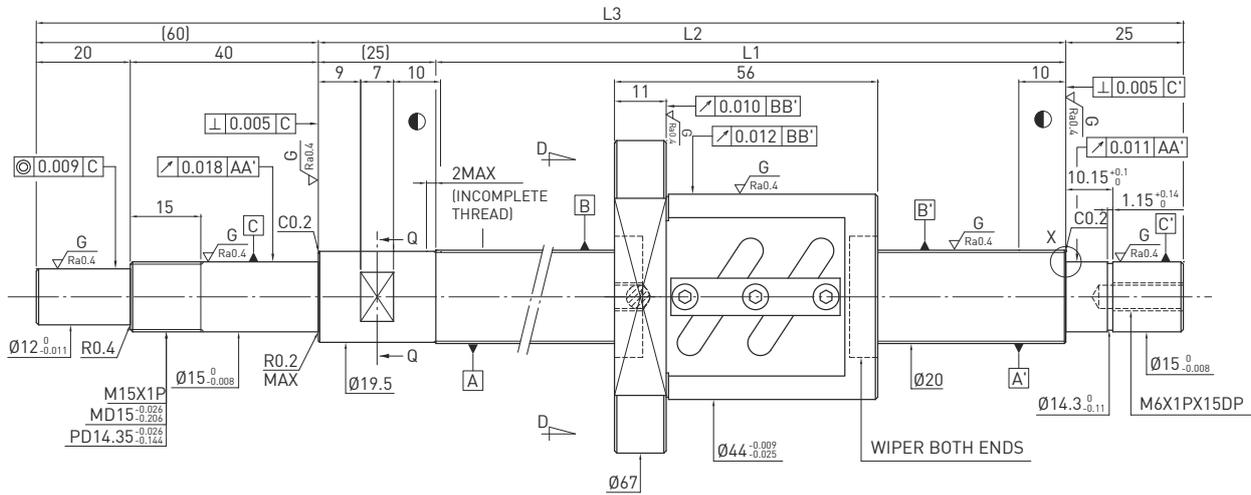
| Ballscrew Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 4 |
| Lead Angle | 3.6° |
| P.C.D (mm) | 20.25 |
| Screw P.C.D (mm) | 20.25 |
| RD (mm) | 17.792 |
| Steel Ball (mm) | Ø2.381 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 561 |
| Static Load Co (kgf) | 1085 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 0.12-0.68 |
| Spacer Ball | 1 : 1 |



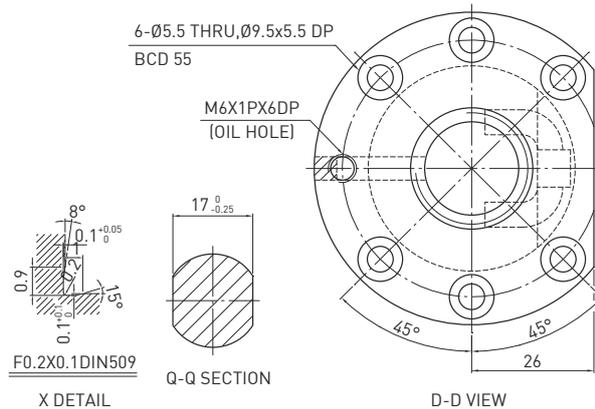
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 150 | R20-4B2-FSW-225-335-0.018 | 225 | 250 | 335 | C5 |
| 200 | R20-4B2-FSW-275-385-0.018 | 275 | 300 | 385 | C5 |
| 300 | R20-4B2-FSW-375-485-0.018 | 375 | 400 | 485 | C5 |
| 400 | R20-4B2-FSW-475-585-0.018 | 475 | 500 | 585 | C5 |
| 500 | R20-4B2-FSW-575-685-0.018 | 575 | 600 | 685 | C5 |
| 600 | R20-4B2-FSW-675-785-0.018 | 675 | 700 | 785 | C5 |

FSW Type (SHAFT OD 20, LEAD 5) ◀ Standard



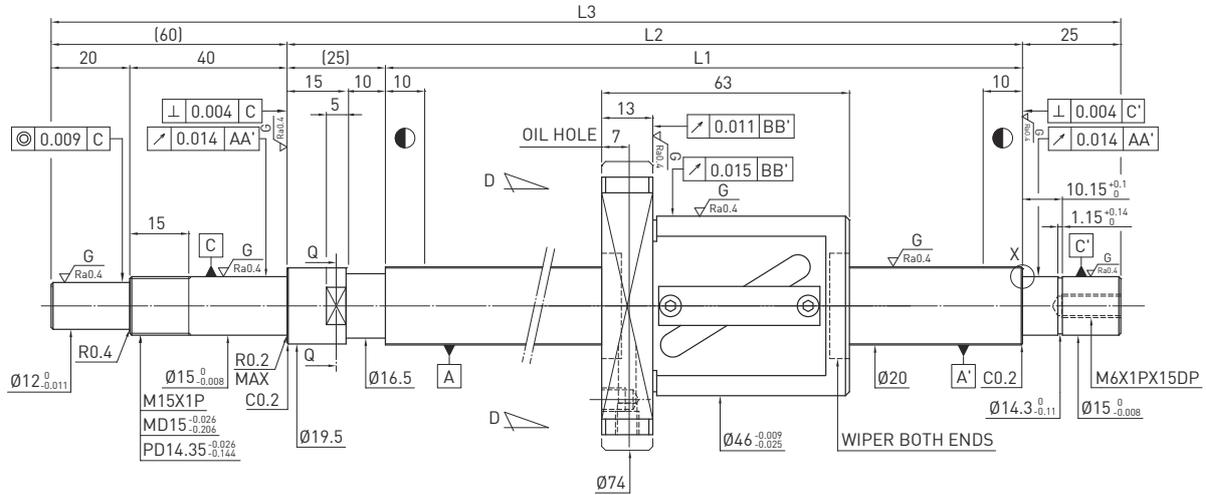
| Ballscrew Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 5 |
| Lead Angle | 4.42° |
| P.C.D (mm) | 20.6 |
| Screw P.C.D (mm) | 20.6 |
| RD (mm) | 17.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 952 |
| Static Load Co (kgf) | 1732 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 0.28-1.32 |
| Spacer Ball | 1 : 1 |



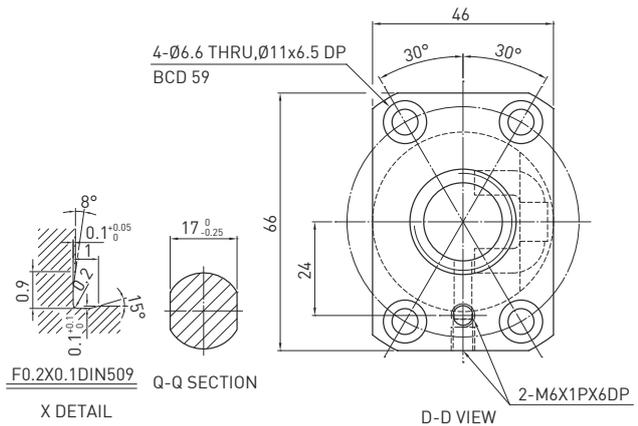
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 150 | R20-5B2-FSW-225-335-0.018 | 225 | 250 | 335 | C5 |
| 200 | R20-5B2-FSW-275-385-0.018 | 275 | 300 | 385 | C5 |
| 300 | R20-5B2-FSW-375-485-0.018 | 375 | 400 | 485 | C5 |
| 400 | R20-5B2-FSW-475-585-0.018 | 475 | 500 | 585 | C5 |
| 500 | R20-5B2-FSW-575-685-0.018 | 575 | 600 | 685 | C5 |
| 700 | R20-5B2-FSW-775-885-0.018 | 775 | 800 | 885 | C5 |

FSW Type (SHAFT OD 20, LEAD 20) ◀ Standard



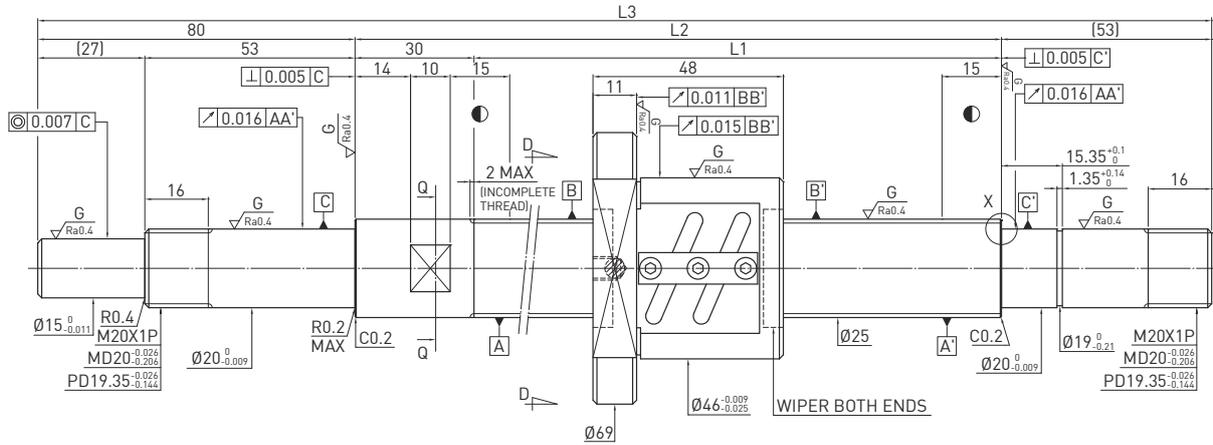
| Ball screw Data | |
|----------------------|----------------------|
| Direction | Right Hand |
| Lead (mm) | 20 |
| Lead Angle | 17.01° |
| P.C.D (mm) | 20.8 |
| Screw P.C.D (mm) | 20.8 |
| RD (mm) | 16.744 |
| Steel Ball (mm) | Ø3.969 |
| Circuits | 1.5x1 |
| Dynamic Load C (kgf) | 453 719 |
| Static Load Co (kgf) | 641 1280 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.2~1.2 0.3 MAX |
| Spacer Ball | 1 : 1 - |



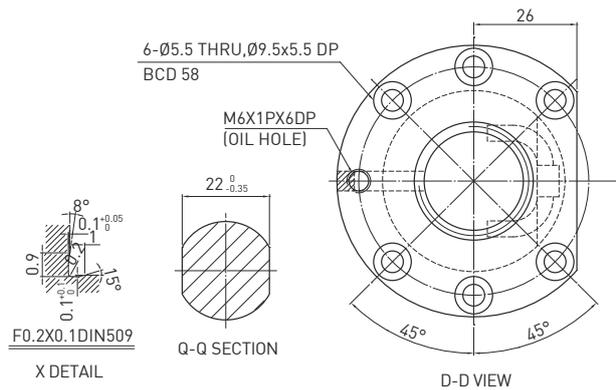
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 200 | R20-20A1-FSW-310-420-0.018 | 310 | 335 | 420 | C5 |
| 300 | R20-20A1-FSW-410-520-0.018 | 410 | 435 | 520 | C5 |
| 400 | R20-20A1-FSW-510-620-0.018 | 510 | 535 | 620 | C5 |
| 500 | R20-20A1-FSW-610-720-0.018 | 610 | 635 | 720 | C5 |
| 600 | R20-20A1-FSW-710-820-0.018 | 710 | 735 | 820 | C5 |
| 700 | R20-20A1-FSW-810-920-0.018 | 810 | 835 | 920 | C5 |
| 800 | R20-20A1-FSW-910-1020-0.018 | 910 | 935 | 1020 | C5 |
| 900 | R20-20A1-FSW-1010-1120-0.018 | 1010 | 1035 | 1120 | C5 |
| 1000 | R20-20A1-FSW-1110-1220-0.018 | 1110 | 1135 | 1220 | C5 |
| 1100 | R20-20A1-FSW-1210-1320-0.018 | 1210 | 1235 | 1320 | C5 |
| 1400 | R20-20A1-FSW-1510-1620-0.018 | 1510 | 1535 | 1620 | C5 |

FSW Type (SHAFT OD 25, LEAD 4) ◀ Standard



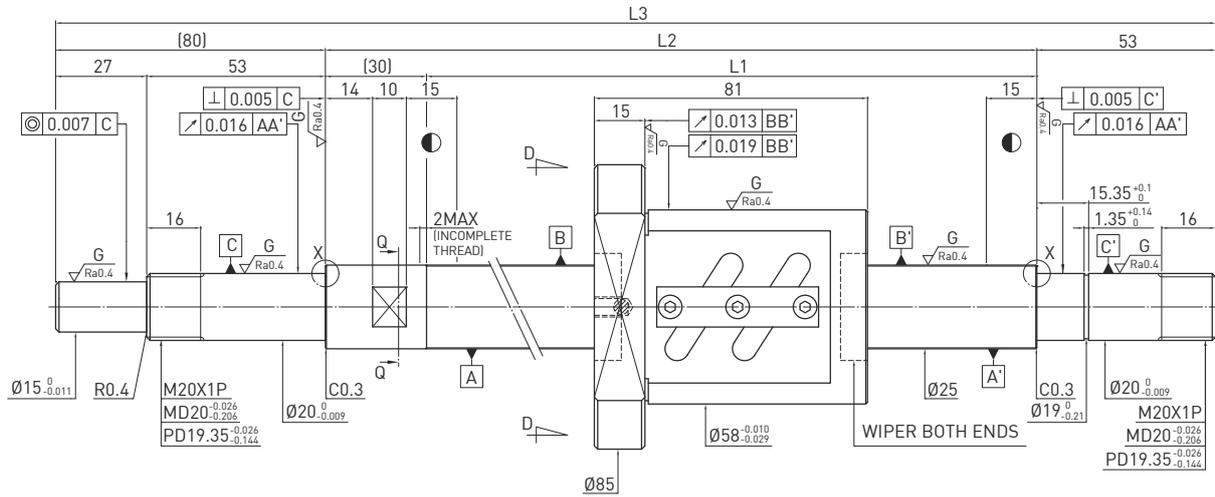
| Ballscrew Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 4 |
| Lead Angle | 2.89° |
| P.C.D (mm) | 25.25 |
| Screw P.C.D (mm) | 25.25 |
| RD (mm) | 22.792 |
| Steel Ball (mm) | Ø2.381 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 988 |
| Static Load Co (kgf) | 2752 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 0.15-0.85 |
| Spacer Ball | 1 : 1 |



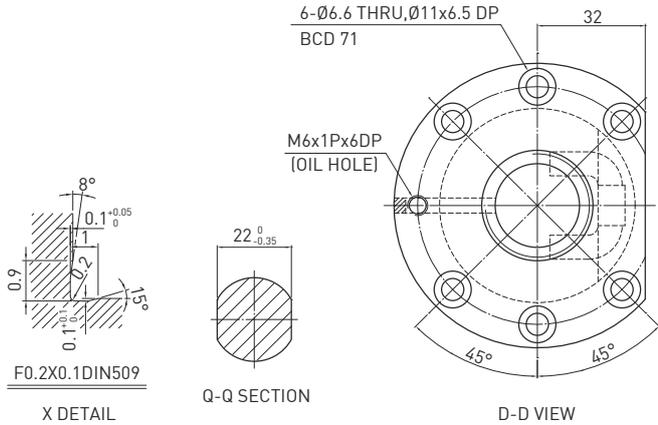
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 150 | R25-4B2-FSW-220-383-0.018 | 220 | 250 | 383 | 5 |
| 200 | R25-4B2-FSW-270-433-0.018 | 270 | 300 | 433 | 5 |
| 300 | R25-4B2-FSW-370-533-0.018 | 370 | 400 | 533 | 5 |
| 400 | R25-4B2-FSW-470-633-0.018 | 470 | 500 | 633 | 5 |
| 500 | R25-4B2-FSW-570-733-0.018 | 570 | 600 | 733 | 5 |
| 700 | R25-4B2-FSW-770-933-0.018 | 770 | 800 | 933 | 5 |

FSW Type (SHAFT OD 25, LEAD 10) ◀ Standard



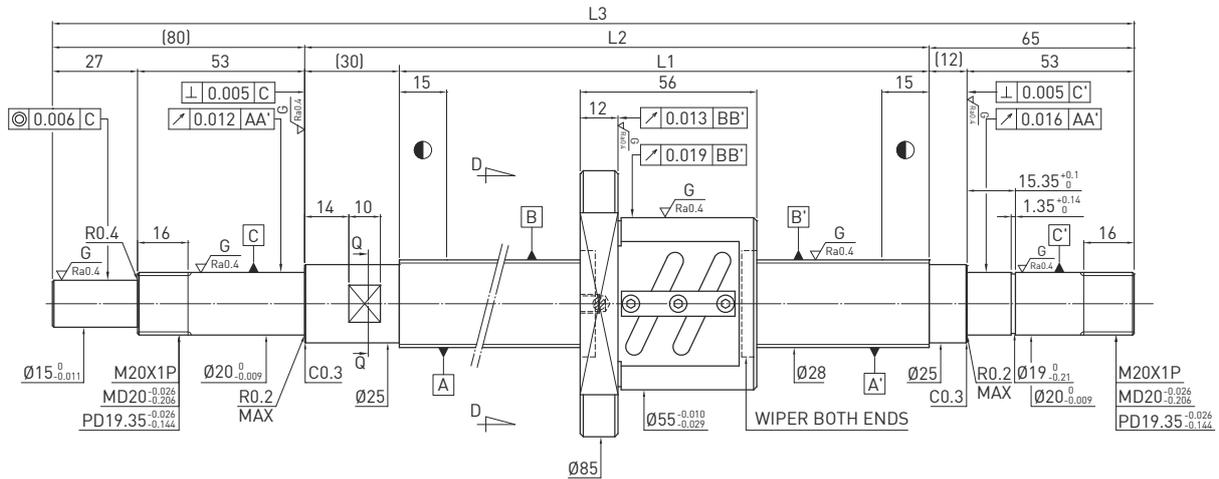
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 10.98° |
| P.C.D (mm) | 26 |
| Screw P.C.D (mm) | 26 |
| RD (mm) | 21.132 |
| Steel Ball (mm) | Ø4.763 |
| Circuits | 1.5x2 |
| Dynamic Load C (kgf) | 1164 |
| Static Load Co (kgf) | 1927 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 0.42~2.4 |
| Spacer Ball | 1 : 1 |



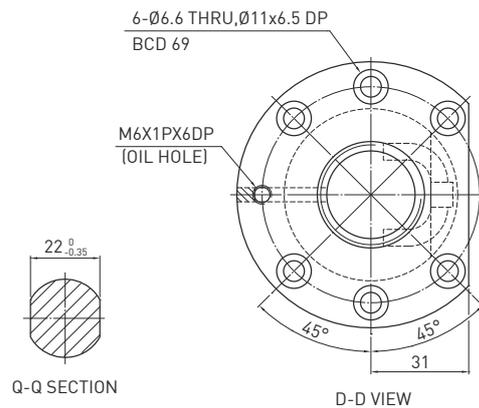
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 250 | R25-10A2-FSW-370-533-0.018 | 370 | 400 | 533 | C5 |
| 450 | R25-10A2-FSW-570-733-0.018 | 570 | 600 | 733 | C5 |
| 650 | R25-10A2-FSW-770-933-0.018 | 770 | 800 | 933 | C5 |
| 850 | R25-10A2-FSW-970-1133-0.018 | 970 | 1000 | 1133 | C5 |
| 1050 | R25-10A2-FSW-1170-1333-0.018 | 1170 | 1200 | 1333 | C5 |
| 1350 | R25-10A2-FSW-1470-1633-0.018 | 1470 | 1500 | 1633 | C5 |

FSW Type (SHAFT OD 28, LEAD 5) ◀ Standard



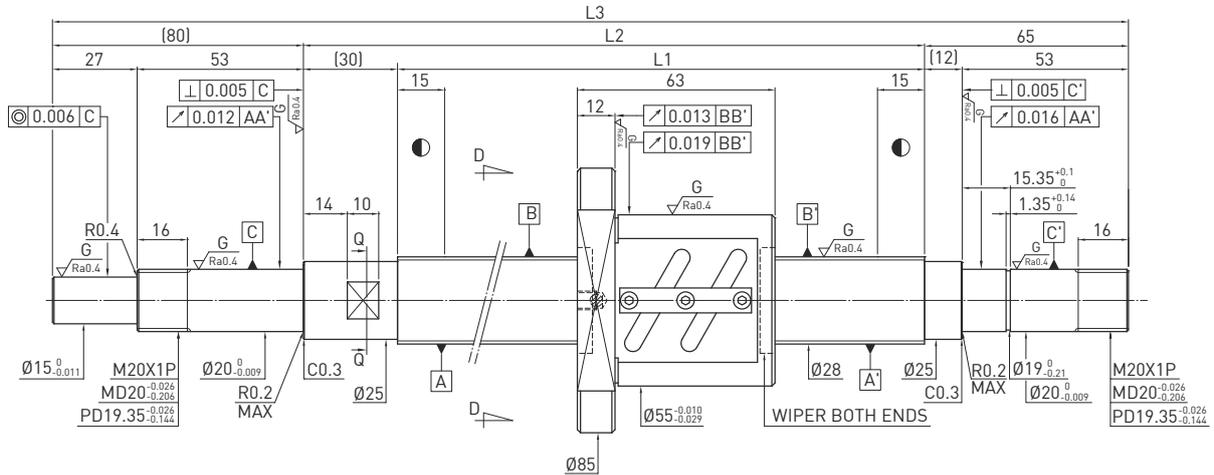
| Ballscrew Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 5 |
| Lead Angle | 3.19° |
| P.C.D (mm) | 28.6 |
| Screw P.C.D (mm) | 28.6 |
| RD (mm) | 25.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 1124 |
| Static Load Co (kgf) | 2466 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 0.3-1.7 |
| Spacer Ball | 1 : 1 |



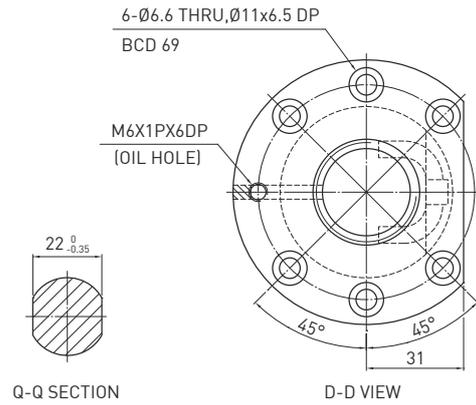
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-----------------------------|------|------|------|----------------|
| 200 | R28-5B2-FSW-270-445-0.018 | 270 | 300 | 445 | C5 |
| 300 | R28-5B2-FSW-370-545-0.018 | 370 | 400 | 545 | C5 |
| 400 | R28-5B2-FSW-470-645-0.018 | 470 | 500 | 645 | C5 |
| 450 | R28-5B2-FSW-558-733-0.018 | 558 | 588 | 733 | C5 |
| 650 | R28-5B2-FSW-758-933-0.018 | 758 | 788 | 933 | C5 |
| 850 | R28-5B2-FSW-958-1133-0.018 | 958 | 988 | 1133 | C5 |
| 1050 | R28-5B2-FSW-1158-1333-0.018 | 1158 | 1188 | 1333 | C5 |

FSW Type (SHAFT OD 28, LEAD 6) ◀ Standard



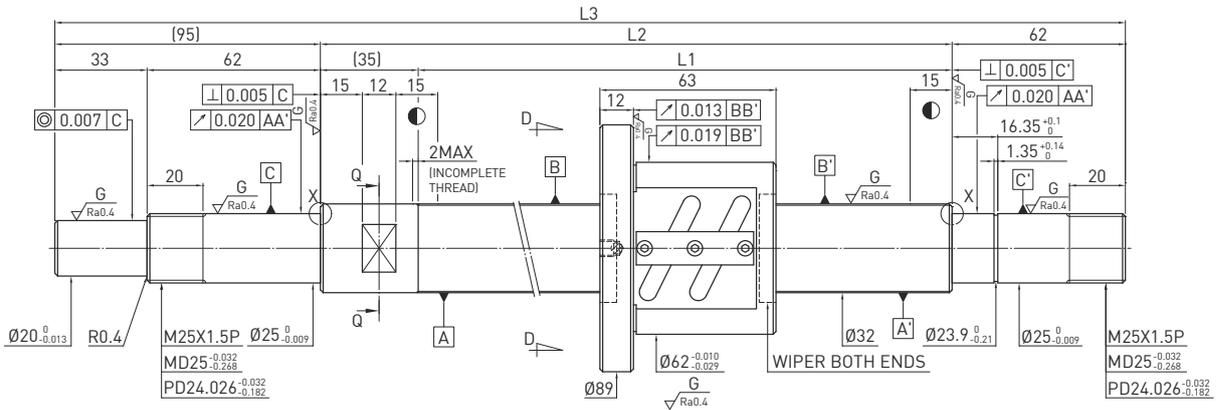
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 6 |
| Lead Angle | 3.82° |
| P.C.D (mm) | 28.6 |
| Screw P.C.D (mm) | 28.6 |
| RD (mm) | 25.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 1124 |
| Static Load Co (kgf) | 2466 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 0.36~2.04 |
| Spacer Ball | 1 : 1 |



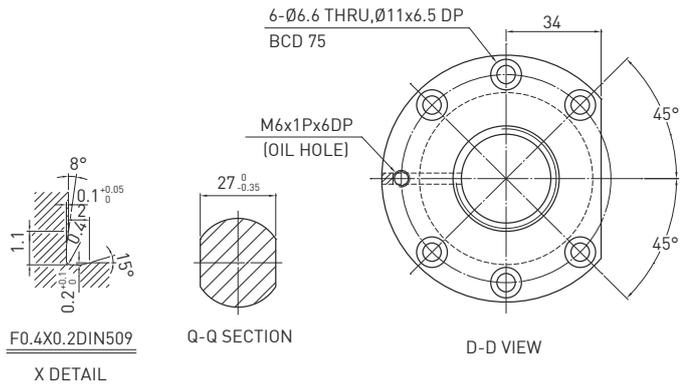
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-----------------------------|------|------|------|----------------|
| 250 | R28-6B2-FSW-370-545-0.018 | 370 | 400 | 545 | C5 |
| 450 | R28-6B2-FSW-570-745-0.018 | 570 | 600 | 745 | C5 |
| 650 | R28-6B2-FSW-758-933-0.018 | 758 | 788 | 933 | C5 |
| 850 | R28-6B2-FSW-958-1133-0.018 | 958 | 988 | 1133 | C5 |
| 1050 | R28-6B2-FSW-1158-1333-0.018 | 1158 | 1188 | 1333 | C5 |

FSW Type (SHAFT OD 32, LEAD 6) ◀ Standard



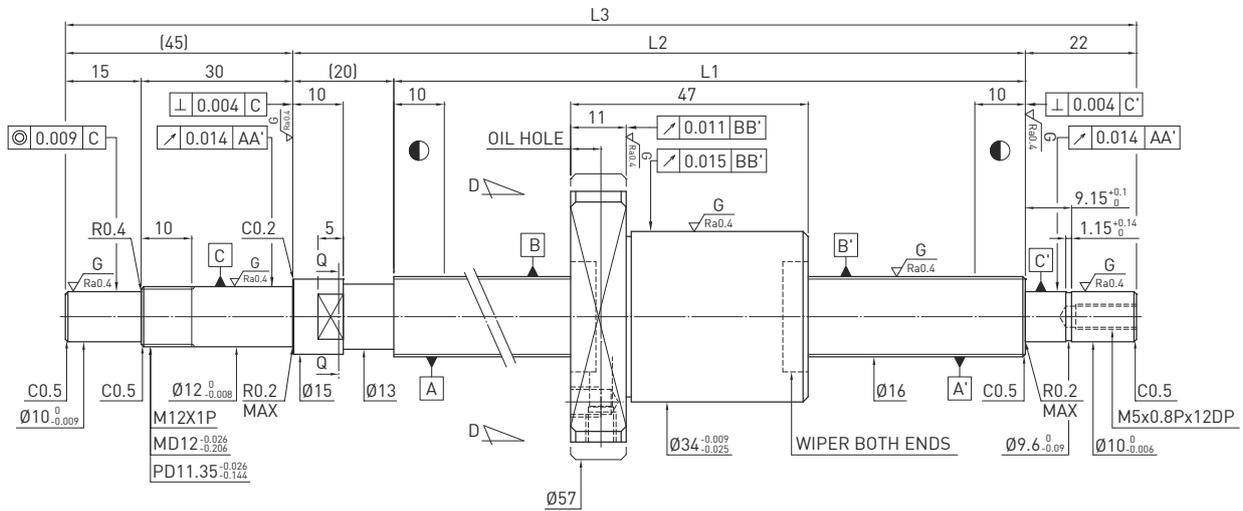
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 6 |
| Lead Angle | 3.33° |
| P.C.D (mm) | 32.8 |
| Screw P.C.D (mm) | 32.8 |
| RD (mm) | 28.744 |
| Steel Ball (mm) | Ø3.969 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 1610 |
| Static Load Co (kgf) | 3510 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 0.48-2.72 |
| Spacer Ball | 1 : 1 |



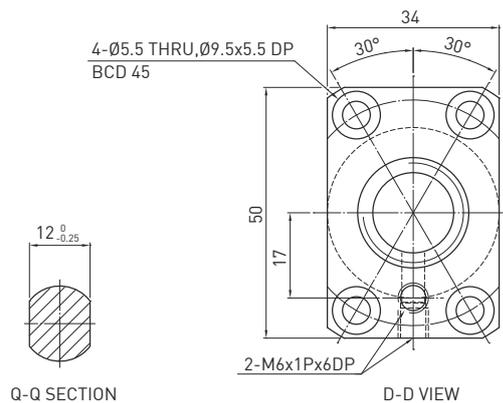
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-----------------------------|------|------|------|----------------|
| 250 | R32-6B2-FSW-365-557-0.018 | 365 | 400 | 557 | C5 |
| 450 | R32-6B2-FSW-565-757-0.018 | 565 | 600 | 757 | C5 |
| 650 | R32-6B2-FSW-765-957-0.018 | 765 | 800 | 957 | C5 |
| 850 | R32-6B2-FSW-965-1157-0.018 | 965 | 1000 | 1157 | C5 |
| 1050 | R32-6B2-FSW-1165-1357-0.018 | 1165 | 1200 | 1357 | C5 |
| 1350 | R32-6B2-FSW-1465-1657-0.018 | 1465 | 1500 | 1657 | C5 |

FSC Type (SHAFT OD 16, LEAD 16) ◀ Standard



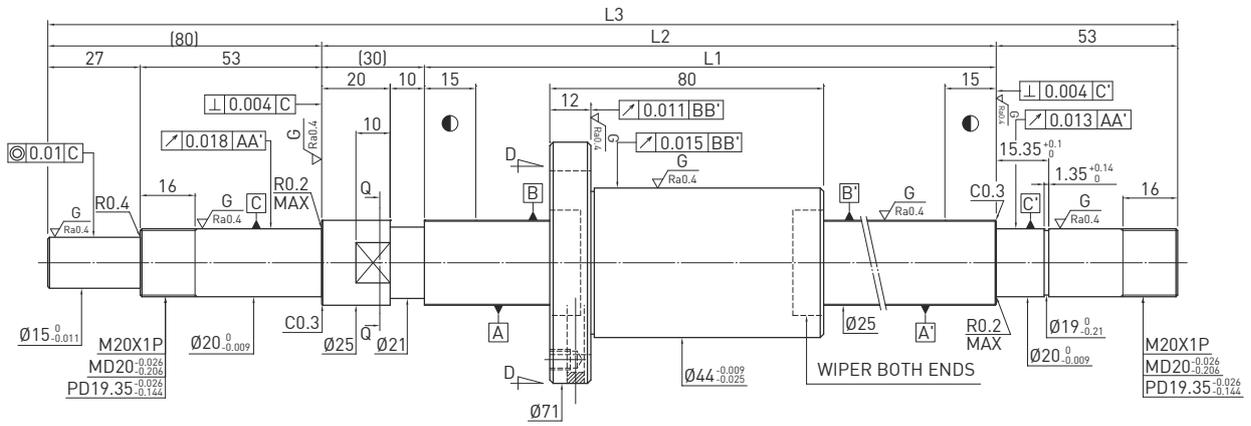
| Ball screw Data | | |
|----------------------|------------|-----------|
| Direction | Right Hand | |
| Lead (mm) | 16 | |
| Lead Angle | 17.06° | |
| P.C.D (mm) | 16.6 | |
| Screw P.C.D (mm) | 16.6 | |
| RD (mm) | 13.324 | |
| Steel Ball (mm) | Ø3.175 | |
| Circuits | 2 | |
| Dynamic Load C (kgf) | 420 | 680 |
| Static Load Co (kgf) | 690 | 1385 |
| Axial Play (mm) | 0 | 0.005 MAX |
| Drag Torque (kgf-cm) | 0.15-0.79 | 0.24 MAX |
| Spacer Ball | 1 : 1 | - |



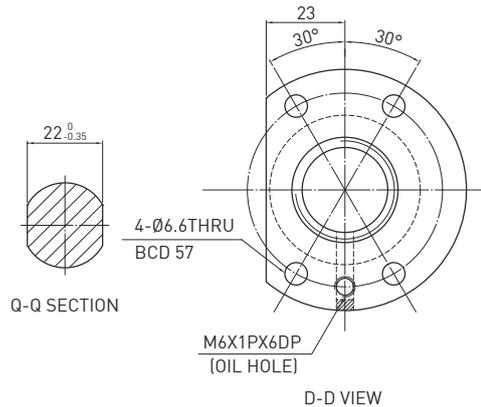
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 100 | R16-16K2-FSC-184-271-0.018 | 184 | 204 | 271 | C5 |
| 150 | R16-16K2-FSC-234-321-0.018 | 234 | 254 | 321 | C5 |
| 200 | R16-16K2-FSC-284-371-0.018 | 284 | 304 | 371 | C5 |
| 250 | R16-16K2-FSC-334-421-0.018 | 334 | 354 | 421 | C5 |
| 300 | R16-16K2-FSC-384-471-0.018 | 384 | 404 | 471 | C5 |
| 350 | R16-16K2-FSC-434-521-0.018 | 434 | 454 | 521 | C5 |
| 400 | R16-16K2-FSC-484-571-0.018 | 484 | 504 | 571 | C5 |
| 450 | R16-16K2-FSC-534-621-0.018 | 534 | 554 | 621 | C5 |
| 500 | R16-16K2-FSC-584-671-0.018 | 584 | 604 | 671 | C5 |
| 550 | R16-16K2-FSC-634-721-0.018 | 634 | 654 | 721 | C5 |
| 600 | R16-16K2-FSC-684-771-0.018 | 684 | 704 | 771 | C5 |
| 700 | R16-16K2-FSC-784-871-0.018 | 784 | 804 | 871 | C5 |
| 800 | R16-16K2-FSC-884-971-0.018 | 884 | 904 | 971 | C5 |
| 1000 | R16-16K2-FSC-1084-1171-0.018 | 1084 | 1104 | 1171 | C5 |

FSC Type (SHAFT OD 25, LEAD 20) ◀ Standard



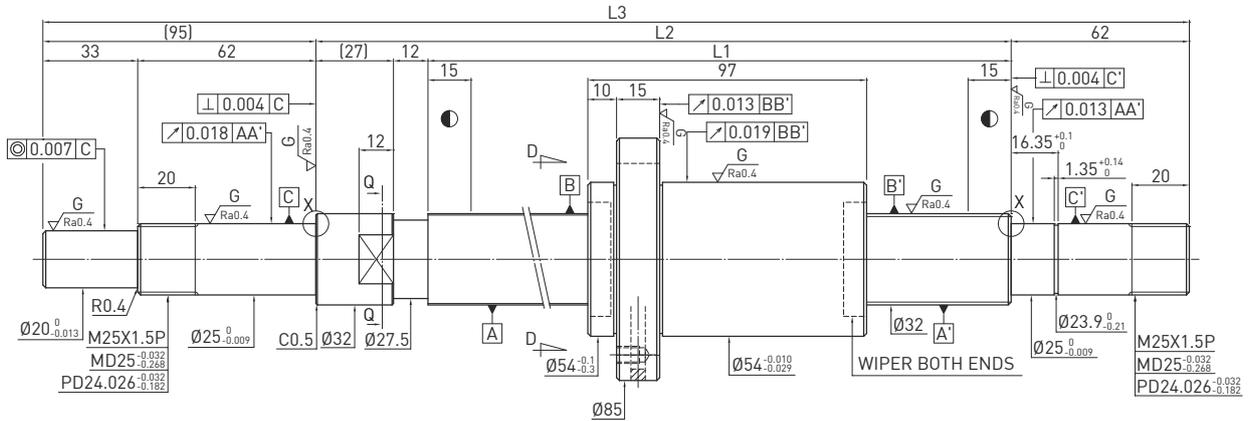
| Ball screw Data | |
|----------------------|----------------------|
| Direction | Right Hand |
| Lead (mm) | 20 |
| Lead Angle | 13.97° |
| P.C.D (mm) | 25.6 |
| Screw P.C.D (mm) | 25.6 |
| RD (mm) | 22.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 3 |
| Dynamic Load C (kgf) | 790 1260 |
| Static Load Co (kgf) | 1715 3430 |
| Axial Play (mm) | 0 0.005 MAX |
| Drag Torque (kgf-cm) | 0.4-2.5 0.5 MAX |
| Spacer Ball | 1 : 1 - |



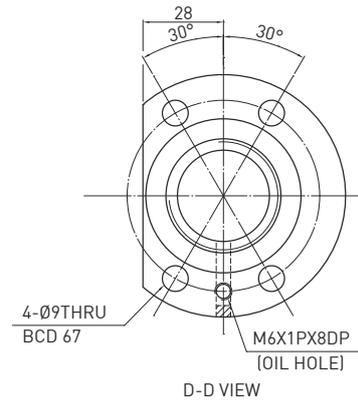
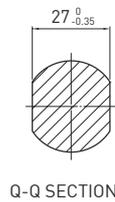
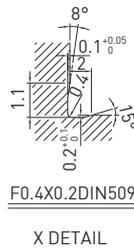
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|--------------------------------|------|------|------|----------------|
| 600 | R25-20K3-FSC- 750- 913-0.018 | 750 | 780 | 913 | C5 |
| 800 | R25-20K3-FSC- 950- 1113-0.018 | 950 | 980 | 1113 | C5 |
| 1000 | R25-20K3-FSC- 1150- 1313-0.018 | 1150 | 1180 | 1313 | C5 |
| 1200 | R25-20K3-FSC- 1350- 1513-0.018 | 1350 | 1380 | 1513 | C5 |
| 1400 | R25-20K3-FSC- 1550- 1713-0.018 | 1550 | 1580 | 1713 | C5 |
| 1600 | R25-20K3-FSC- 1750- 1913-0.018 | 1750 | 1780 | 1913 | C5 |
| 2000 | R25-20K3-FSC- 2150- 2313-0.018 | 2150 | 2180 | 2313 | C5 |

FSC Type (SHAFT OD 32, LEAD 25) ◀ Standard



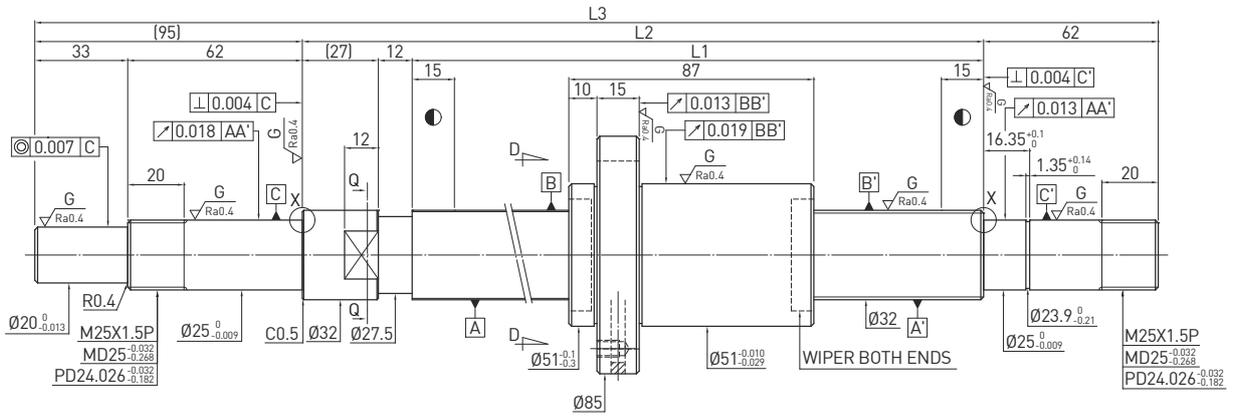
| Ball screw Data | | |
|----------------------|------------|----------|
| Direction | Right Hand | |
| Lead (mm) | 25 | |
| Lead Angle | 13.56° | |
| P.C.D (mm) | 33 | |
| Screw P.C.D (mm) | 33 | |
| RD (mm) | 28.132 | |
| Steel Ball (mm) | Ø4.763 | |
| Circuits | 3 | |
| Dynamic Load C (kgf) | 1980 | 3150 |
| Static Load Co (kgf) | 4410 | 8820 |
| Axial Play (mm) | 0 | 0.005MAX |
| Drag Torque (kgf-cm) | 0.69-3.21 | 0.8MAX |
| Spacer Ball | 1 : 1 | - |



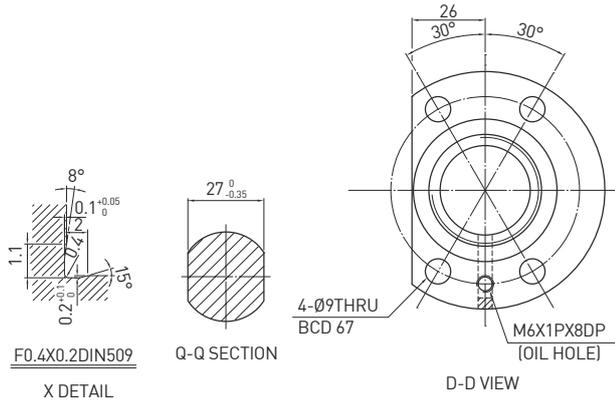
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 1000 | R32-25K3-FSC-1180-1376-0.018 | 1180 | 1219 | 1376 | C5 |
| 1500 | R32-25K3-FSC-1680-1876-0.018 | 1680 | 1719 | 1876 | C5 |
| 2000 | R32-25K3-FSC-2180-2376-0.018 | 2180 | 2219 | 2376 | C5 |
| 2600 | R32-25K3-FSC-2780-2976-0.018 | 2780 | 2819 | 2976 | C5 |

FSC Type (SHAFT OD 32, LEAD 32) ◀ Standard



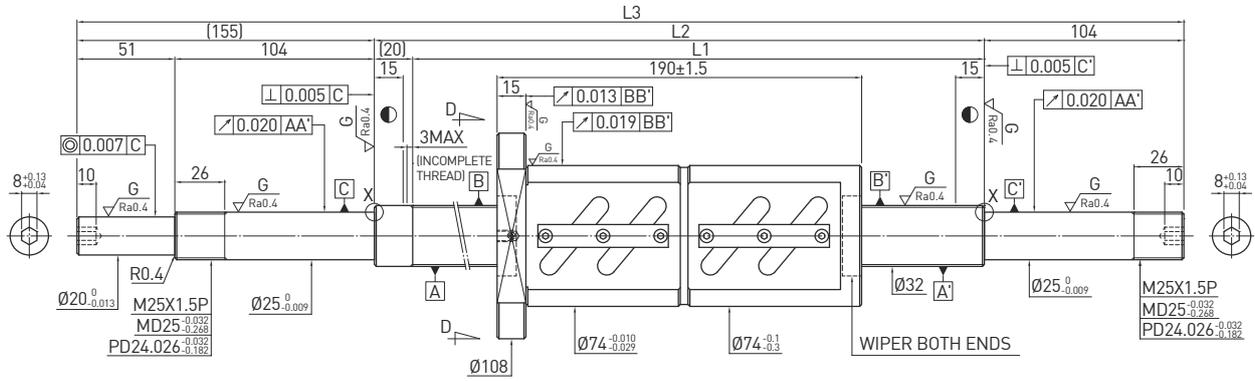
| Ballscrew Data | | |
|----------------------|------------|----------|
| Direction | Right Hand | |
| Lead (mm) | 32 | |
| Lead Angle | 17.25° | |
| P.C.D (mm) | 32.8 | |
| Screw P.C.D (mm) | 32.8 | |
| RD (mm) | 28.744 | |
| Steel Ball (mm) | Ø3.969 | |
| Circuits | 2 | |
| Dynamic Load C (kgf) | 800 | 1280 |
| Static Load Co (kgf) | 1765 | 3530 |
| Axial Play (mm) | 0 | 0.005MAX |
| Drag Torque (kgf-cm) | 0.7-3.21 | 0.8MAX |
| Spacer Ball | 1 : 1 | - |



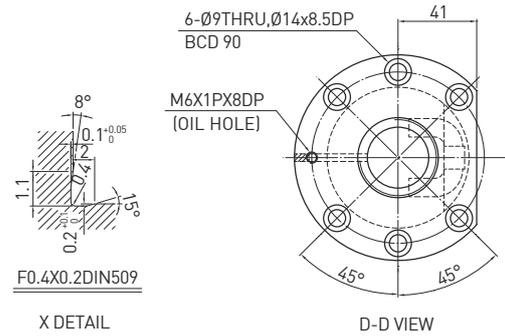
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 1000 | R32-32K2-FSC-1180-1376-0.018 | 1180 | 1219 | 1376 | C5 |
| 1500 | R32-32K2-FSC-1680-1876-0.018 | 1680 | 1719 | 1876 | C5 |
| 2000 | R32-32K2-FSC-2180-2376-0.018 | 2180 | 2219 | 2376 | C5 |
| 2600 | R32-32K2-FSC-2780-2976-0.018 | 2780 | 2819 | 2976 | C5 |

FDW Type (SHAFT OD 32, LEAD 10) ◀ Standard



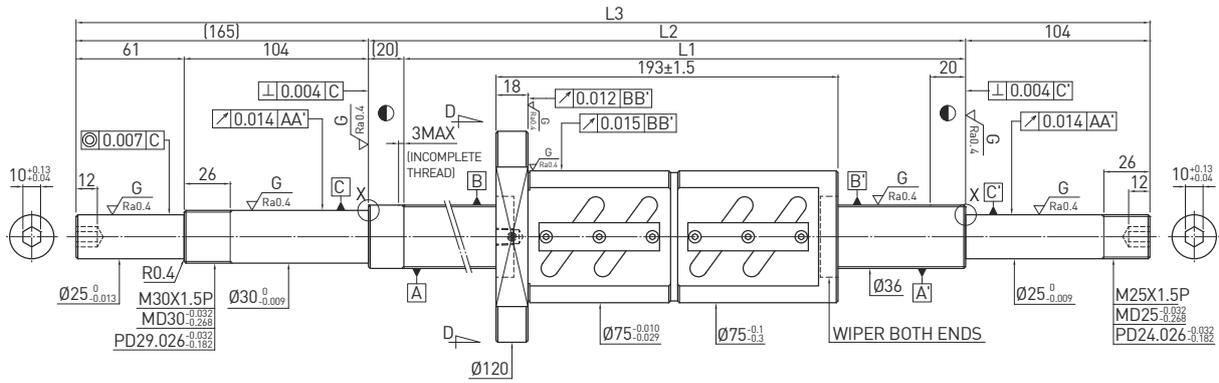
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 5.44° |
| P.C.D (mm) | 33.4 |
| Screw P.C.D (mm) | 33.4 |
| RD (mm) | 26.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 4810 |
| Static Load Co (kgf) | 11199 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 5.51-11.43 |
| Spacer Ball | - |



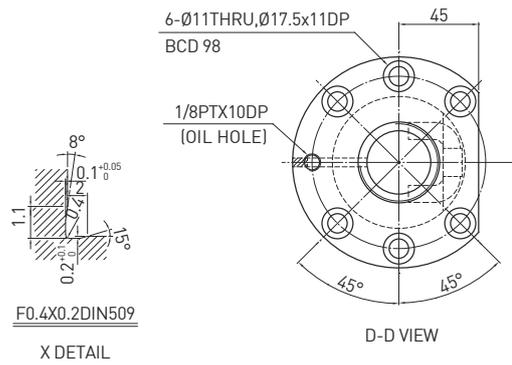
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 150 | R32-10B2-FDW-380-659-0.018 | 380 | 400 | 659 | C5 |
| 250 | R32-10B2-FDW-480-759-0.018 | 480 | 500 | 759 | C5 |
| 350 | R32-10B2-FDW-580-859-0.018 | 580 | 600 | 859 | C5 |
| 450 | R32-10B2-FDW-680-959-0.018 | 680 | 700 | 959 | C5 |
| 550 | R32-10B2-FDW-780-1059-0.018 | 780 | 800 | 1059 | C5 |
| 750 | R32-10B2-FDW-980-1259-0.018 | 980 | 1000 | 1259 | C5 |
| 950 | R32-10B2-FDW-1180-1459-0.018 | 1180 | 1200 | 1459 | C5 |
| 1250 | R32-10B2-FDW-1480-1759-0.018 | 1480 | 1500 | 1759 | C5 |
| 1550 | R32-10B2-FDW-1780-2059-0.018 | 1780 | 1800 | 2059 | C5 |

FDW Type (SHAFT OD 36, LEAD 10) ◀ Standard



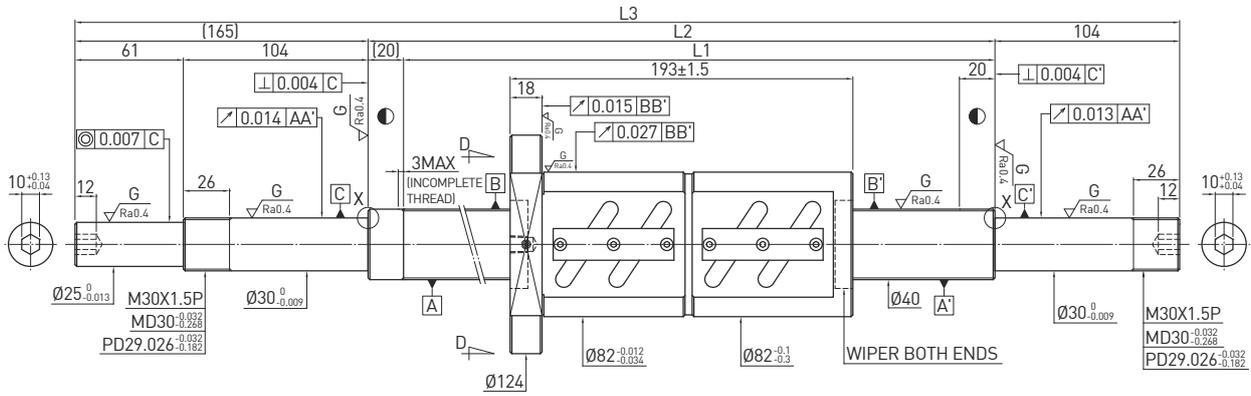
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 4.86° |
| P.C.D (mm) | 37.4 |
| Screw P.C.D (mm) | 37.4 |
| RD (mm) | 30.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 5105 |
| Static Load Co (kgf) | 12668 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 6.64~12.34 |
| Spacer Ball | - |



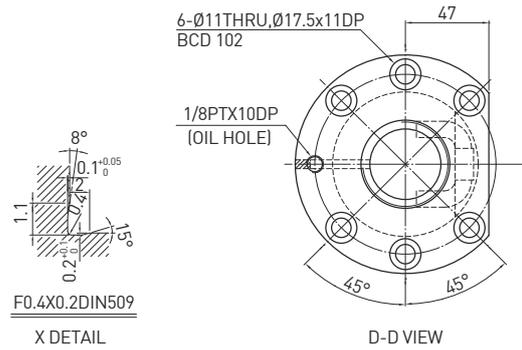
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 250 | R36-10B2-FDW-480-769-0.018 | 480 | 500 | 769 | C5 |
| 450 | R36-10B2-FDW-680-969-0.018 | 680 | 700 | 969 | C5 |
| 750 | R36-10B2-FDW-980-1269-0.018 | 980 | 1000 | 1269 | C5 |
| 1150 | R36-10B2-FDW-1380-1669-0.018 | 1380 | 1400 | 1669 | C5 |
| 1550 | R36-10B2-FDW-1780-2069-0.018 | 1780 | 1800 | 2069 | C5 |

FDW Type (SHAFT OD 40, LEAD 10) ◀ Standard



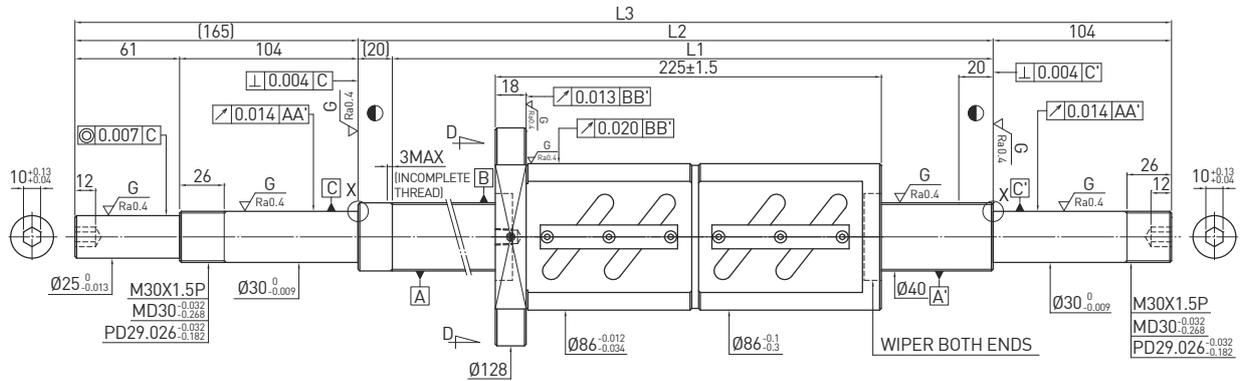
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 4.4° |
| P.C.D (mm) | 41.4 |
| Screw P.C.D (mm) | 41.4 |
| RD (mm) | 34.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 5369 |
| Static Load Co (kgf) | 14138 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 8.26-13.78 |
| Spacer Ball | - |



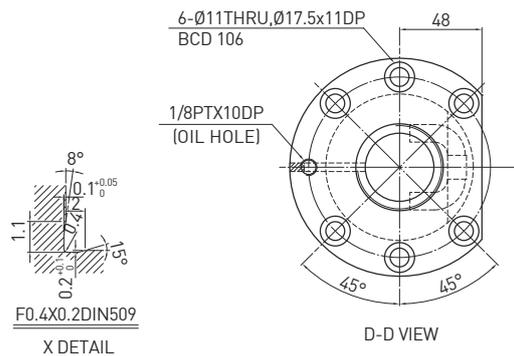
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 250 | R40-10B2-FDW-480-769-0.018 | 480 | 500 | 769 | C5 |
| 350 | R40-10B2-FDW-580-869-0.018 | 580 | 600 | 869 | C5 |
| 450 | R40-10B2-FDW-680-969-0.018 | 680 | 700 | 969 | C5 |
| 550 | R40-10B2-FDW-780-1069-0.018 | 780 | 800 | 1069 | C5 |
| 750 | R40-10B2-FDW-980-1269-0.018 | 980 | 1000 | 1269 | C5 |
| 950 | R40-10B2-FDW-1180-1469-0.018 | 1180 | 1200 | 1469 | C5 |
| 1150 | R40-10B2-FDW-1380-1669-0.018 | 1380 | 1400 | 1669 | C5 |
| 1350 | R40-10B2-FDW-1580-1869-0.018 | 1580 | 1600 | 1869 | C5 |
| 1550 | R40-10B2-FDW-1780-2069-0.018 | 1780 | 1800 | 2069 | C5 |
| 2150 | R40-10B2-FDW-2380-2669-0.018 | 2380 | 2400 | 2669 | C5 |

FDW Type (SHAFT OD 40, LEAD 12) ◀ Standard



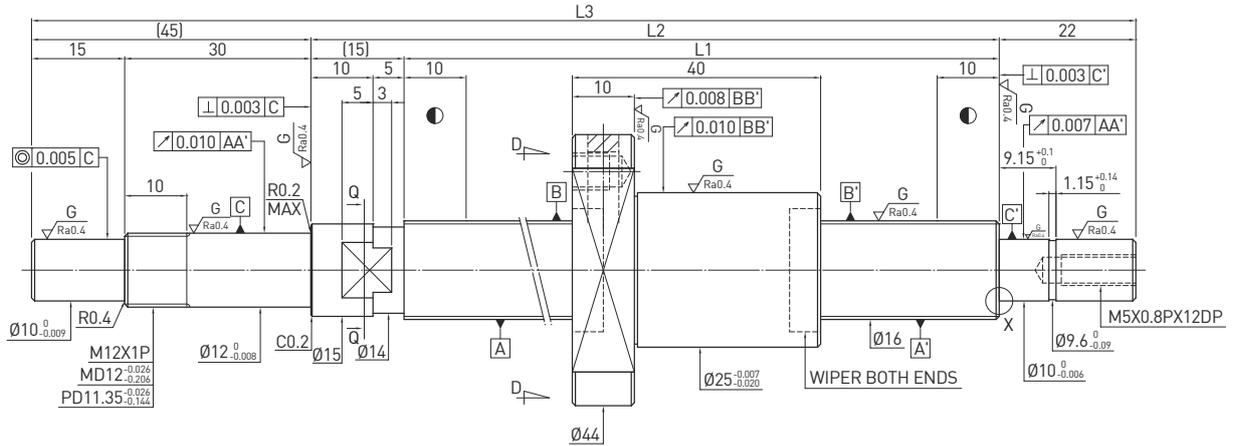
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 12 |
| Lead Angle | 5.25° |
| P.C.D (mm) | 41.6 |
| Screw P.C.D (mm) | 41.6 |
| RD (mm) | 34.299 |
| Steel Ball (mm) | Ø7.144 |
| Circuits | 2.5x2 |
| Dynamic Load C [kgf] | 6216 |
| Static Load Co [kgf] | 15614 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 9.79-18.17 |
| Spacer Ball | - |



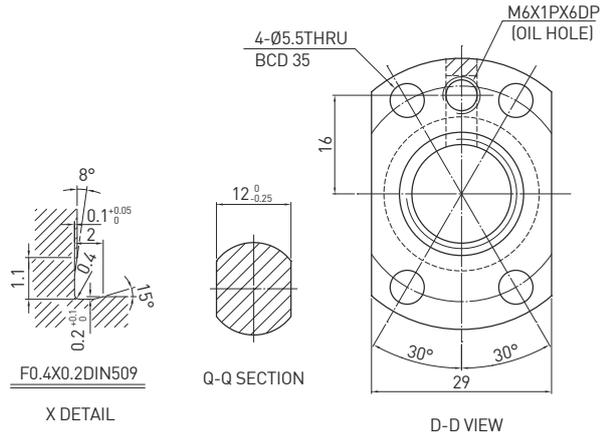
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 400 | R40-12B2-FDW-680-969-0.018 | 680 | 700 | 969 | C5 |
| 700 | R40-12B2-FDW-980-1269-0.018 | 980 | 1000 | 1269 | C5 |
| 1100 | R40-12B2-FDW-1380-1669-0.018 | 1380 | 1400 | 1669 | C5 |
| 1500 | R40-12B2-FDW-1780-2069-0.018 | 1780 | 1800 | 2069 | C5 |
| 2200 | R40-12B2-FDW-2480-2769-0.018 | 2480 | 2500 | 2769 | C5 |

FSI Type (SHAFT OD 16, LEAD 2) ◀ Standard



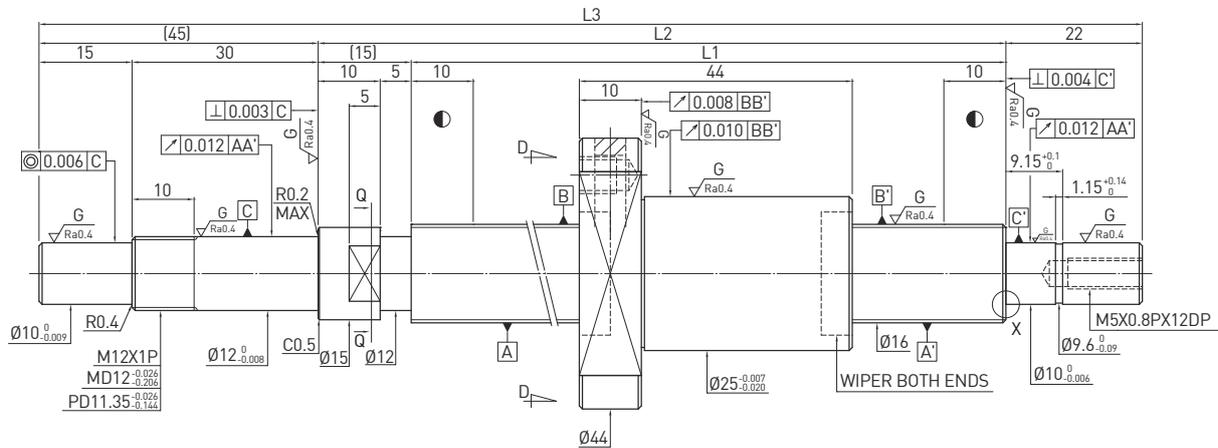
| Ball screw Data | |
|----------------------|-----------------------|
| Direction | Right Hand |
| Lead (mm) | 2 |
| Lead Angle | 2.25° |
| P.C.D (mm) | 16.2 |
| Screw P.C.D (mm) | 16.2 |
| RD (mm) | 14.652 |
| Steel Ball (mm) | Ø1.5 |
| Circuits | 1x4 |
| Dynamic Load C (kgf) | 323 |
| Static Load Co (kgf) | 790 |
| Axial Play (mm) | 0 0.005MAX |
| Drag Torque (kgf-cm) | 0.05~0.5 0.15MAX |
| Spacer Ball | - - |



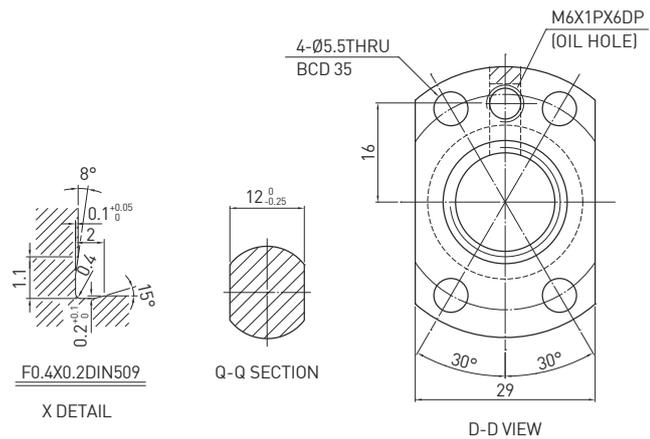
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------|-----|-----|-----|----------------|
| 50 | R16-2T4-FSI-139-221-0.008 | 139 | 154 | 221 | C3 |
| 100 | R16-2T4-FSI-189-271-0.008 | 189 | 204 | 271 | C3 |
| 150 | R16-2T4-FSI-239-321-0.008 | 239 | 254 | 321 | C3 |
| 200 | R16-2T4-FSI-289-371-0.008 | 289 | 304 | 371 | C3 |
| 300 | R16-2T4-FSI-389-471-0.008 | 389 | 404 | 471 | C3 |

FSI Type (SHAFT OD 16, LEAD 2.5) ◀ Standard



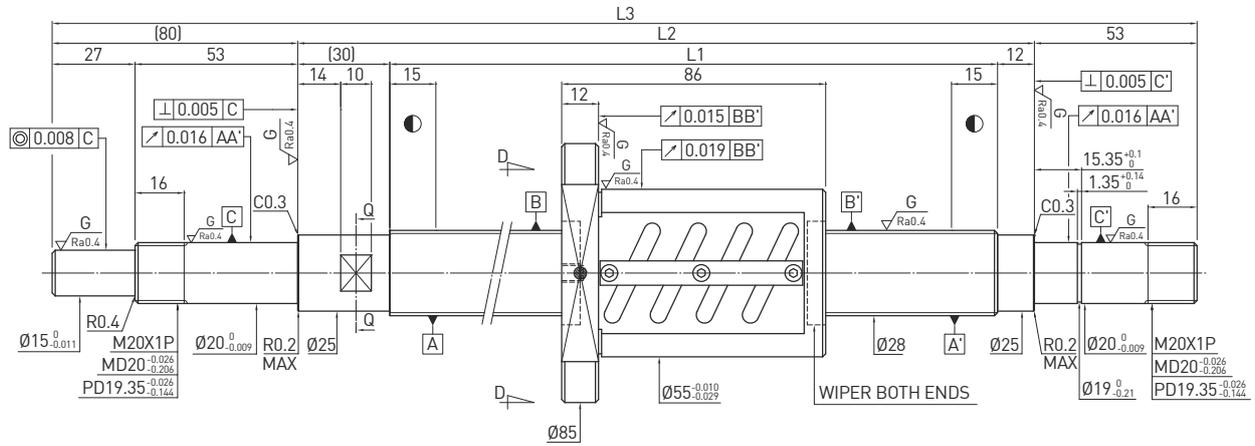
| Ballscrew Data | |
|----------------------|-----------------------|
| Direction | Right Hand |
| Lead (mm) | 2.5 |
| Lead Angle | 2.81° |
| P.C.D (mm) | 16.2 |
| Screw P.C.D (mm) | 16.2 |
| RD (mm) | 14.652 |
| Steel Ball (mm) | Ø1.5 |
| Circuits | 1x4 |
| Dynamic Load C (kgf) | 323 |
| Static Load Co (kgf) | 790 |
| Axial Play (mm) | 0 0.005MAX |
| Drag Torque (kgf-cm) | 0.05~0.5 0.15MAX |
| Spacer Ball | - - |



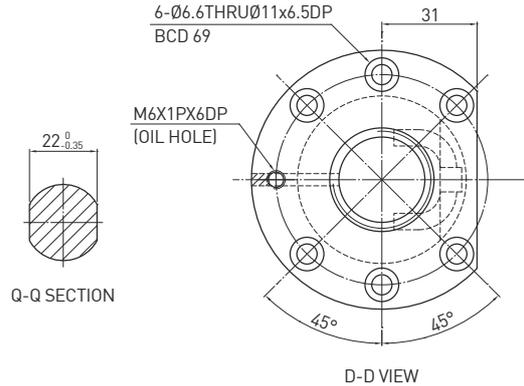
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-----------------------------|-----|-----|-----|----------------|
| 50 | R16-2.5T4-FSI-139-221-0.008 | 139 | 154 | 221 | C3 |
| 100 | R16-2.5T4-FSI-189-271-0.008 | 189 | 204 | 271 | C3 |
| 150 | R16-2.5T4-FSI-239-321-0.008 | 239 | 254 | 321 | C3 |
| 200 | R16-2.5T4-FSI-289-371-0.008 | 289 | 304 | 371 | C3 |
| 300 | R16-2.5T4-FSI-389-471-0.008 | 389 | 404 | 471 | C3 |

OFSW Type (SHAFT OD 16, LEAD 2) ◀ Standard



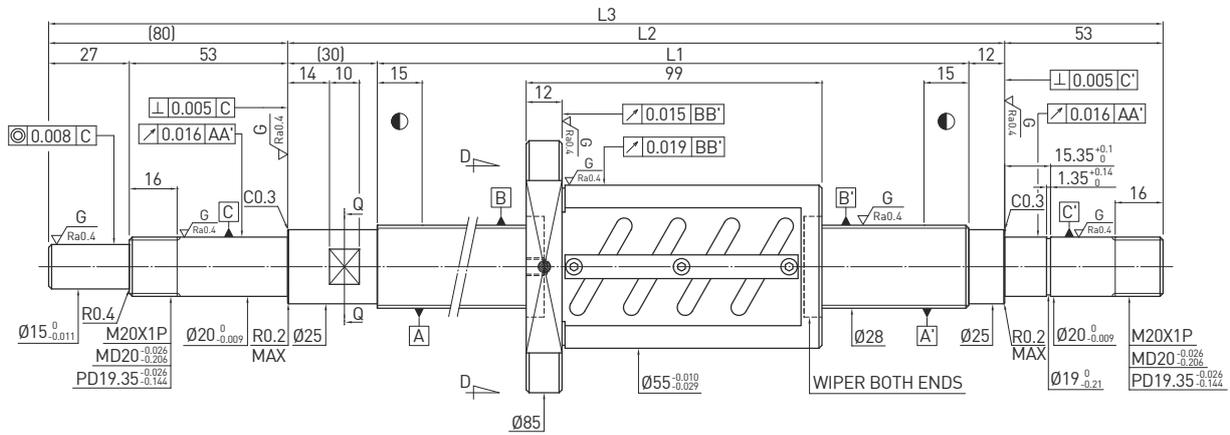
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 5 |
| Lead Angle | 3.19° |
| P.C.D (mm) | 28.6 |
| Screw P.C.D (mm) | 28.6 |
| RD (mm) | 25.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 1784 |
| Static Load Co (kgf) | 4932 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 1.1-3.3 |
| Spacer Ball | - |



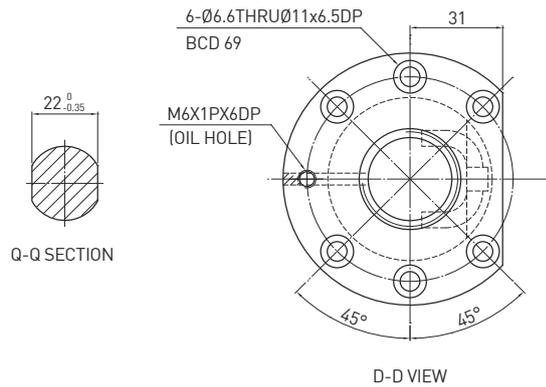
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 150 | R28-5B2-OFSW-270-445-0.018 | 270 | 312 | 445 | C5 |
| 250 | R28-5B2-OFSW-370-545-0.018 | 370 | 412 | 545 | C5 |
| 350 | R28-5B2-OFSW-470-645-0.018 | 470 | 512 | 645 | C5 |
| 450 | R28-5B2-OFSW-558-733-0.018 | 558 | 600 | 733 | C5 |
| 650 | R28-5B2-OFSW-758-933-0.018 | 758 | 800 | 933 | C5 |
| 850 | R28-5B2-OFSW-958-1133-0.018 | 958 | 1000 | 1133 | C5 |
| 1050 | R28-5B2-OFSW-1158-1333-0.018 | 1158 | 1200 | 1333 | C5 |

OFSW Type (SHAFT OD 28, LEAD 6) ◀ Standard



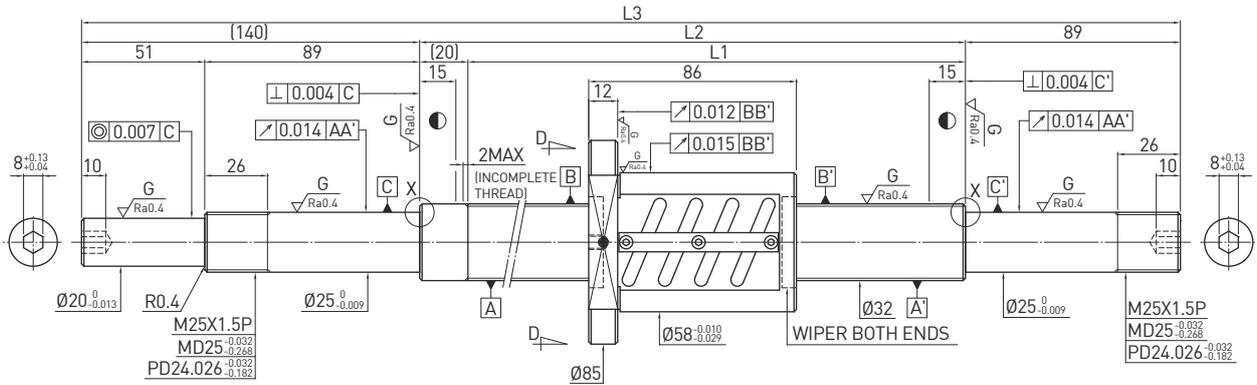
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 6 |
| Lead Angle | 3.82° |
| P.C.D (mm) | 28.6 |
| Screw P.C.D (mm) | 28.6 |
| RD (mm) | 25.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 1784 |
| Static Load Co (kgf) | 4932 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 1.2~3.6 |
| Spacer Ball | - |



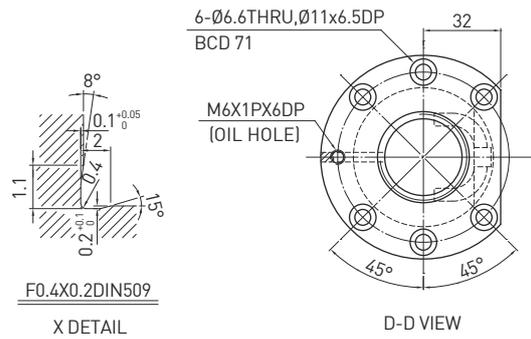
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 250 | R28-6B2-OFSW-370-545-0.018 | 370 | 412 | 545 | C5 |
| 450 | R28-6B2-OFSW-570-745-0.018 | 570 | 612 | 745 | C5 |
| 650 | R28-6B2-OFSW-758-933-0.018 | 758 | 800 | 933 | C5 |
| 850 | R28-6B2-OFSW-958-1133-0.018 | 958 | 1000 | 1133 | C5 |
| 1050 | R28-6B2-OFSW-1158-1333-0.018 | 1158 | 1200 | 1333 | C5 |

OFSW Type (SHAFT OD 32, LEAD 5) ◀ Standard



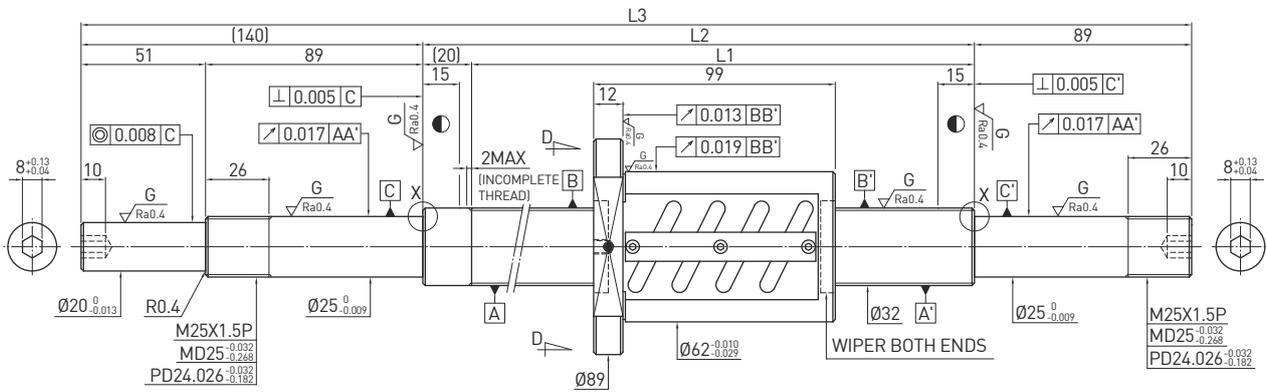
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 5 |
| Lead Angle | 2.79° |
| P.C.D (mm) | 32.6 |
| Screw P.C.D (mm) | 32.6 |
| RD (mm) | 29.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 1886 |
| Static Load Co (kgf) | 5666 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 1.2-3.6 |
| Spacer Ball | - |



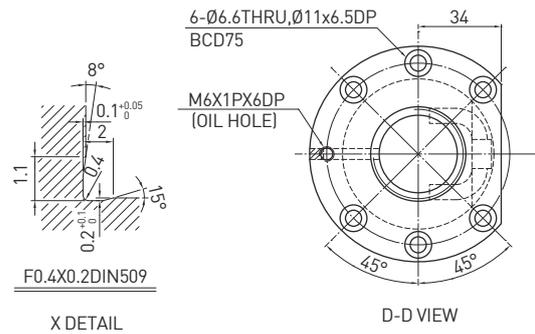
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 150 | R32-5B2-OFSW-280-529-0.018 | 280 | 300 | 529 | C5 |
| 250 | R32-5B2-OFSW-380-629-0.018 | 380 | 400 | 629 | C5 |
| 350 | R32-5B2-OFSW-480-729-0.018 | 480 | 500 | 729 | C5 |
| 450 | R32-5B2-OFSW-580-829-0.018 | 580 | 600 | 829 | C5 |
| 550 | R32-5B2-OFSW-680-929-0.018 | 680 | 700 | 929 | C5 |
| 650 | R32-5B2-OFSW-780-1029-0.018 | 780 | 800 | 1029 | C5 |
| 850 | R32-5B2-OFSW-980-1229-0.018 | 980 | 1000 | 1229 | C5 |
| 1050 | R32-5B2-OFSW-1180-1429-0.018 | 1180 | 1200 | 1429 | C5 |
| 1350 | R32-5B2-OFSW-1480-1729-0.018 | 1480 | 1500 | 1729 | C5 |

OFSW Type (SHAFT OD 32, LEAD 6) ◀ Standard



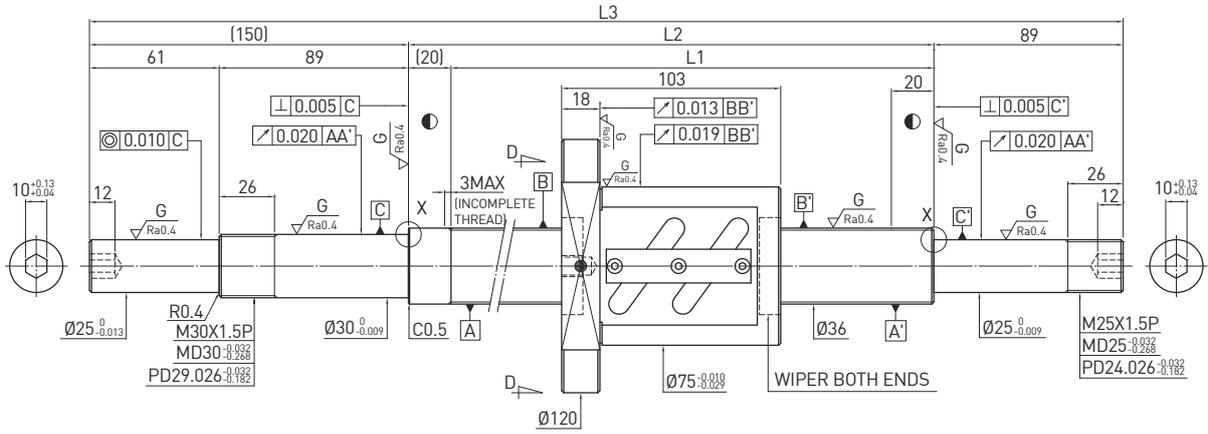
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 6 |
| Lead Angle | 3.33° |
| P.C.D (mm) | 32.8 |
| Screw P.C.D (mm) | 32.8 |
| RD (mm) | 28.744 |
| Steel Ball (mm) | Ø3.969 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 2556 |
| Static Load Co (kgf) | 7019 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 2.32-4.82 |
| Spacer Ball | - |



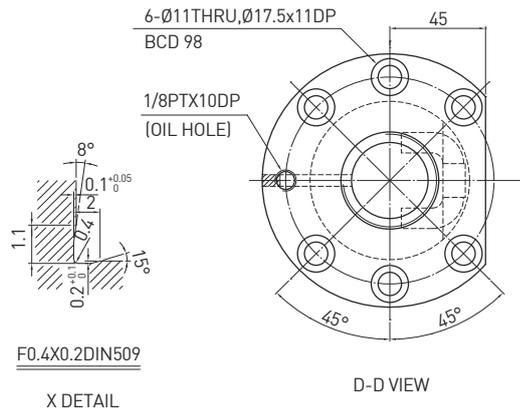
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 250 | R32-6B2-OFSW-380-629-0.018 | 380 | 400 | 629 | C5 |
| 450 | R32-6B2-OFSW-580-829-0.018 | 580 | 600 | 829 | C5 |
| 650 | R32-6B2-OFSW-780-1029-0.018 | 780 | 800 | 1029 | C5 |
| 850 | R32-6B2-OFSW-980-1229-0.018 | 980 | 1000 | 1229 | C5 |
| 1050 | R32-6B2-OFSW-1180-1429-0.018 | 1180 | 1200 | 1429 | C5 |
| 1350 | R32-6B2-OFSW-1480-1729-0.018 | 1480 | 1500 | 1729 | C5 |

OFSW Type (SHAFT OD 36, LEAD 10) ◀ Standard



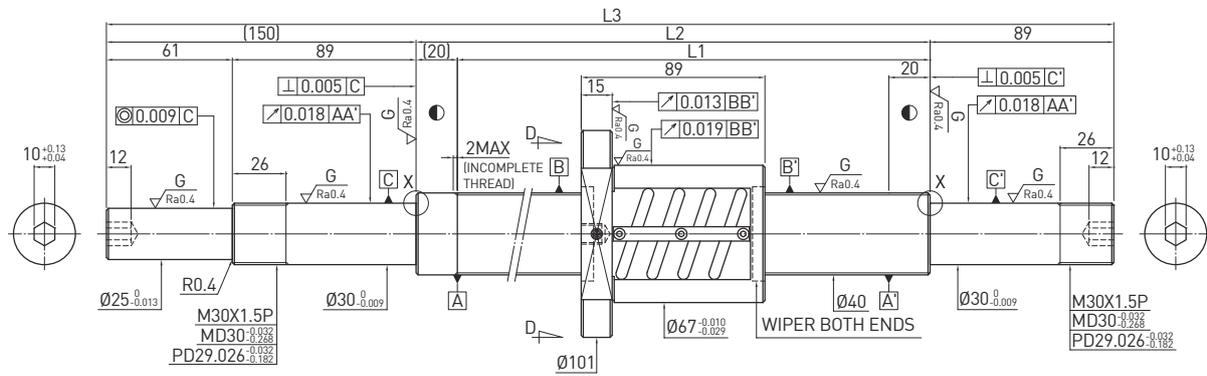
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 4.84° |
| P.C.D (mm) | 37.4 |
| Screw P.C.D (mm) | 37.4 |
| RD (mm) | 30.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 2812 |
| Static Load Co (kgf) | 6334 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 3.91-8.13 |
| Spacer Ball | - |



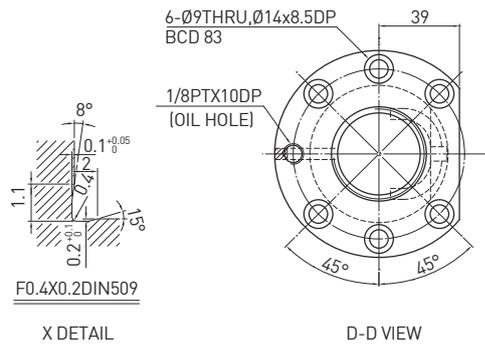
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-------------------------------|------|------|------|----------------|
| 350 | R36-10B1-OFSW-480-739-0.018 | 480 | 500 | 739 | C5 |
| 550 | R36-10B1-OFSW-680-939-0.018 | 680 | 700 | 939 | C5 |
| 850 | R36-10B1-OFSW-980-1239-0.018 | 980 | 1000 | 1239 | C5 |
| 1250 | R36-10B1-OFSW-1380-1639-0.018 | 1380 | 1400 | 1639 | C5 |
| 1650 | R36-10B1-OFSW-1780-2039-0.018 | 1780 | 1800 | 2039 | C5 |

OFSW Type (SHAFT OD 40, LEAD 5) ◀ Standard



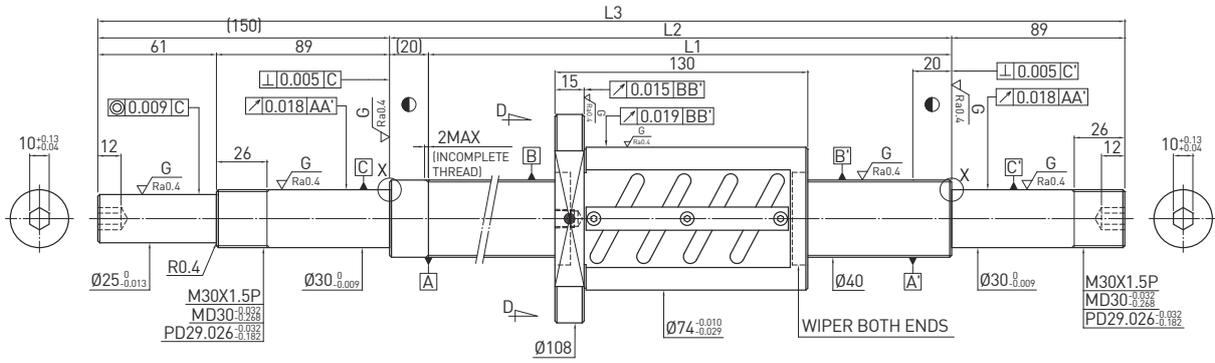
| Ballscrew Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 5 |
| Lead Angle | 2.24° |
| P.C.D (mm) | 40.6 |
| Screw P.C.D (mm) | 40.6 |
| RD (mm) | 37.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.5x2 |
| Dynamic Load C (Kgf) | 2070 |
| Static Load Co (Kgf) | 7134 |
| Axial Play (mm) | 0 |
| Drag Torque (Kgf-cm) | 1.81-4.21 |
| Spacer Ball | - |



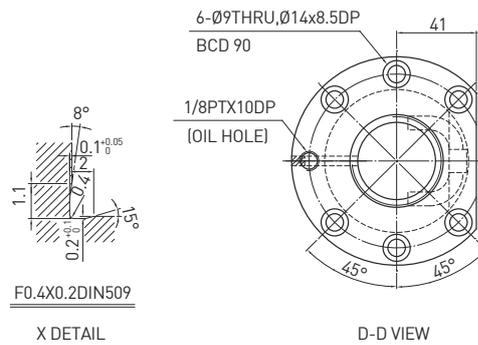
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 250 | R40-5B2-OFSW-380-639-0.018 | 380 | 400 | 639 | C5 |
| 450 | R40-5B2-OFSW-580-839-0.018 | 580 | 600 | 839 | C5 |
| 650 | R40-5B2-OFSW-780-1039-0.018 | 780 | 800 | 1039 | C5 |
| 850 | R40-5B2-OFSW-980-1239-0.018 | 980 | 1000 | 1239 | C5 |
| 1050 | R40-5B2-OFSW-1180-1439-0.018 | 1180 | 1200 | 1439 | C5 |
| 1450 | R40-5B2-OFSW-1580-1839-0.018 | 1580 | 1600 | 1839 | C5 |

OFSW Type (SHAFT OD 40, LEAD 8) ◀ Standard



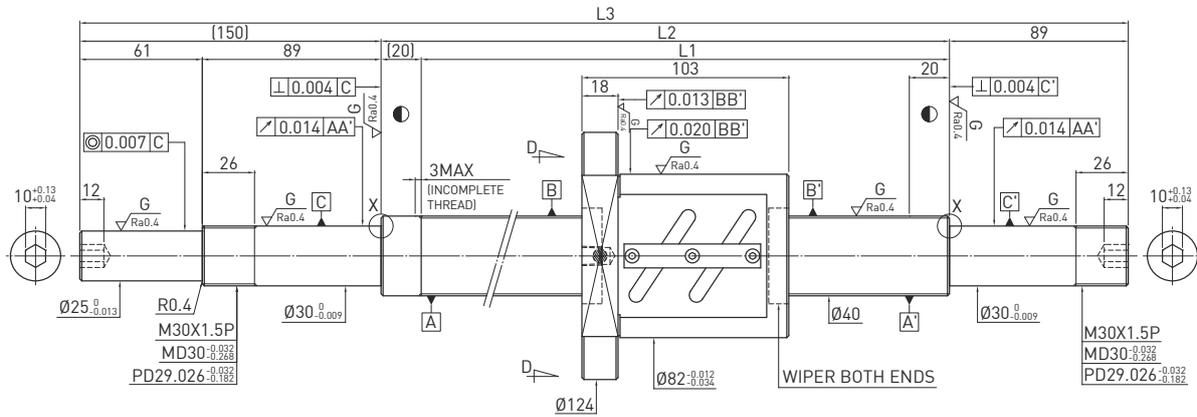
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 8 |
| Lead Angle | 3.55° |
| P.C.D (mm) | 41 |
| Screw P.C.D (mm) | 41 |
| RD (mm) | 36.132 |
| Steel Ball (mm) | Ø4.763 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 3634 |
| Static Load Co (kgf) | 10603 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 4.24-8.82 |
| Spacer Ball | - |



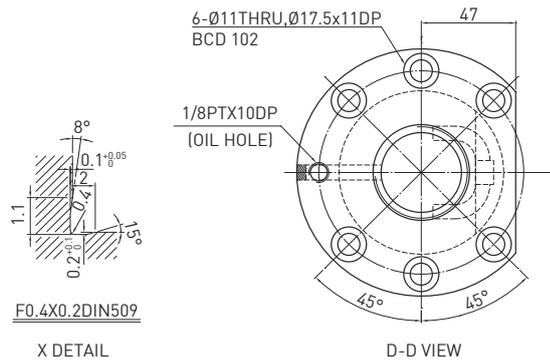
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 200 | R40-8B2-OFSW-380-639-0.018 | 380 | 400 | 639 | C5 |
| 400 | R40-8B2-OFSW-580-839-0.018 | 580 | 600 | 839 | C5 |
| 600 | R40-8B2-OFSW-780-1039-0.018 | 780 | 800 | 1039 | C5 |
| 800 | R40-8B2-OFSW-980-1239-0.018 | 980 | 1000 | 1239 | C5 |
| 1000 | R40-8B2-OFSW-1180-1439-0.018 | 1180 | 1200 | 1439 | C5 |
| 1400 | R40-8B2-OFSW-1580-1839-0.018 | 1580 | 1600 | 1839 | C5 |

OFSW Type (SHAFT OD 40, LEAD 10) ◀ Standard



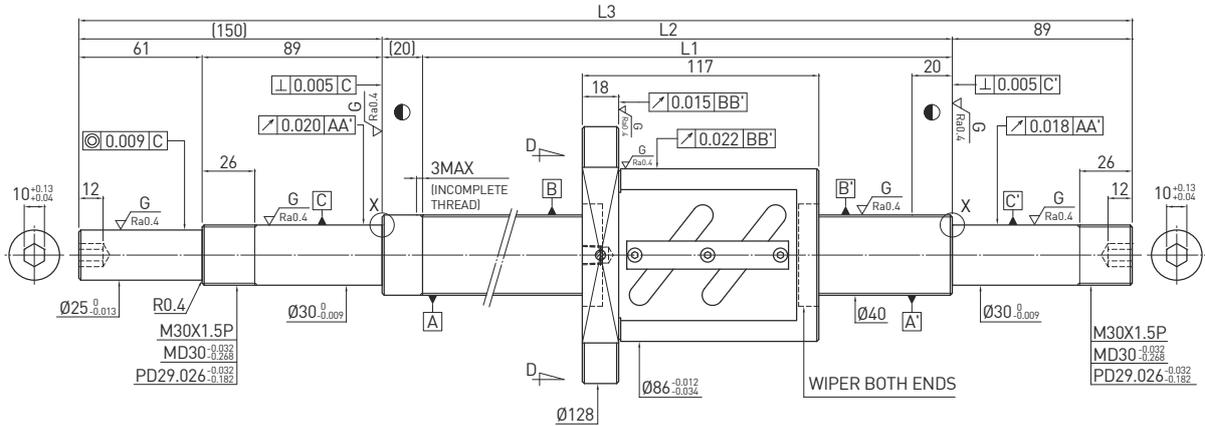
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 4.4° |
| P.C.D (mm) | 41.4 |
| Screw P.C.D (mm) | 41.4 |
| RD (mm) | 34.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 2958 |
| Static Load Co (kgf) | 7069 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 4.57-8.49 |
| Spacer Ball | - |



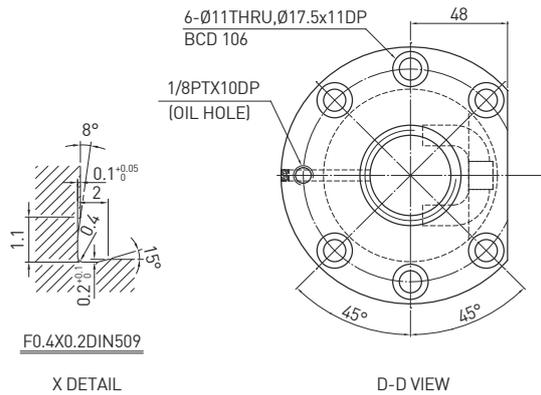
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-------------------------------|------|------|------|----------------|
| 350 | R40-10B1-OFSW-480-739-0.018 | 480 | 500 | 739 | C5 |
| 450 | R40-10B1-OFSW-580-839-0.018 | 580 | 600 | 839 | C5 |
| 550 | R40-10B1-OFSW-680-939-0.018 | 680 | 700 | 939 | C5 |
| 650 | R40-10B1-OFSW-780-1039-0.018 | 780 | 800 | 1039 | C5 |
| 850 | R40-10B1-OFSW-980-1239-0.018 | 980 | 1000 | 1239 | C5 |
| 1050 | R40-10B1-OFSW-1180-1439-0.018 | 1180 | 1200 | 1439 | C5 |
| 1250 | R40-10B1-OFSW-1380-1639-0.018 | 1380 | 1400 | 1639 | C5 |
| 1450 | R40-10B1-OFSW-1580-1839-0.018 | 1580 | 1600 | 1839 | C5 |
| 1650 | R40-10B1-OFSW-1780-2039-0.018 | 1780 | 1800 | 2039 | C5 |
| 2250 | R40-10B1-OFSW-2380-2639-0.018 | 2380 | 2400 | 2639 | C5 |

OFSW Type (SHAFT OD 40, LEAD 12) ◀ Standard



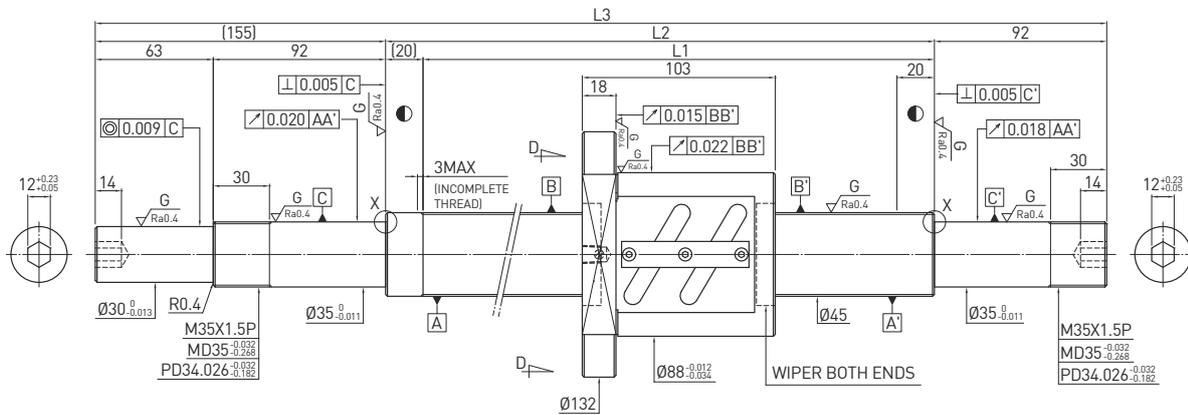
| Ballscrew Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 12 |
| Lead Angle | 5.25° |
| P.C.D (mm) | 41.6 |
| Screw P.C.D (mm) | 41.6 |
| RD (mm) | 34.299 |
| Steel Ball (mm) | Ø7.144 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 3425 |
| Static Load Co (kgf) | 7837 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 5.93-11.01 |
| Spacer Ball | - |



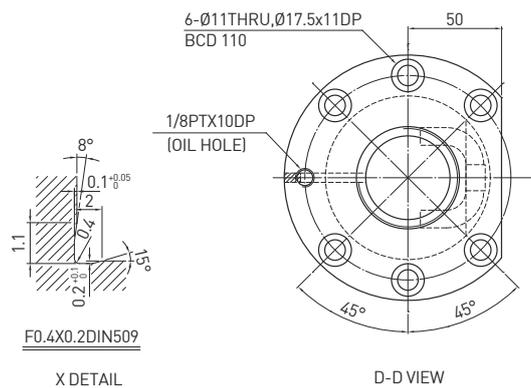
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-------------------------------|------|------|------|----------------|
| 500 | R40-12B1-OFSW-680-939-0.018 | 680 | 700 | 939 | C5 |
| 800 | R40-12B1-OFSW-980-1239-0.018 | 980 | 1000 | 1239 | C5 |
| 1200 | R40-12B1-OFSW-1380-1639-0.018 | 1380 | 1400 | 1639 | C5 |
| 1600 | R40-12B1-OFSW-1780-2039-0.018 | 1780 | 1800 | 2039 | C5 |
| 2300 | R40-12B1-OFSW-2480-2739-0.018 | 2480 | 2500 | 2739 | C5 |

OFSW Type (SHAFT OD 45, LEAD 10) ◀ Standard



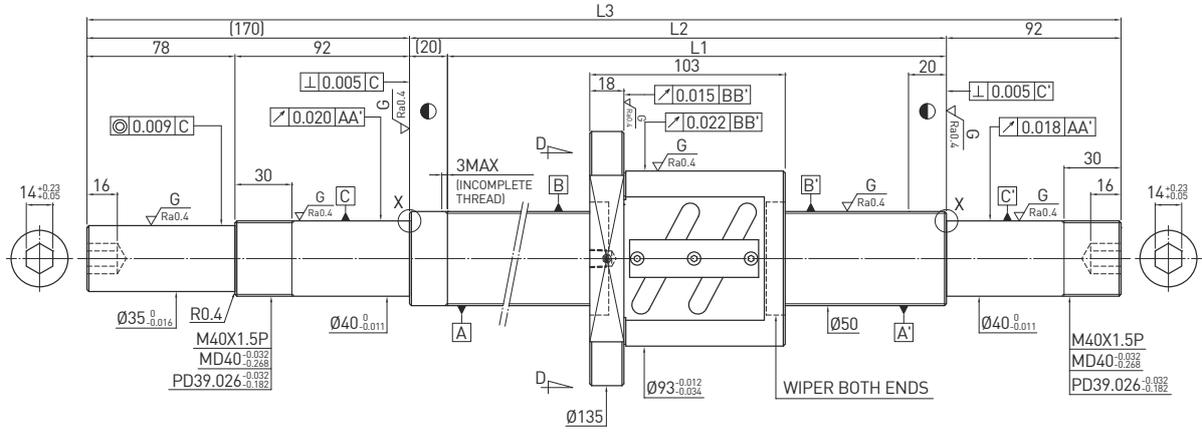
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 3.92° |
| P.C.D (mm) | 46.4 |
| Screw P.C.D (mm) | 46.4 |
| RD (mm) | 39.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 3115 |
| Static Load Co (kgf) | 7952 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 4.58~9.5 |
| Spacer Ball | - |



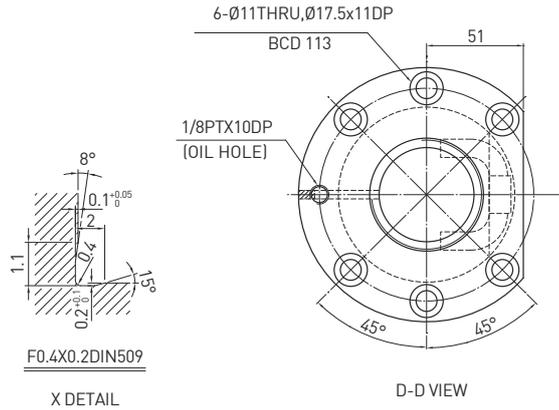
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-------------------------------|------|------|------|----------------|
| 550 | R45-10B1-OFSW-680-947-0.018 | 680 | 700 | 947 | C5 |
| 850 | R45-10B1-OFSW-980-1247-0.018 | 980 | 1000 | 1247 | C5 |
| 1250 | R45-10B1-OFSW-1380-1647-0.018 | 1380 | 1400 | 1647 | C5 |
| 1650 | R45-10B1-OFSW-1780-2047-0.018 | 1780 | 1800 | 2047 | C5 |
| 2350 | R45-10B1-OFSW-2480-2747-0.018 | 2480 | 2500 | 2747 | C5 |

OFSW Type (SHAFT OD 50, LEAD 10) ◀ Standard



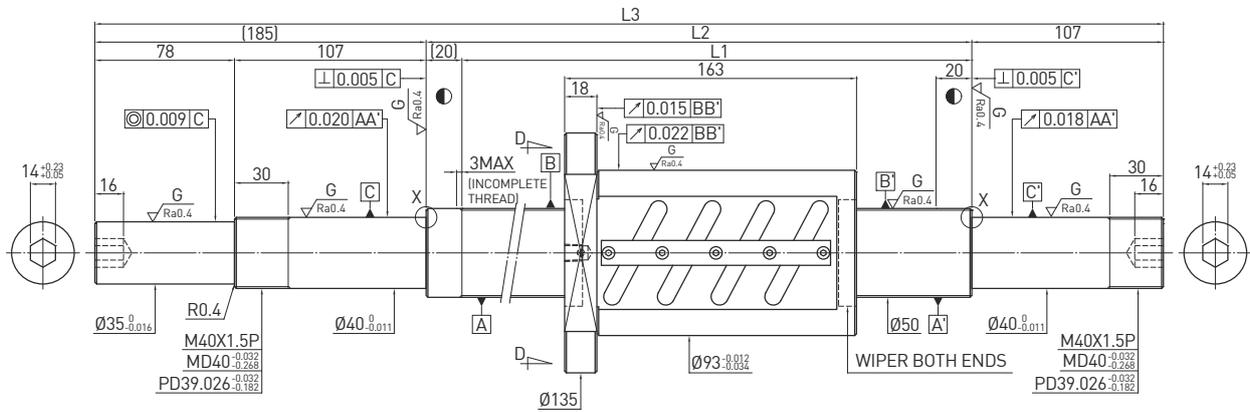
| Ball screw Data | |
|----------------------|------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 3.54° |
| P.C.D (mm) | 51.4 |
| Screw P.C.D (mm) | 51.4 |
| RD (mm) | 44.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x1 |
| Dynamic Load C (kgf) | 3263 |
| Static Load Co (kgf) | 8835 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 4.84~11.28 |
| Spacer Ball | - |



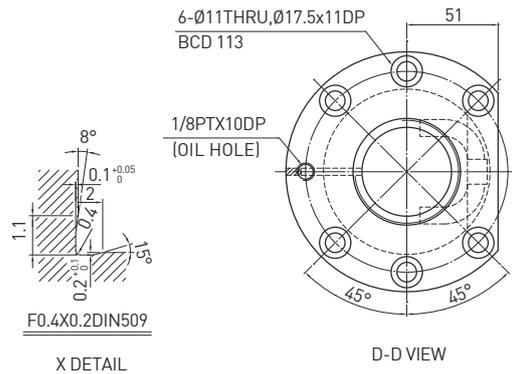
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-------------------------------|------|------|------|----------------|
| 450 | R50-10B1-OFSW-580-862-0.018 | 580 | 600 | 862 | C5 |
| 650 | R50-10B1-OFSW-780-1062-0.018 | 780 | 800 | 1062 | C5 |
| 850 | R50-10B1-OFSW-980-1262-0.018 | 980 | 1000 | 1262 | C5 |
| 1050 | R50-10B1-OFSW-1180-1462-0.018 | 1180 | 1200 | 1462 | C5 |
| 1350 | R50-10B1-OFSW-1480-1762-0.018 | 1480 | 1500 | 1762 | C5 |
| 1850 | R50-10B1-OFSW-1980-2262-0.018 | 1980 | 2000 | 2262 | C5 |
| 2450 | R50-10B1-OFSW-2580-2862-0.018 | 2580 | 2600 | 2862 | C5 |

OFSW Type (SHAFT OD 50, LEAD 10) ◀ Standard



| Ballscrew Data | |
|----------------------|-------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 3.54° |
| P.C.D (mm) | 51.4 |
| Screw P.C.D (mm) | 51.4 |
| RD (mm) | 44.91 |
| Steel Ball (mm) | Ø6.35 |
| Circuits | 2.5x2 |
| Dynamic Load C (kgf) | 5923 |
| Static Load Co (kgf) | 17670 |
| Axial Play (mm) | 0 |
| Drag Torque (kgf-cm) | 10.48-17.48 |
| Spacer Ball | - |

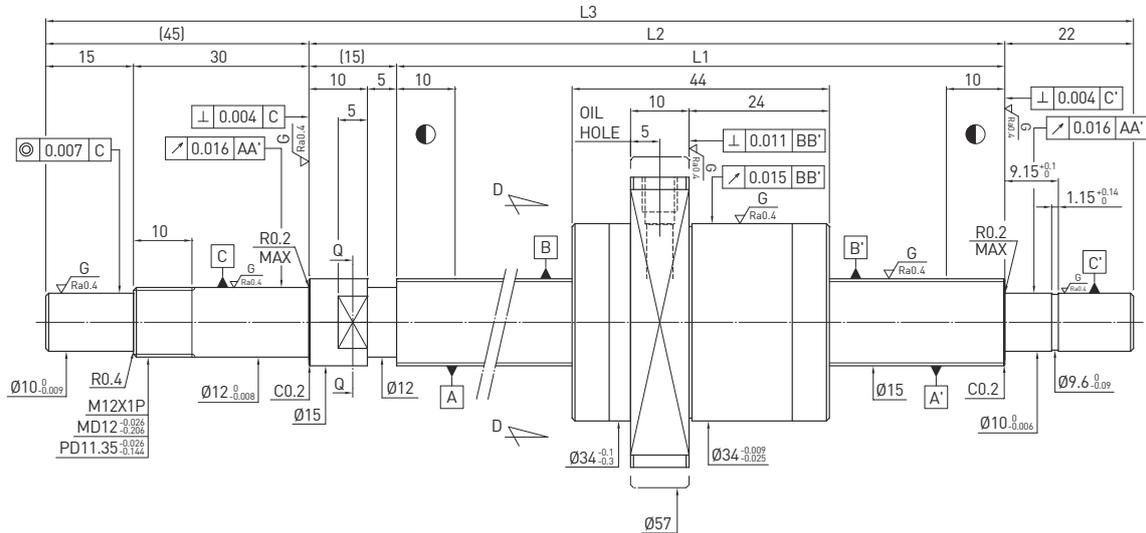


Unit : mm

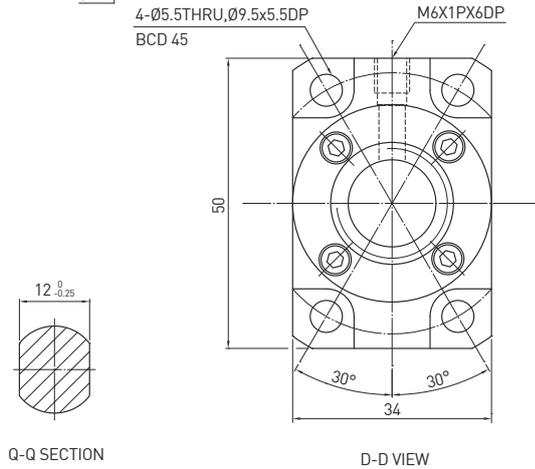
| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|-------------------------------|------|------|------|----------------|
| 350 | R50-10B2-OFSW-580-892-0.018 | 580 | 600 | 892 | C5 |
| 550 | R50-10B2-OFSW-780-1092-0.018 | 780 | 800 | 1092 | C5 |
| 750 | R50-10B2-OFSW-980-1292-0.018 | 980 | 1000 | 1292 | C5 |
| 950 | R50-10B2-OFSW-1180-1492-0.018 | 1180 | 1200 | 1492 | C5 |
| 1250 | R50-10B2-OFSW-1480-1792-0.018 | 1480 | 1500 | 1792 | C5 |
| 1750 | R50-10B2-OFSW-1980-2292-0.018 | 1980 | 2000 | 2292 | C5 |
| 2350 | R50-10B2-OFSW-2580-2892-0.018 | 2580 | 2600 | 2892 | C5 |

6.5 High Lead Ground Ballscrew

DFSH Type (SHAFT OD 15, LEAD 10) ◀ High Lead



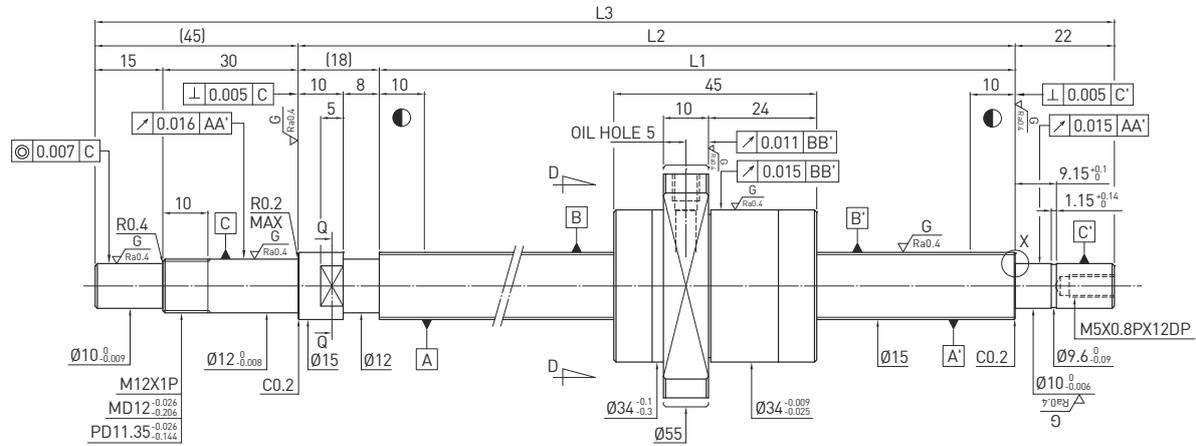
| Ball screw Data | |
|----------------------|-----------------|
| Direction | Right Hand |
| Lead (mm) | 10 |
| Lead Angle | 11.53° |
| P.C.D (mm) | 15.6 |
| Screw P.C.D (mm) | 15.6 |
| RD (mm) | 12.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 2.8x2 |
| Dynamic Load C (kgf) | 940 1490 |
| Static Load Co (kgf) | 1590 3190 |
| Axial Play (mm) | 0 0.005MAX |
| Drag Torque (kgf-cm) | 0.2~1 - |
| Spacer Ball | 1 : 1 - |



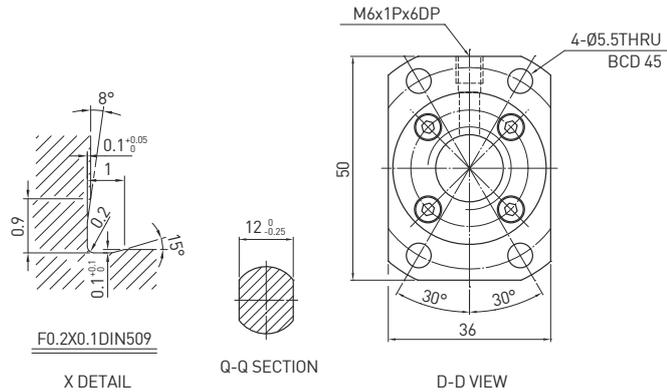
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|-----|-----|-----|----------------|
| 150 | 2R15-10U2-DFSH-239-321-0.018 | 239 | 254 | 321 | C5 |
| 200 | 2R15-10U2-DFSH-289-371-0.018 | 289 | 304 | 371 | C5 |
| 250 | 2R15-10U2-DFSH-339-421-0.018 | 339 | 354 | 421 | C5 |
| 300 | 2R15-10U2-DFSH-389-471-0.018 | 389 | 404 | 471 | C5 |
| 350 | 2R15-10U2-DFSH-439-521-0.018 | 439 | 454 | 521 | C5 |
| 400 | 2R15-10U2-DFSH-489-571-0.018 | 489 | 504 | 571 | C5 |
| 450 | 2R15-10U2-DFSH-539-621-0.018 | 539 | 554 | 621 | C5 |
| 500 | 2R15-10U2-DFSH-589-671-0.018 | 589 | 604 | 671 | C5 |
| 550 | 2R15-10U2-DFSH-639-721-0.018 | 639 | 654 | 721 | C5 |
| 600 | 2R15-10U2-DFSH-689-771-0.018 | 689 | 704 | 771 | C5 |
| 700 | 2R15-10U2-DFSH-789-871-0.018 | 789 | 804 | 871 | C5 |
| 800 | 2R15-10U2-DFSH-889-971-0.018 | 889 | 904 | 971 | C5 |

FSH Type (SHAFT OD 15, LEAD 20) ◀ High Lead



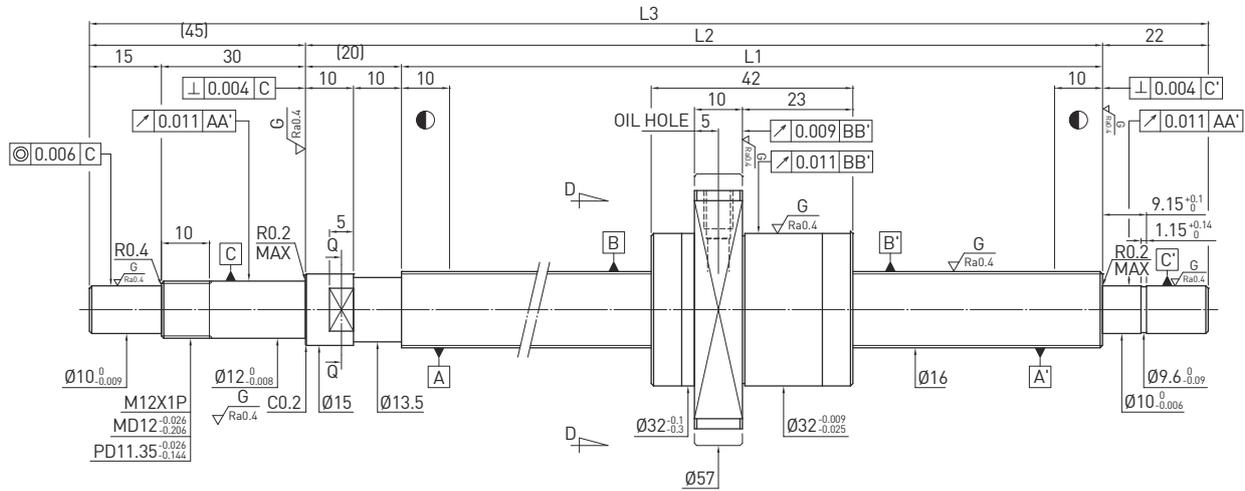
| Ball screw Data | |
|----------------------|-----------------------|
| Direction | Right Hand |
| Lead (mm) | 20 |
| Lead Angle | 22.2° |
| P.C.D (mm) | 15.6 |
| Screw P.C.D (mm) | 15.6 |
| RD (mm) | 12.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 1.8x1 |
| Dynamic Load C (kgf) | 340 540 |
| Static Load Co (kgf) | 510 1030 |
| Axial Play (mm) | 0 0.005MAX |
| Drag Torque (kgf-cm) | 0.15-0.8 0.24MAX |
| Spacer Ball | 1 : 1 - |



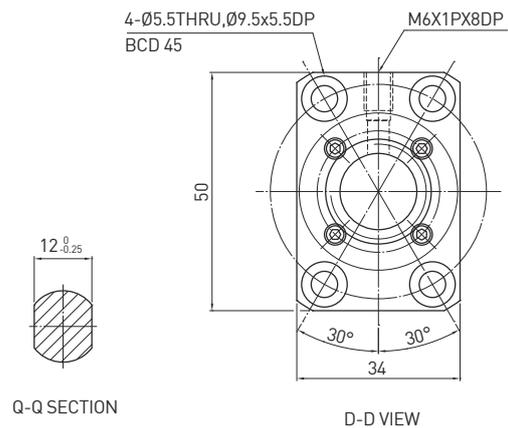
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|------|------|------|----------------|
| 100 | R15-20S1-FSH-186-271-0.018 | 186 | 204 | 271 | C5 |
| 150 | R15-20S1-FSH-236-321-0.018 | 236 | 254 | 321 | C5 |
| 200 | R15-20S1-FSH-286-371-0.018 | 286 | 304 | 371 | C5 |
| 250 | R15-20S1-FSH-336-421-0.018 | 336 | 354 | 421 | C5 |
| 300 | R15-20S1-FSH-386-471-0.018 | 386 | 404 | 471 | C5 |
| 350 | R15-20S1-FSH-436-521-0.018 | 436 | 454 | 521 | C5 |
| 400 | R15-20S1-FSH-486-571-0.018 | 486 | 504 | 571 | C5 |
| 450 | R15-20S1-FSH-536-621-0.018 | 536 | 554 | 621 | C5 |
| 500 | R15-20S1-FSH-586-671-0.018 | 586 | 604 | 671 | C5 |
| 550 | R15-20S1-FSH-636-721-0.018 | 636 | 654 | 721 | C5 |
| 600 | R15-20S1-FSH-686-771-0.018 | 686 | 704 | 771 | C5 |
| 700 | R15-20S1-FSH-786-871-0.018 | 786 | 804 | 871 | C5 |
| 800 | R15-20S1-FSH-886-971-0.018 | 886 | 904 | 971 | C5 |
| 1000 | R15-20S1-FSH-1086-1171-0.018 | 1086 | 1104 | 1171 | C5 |

DFSH Type (SHAFT OD 16, LEAD 16) ◀ High Lead



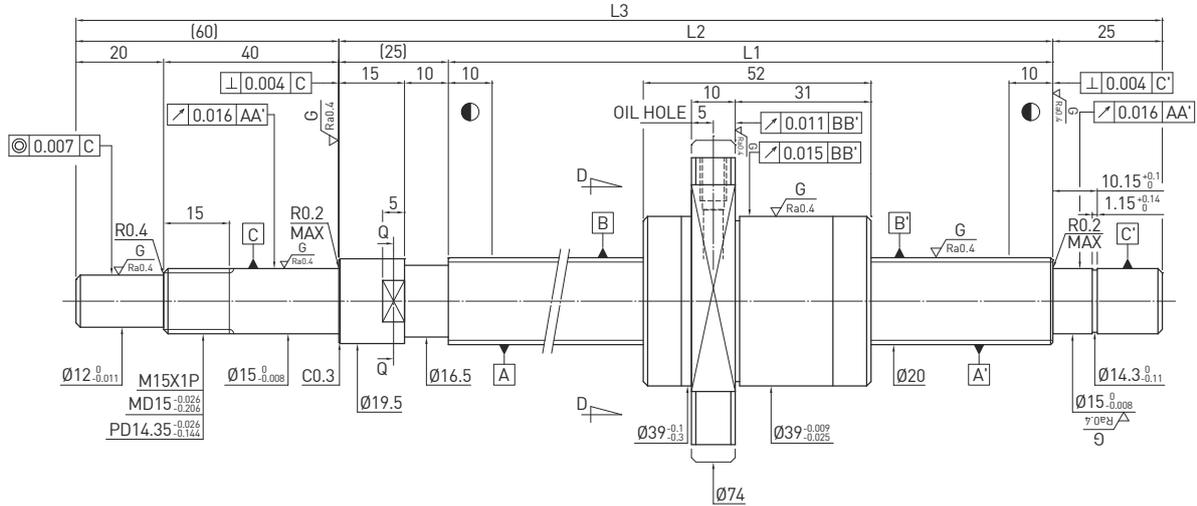
| Ballscrew Data | |
|----------------------|-----------------|
| Direction | Right Hand |
| Lead (mm) | 16 |
| Lead Angle | 17.06° |
| P.C.D (mm) | 16.6 |
| Screw P.C.D (mm) | 16.6 |
| RD (mm) | 13.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 1.8x2 |
| Dynamic Load C (kgf) | 670 1060 |
| Static Load Co (kgf) | 1140 2280 |
| Axial Play (mm) | 0 0.005MAX |
| Drag Torque (kgf-cm) | 0.2~1 - |
| Spacer Ball | 1 : 1 - |



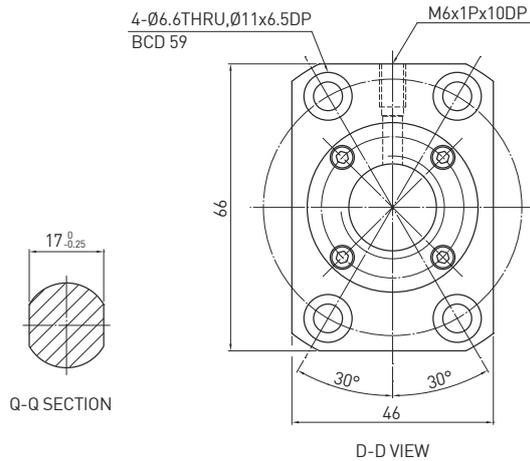
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|------------------------------|-----|-----|-----|----------------|
| 150 | 2R16-16S2-DFSH-234-321-0.018 | 234 | 254 | 321 | C5 |
| 200 | 2R16-16S2-DFSH-284-371-0.018 | 284 | 304 | 371 | C5 |
| 250 | 2R16-16S2-DFSH-334-421-0.018 | 334 | 354 | 421 | C5 |
| 300 | 2R16-16S2-DFSH-384-471-0.018 | 384 | 404 | 471 | C5 |
| 350 | 2R16-16S2-DFSH-434-521-0.018 | 434 | 454 | 521 | C5 |
| 400 | 2R16-16S2-DFSH-484-571-0.018 | 484 | 504 | 571 | C5 |
| 450 | 2R16-16S2-DFSH-534-621-0.018 | 534 | 554 | 621 | C5 |
| 500 | 2R16-16S2-DFSH-584-671-0.018 | 584 | 604 | 671 | C5 |
| 550 | 2R16-16S2-DFSH-634-721-0.018 | 634 | 654 | 721 | C5 |
| 600 | 2R16-16S2-DFSH-684-771-0.018 | 684 | 704 | 771 | C5 |
| 700 | 2R16-16S2-DFSH-784-871-0.018 | 784 | 804 | 871 | C5 |
| 800 | 2R16-16S2-DFSH-884-971-0.018 | 884 | 904 | 971 | C5 |

DFSH Type (SHAFT OD 20, LEAD 20) ◀ High Lead



| Ball screw Data | | |
|----------------------|------------|----------|
| Direction | Right Hand | |
| Lead (mm) | 20 | |
| Lead Angle | 17.17° | |
| P.C.D (mm) | 20.6 | |
| Screw P.C.D (mm) | 20.6 | |
| RD (mm) | 17.324 | |
| Steel Ball (mm) | Ø3.175 | |
| Circuits | 1.8x2 | |
| Dynamic Load C (kgf) | 740 | 1180 |
| Static Load Co (kgf) | 1430 | 2860 |
| Axial Play (mm) | 0 | 0.005MAX |
| Drag Torque (kgf-cm) | 0.1~1 | - |
| Spacer Ball | 1 : 1 | - |

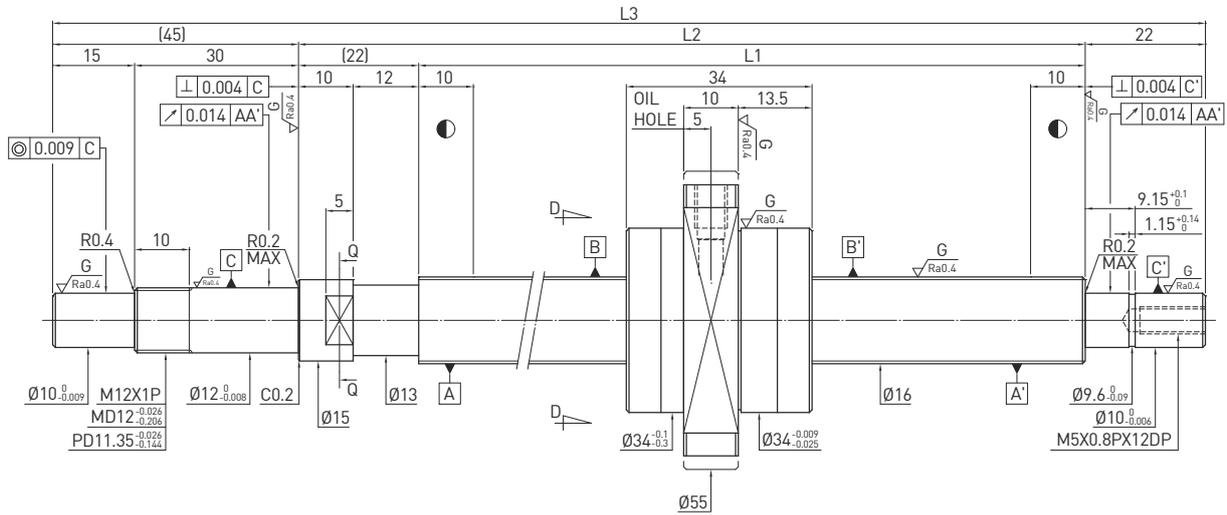


Unit : mm

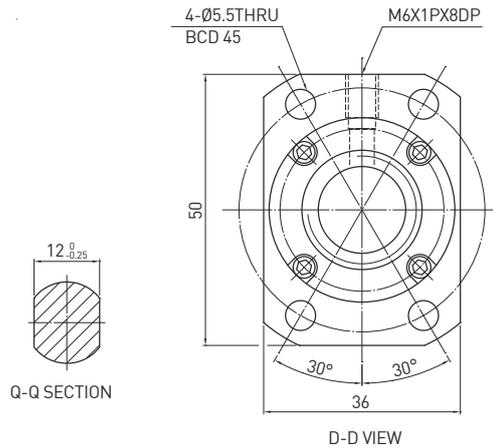
| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|--------------------------------|------|------|------|----------------|
| 300 | 2R20-20S2-DFSH-410-520-0.018 | 410 | 435 | 520 | C5 |
| 400 | 2R20-20S2-DFSH-510-620-0.018 | 510 | 535 | 620 | C5 |
| 500 | 2R20-20S2-DFSH-610-720-0.018 | 610 | 635 | 720 | C5 |
| 600 | 2R20-20S2-DFSH-710-820-0.018 | 710 | 735 | 820 | C5 |
| 700 | 2R20-20S2-DFSH-810-920-0.018 | 810 | 835 | 920 | C5 |
| 800 | 2R20-20S2-DFSH-910-1020-0.018 | 910 | 935 | 1020 | C5 |
| 900 | 2R20-20S2-DFSH-1010-1120-0.018 | 1010 | 1035 | 1120 | C5 |
| 1000 | 2R20-20S2-DFSH-1110-1220-0.018 | 1110 | 1135 | 1220 | C5 |
| 1100 | 2R20-20S2-DFSH-1210-1320-0.018 | 1210 | 1235 | 1320 | C5 |

6.6 Ultra High Lead Ground Ballscrew

DFSH Type (SHAFT OD 16, LEAD 32) ◀ Ultra High Lead



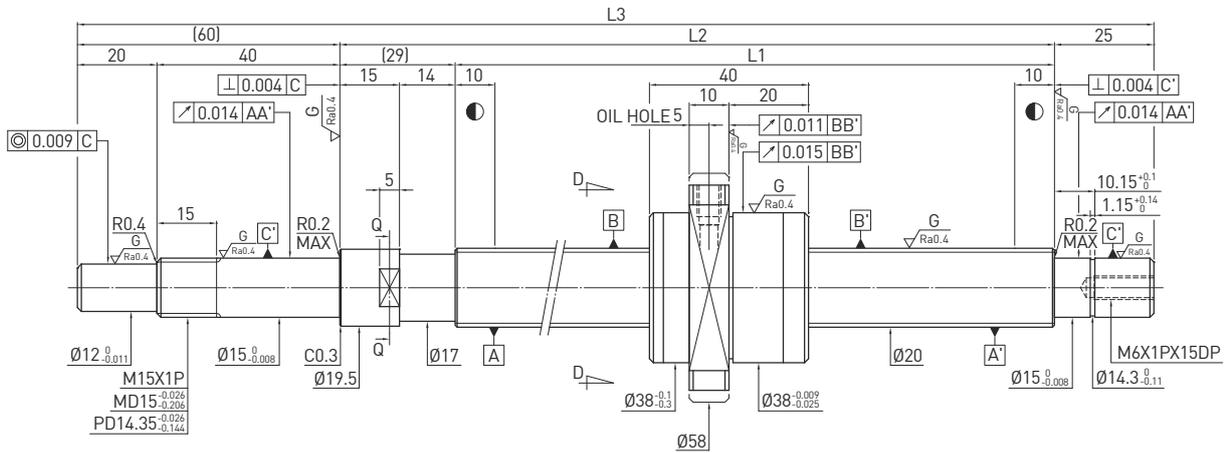
| Ball screw Data | |
|----------------------|-----------------------|
| Direction | Right Hand |
| Lead (mm) | 32 |
| Lead Angle | 31.53° |
| P.C.D (mm) | 16.6 |
| Screw P.C.D (mm) | 16.6 |
| RD (mm) | 13.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 0.8x2 |
| Dynamic Load C (kgf) | 490 |
| Static Load Co (kgf) | 1010 |
| Axial Play (mm) | 0 0.005MAX |
| Drag Torque (kgf-cm) | 0.15~1.0 0.24MAX |
| Spacer Ball | - - |



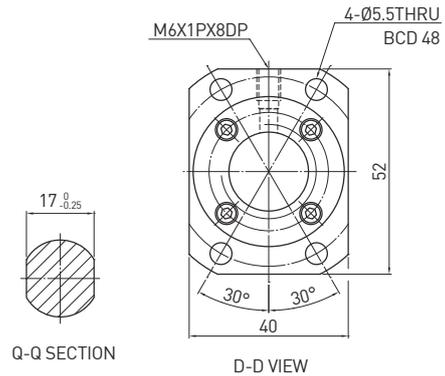
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|--------------------------------|------|------|------|----------------|
| 300 | 2R16-32V2-DFSH-382-471-0.018 | 382 | 404 | 471 | C5 |
| 500 | 2R16-32V2-DFSH-582-671-0.018 | 582 | 604 | 671 | C5 |
| 800 | 2R16-32V2-DFSH-882-971-0.018 | 882 | 904 | 971 | C5 |
| 1200 | 2R16-32V2-DFSH-1282-1371-0.018 | 1282 | 1304 | 1371 | C5 |

DFSH Type (SHAFT OD 20, LEAD 40) ◀ Ultra High Lead



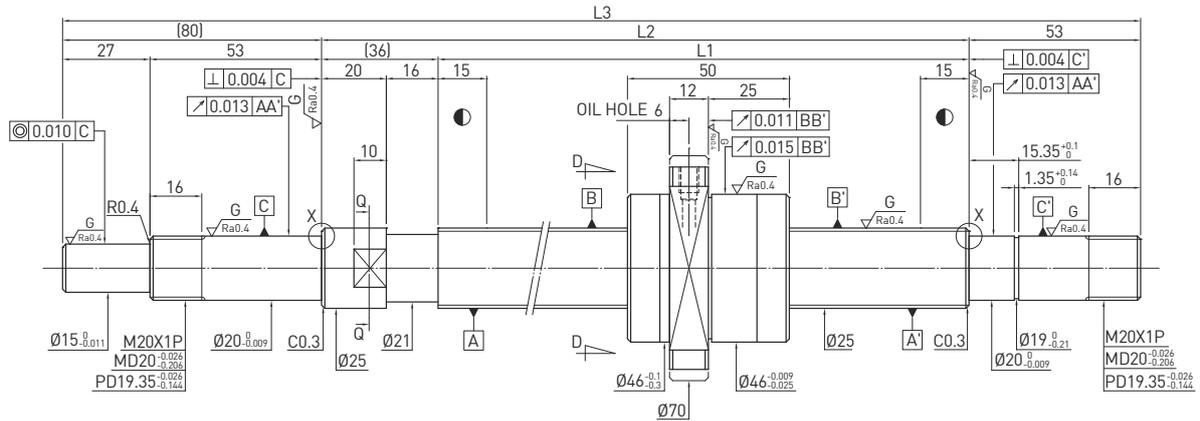
| Ballscrew Data | |
|----------------------|---------------------|
| Direction | Right Hand |
| Lead (mm) | 40 |
| Lead Angle | 31.47° |
| P.C.D (mm) | 20.8 |
| Screw P.C.D (mm) | 20.8 |
| RD (mm) | 17.324 |
| Steel Ball (mm) | Ø3.175 |
| Circuits | 0.8x2 |
| Dynamic Load C (kgf) | 540 |
| Static Load Co (kgf) | 1240 |
| Axial Play (mm) | 0 0.005MAX |
| Drag Torque (kgf-cm) | 0.2~1.2 0.3MAX |
| Spacer Ball | - - |



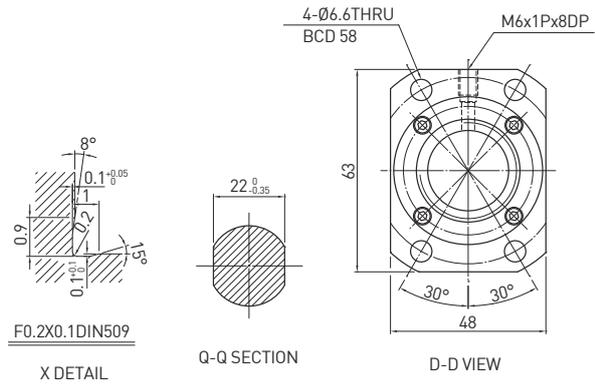
Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|---------------------------------|------|------|------|----------------|
| 400 | 2R20-40V2-DFSH-506- 620-0.018 | 506 | 535 | 620 | C5 |
| 600 | 2R20-40V2-DFSH-706- 820-0.018 | 706 | 735 | 820 | C5 |
| 800 | 2R20-40V2-DFSH-906- 1020-0.018 | 906 | 935 | 1020 | C5 |
| 1000 | 2R20-40V2-DFSH-1106- 1220-0.018 | 1106 | 1135 | 1220 | C5 |
| 1200 | 2R20-40V2-DFSH-1306- 1420-0.018 | 1306 | 1335 | 1420 | C5 |
| 1600 | 2R20-40V2-DFSH-1706- 1820-0.018 | 1706 | 1735 | 1820 | C5 |

DFSH Type (SHAFT OD 25, LEAD 50) ◀ Ultra High Lead



| Ball screw Data | | |
|----------------------|------------|----------|
| Direction | Right Hand | |
| Lead (mm) | 50 | |
| Lead Angle | 31.67° | |
| P.C.D (mm) | 25.8 | |
| Screw P.C.D (mm) | 25.8 | |
| RD (mm) | 21.744 | |
| Steel Ball (mm) | Ø3.969 | |
| Circuits | 0.8x2 | |
| Dynamic Load C (kgf) | 800 | |
| Static Load Co (Kgf) | 1930 | |
| Axial Play (mm) | 0 | 0.005MAX |
| Drag Torque (kgf-cm) | 0.3-2.19 | 0.5MAX |
| Spacer Ball | - | - |



Unit : mm

| Stroke | HIWIN Code | L1 | L2 | L3 | Accuracy grade |
|--------|--------------------------------|------|------|------|----------------|
| 700 | 2R25-50V2-DFSH-844-1013-0.018 | 844 | 880 | 1013 | C5 |
| 1000 | 2R25-50V2-DFSH-1144-1313-0.018 | 1144 | 1180 | 1313 | C5 |
| 1500 | 2R25-50V2-DFSH-1644-1813-0.018 | 1644 | 1680 | 1813 | C5 |
| 2000 | 2R25-50V2-DFSH-2144-2313-0.018 | 2144 | 2180 | 2313 | C5 |

7. Rolled Ballscrews

7.1 Introduction

HIWIN Rolled Ballscrews are made by a rolling process of the screw spindle instead of a grinding process. Rolled ballscrews not only have the benefit of low friction and smooth running for the linear feed system compared with traditional screws, but also can be supplied with quick stock delivery and lower production price.

HIWIN uses the most advanced technology in the ballscrew rolling process, and maintains the homogeneous manufacturing procedure of selecting materials, rolling, heat treating, machining and assembling.

In general, rolled ballscrews use the same preload method as the precision ground ballscrews, except that there are some differences in the lead error definition and the geometric tolerance. The grade of the rolled ballscrews can be ordered according to the same nut dimension of the precision ground ballscrew. If the ends of the spindle are unmachined, the geometric tolerance does not apply. The production scale of each type of the ballscrews and the accuracy classification are described in the following sections (the unit of length used is in mm).

7.2 Precision Rolled Ballscrews

Table 7.1 gives the lead accuracy of the precision rolled ballscrews. The lead accuracy is measured by the accumulated lead error of any portion of 300 mm in length. The maximum axial plays of the precision rolled ballscrews are shown in Table 7.2. These ballscrews can be preloaded as the precision ground ones. The categories of the precision rolled ballscrews are listed in Table 7.3.

Fig. 7.1 shows the geometric tolerance of the general rolled ballscrews. HIWIN has a variety of precision rolled ballscrews for our customers' urgent requirements.

Table 7.1 Accuracy grade of precision rolled ballscrew

Unit : 0.001mm

| Cumulative | C6 | C7 | C8 | C10 |
|------------|---|----|-----|-----|
| v_{300} | 23 | 50 | 100 | 210 |
| e_p | $e_p = \frac{\text{length measured}}{300} \times v_{300}$ | | | |

| length measured \ Cumulative v_{300} | C6 | C7 | C8 | C10 |
|---|-------|----|-----|-----|
| | 0~100 | 18 | 44 | 84 |
| 101~200 | 20 | 48 | 92 | 194 |
| 201~315 | 23 | 50 | 100 | 210 |

Measuring length unit: mm

Table 7.2 Maximum axial play of precision rolled ballscrew

Unit : mm

| Ball diameter (mm) | -1.2 | 2 | 3.175 | 4.763 | 6.35 | 7.938 | 9.525 | 12.7- |
|--------------------|------|-------|-------|-------|-------|-------|-------|-------|
| | | 2.381 | 3.969 | | 7.144 | | | |
| Axial play (mm) | 0.01 | 0.02 | 0.04 | 0.05 | 0.07 | 0.08 | 0.09 | 0.11 |

Table 7.3 Category of HIWIN precision rolled ballscrew

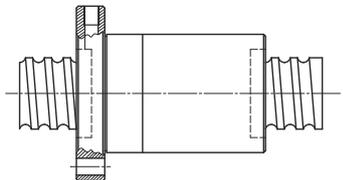
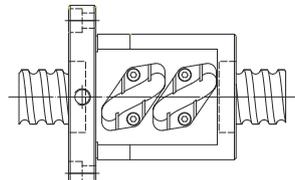
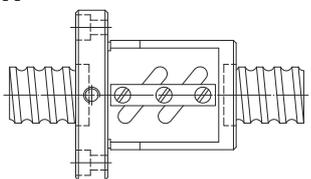
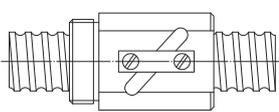
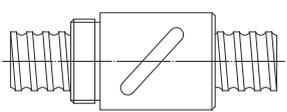
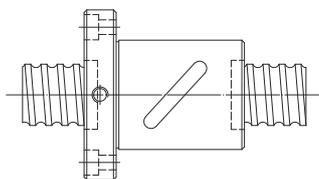
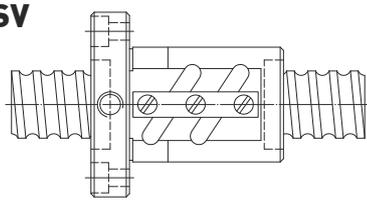
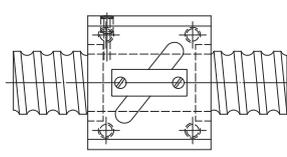
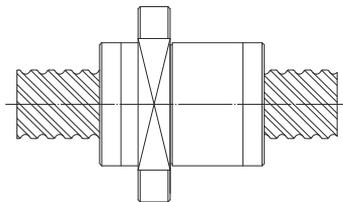
Unit : mm

| Nominal diameter do (mm) | Lead | | | | | | | | | | | | | | | | | | | | Max.screw length | |
|--------------------------|------|------|---|-----|---|---|---|------|---|---|----|----|----|----|----|----|----|----|----|----|------------------|------|
| | 1 | 1.25 | 2 | 2.5 | 3 | 4 | 5 | 5.08 | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 30 | 32 | 36 | 40 | 50 | | 63 |
| 6 | ● | ● | | | | | | | | | | | | | | | | | | | | 800 |
| 8 | ● | | ● | ■ | ● | | ● | | | | | | | | | | | | | | | 800 |
| 10 | | | ● | ■ | ● | ● | ● | | ● | | ● | | | | | | | | | | | 1000 |
| 12 | | | ● | ■ | ● | ■ | ● | ● | | ● | ● | ● | | | | | | | | | | 1200 |
| 14 | | | | | ● | ● | ● | | | | ● | | | | | | | | | | | 2000 |
| 15 | | | | | | | | | | | ● | | | | | | ● | | | | | 2000 |
| 16 | ● | | ■ | ■ | | ● | ■ | ● | ● | ● | ■ | ● | ● | | | | ● | | | | | 3000 |
| 18 | | | | | | | | | | ● | | | | | | | | | | | | 3000 |
| 20 | | | | ■ | | ● | ■ | ■ | ● | ● | ● | | | ■ | | | | | ● | | | 3000 |
| 22 | | | | | | ● | | | | | ● | | | | | | | | | | | 3000 |
| 25 | | | | ● | | ● | ■ | ■ | ● | ● | ■ | | | | | ● | | | | | | 4000 |
| 28 | | | | | | ● | | | ● | | | | | | | | | | | | | 4000 |
| 32 | | | | | | ■ | ■ | ■ | ● | ● | ■ | | | | | ● | | | ● | | | 4500 |
| 36 | | | | | | ● | | | ● | ● | ● | ● | ● | | ● | | | ● | | | | 4500 |
| 38 | | | | | | | | | | | ■ | | ● | ● | | | | | | ● | | 5600 |
| 40 | | | | | | | ■ | | ● | ● | ■ | ● | ● | ● | ● | | | | ● | | | 5600 |
| 45 | | | | | | | | | | | ● | ● | | ● | | | | | | | | 5600 |
| 48 | | | | | | | | | | | ● | | | ● | | | | | | | | 5600 |
| 50 | | | | | | ● | | | ● | | ■ | ● | ● | ● | | ● | | | | ● | ● | 5600 |
| 55 | | | | | | | | | ● | | ● | | | | | | | | | | | 5600 |
| 63 | | | | | | | | | | | ■ | ● | ● | ■ | | | | | ● | | ● | 5600 |
| 80 | | | | | | | | | | | ● | | ● | ● | | ● | | | | | | 6500 |

■ : Right turn and left turn ● : Right turn only. Please contact Hiwin for special request

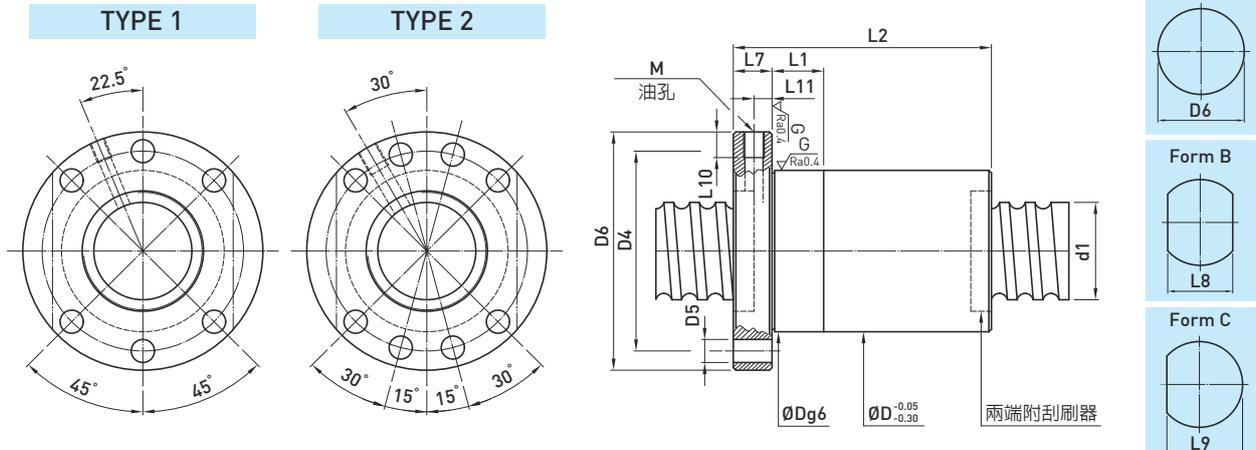
Note: The maximum length for ballscrew is based on grade C7. For rolled ballscrew, the maximum length varies according to lead accuracy grade.

7.3 General Type of Rolled Ballscrews

| page | General Type | | page |
|------|---|--|------|
| 154 | <p>FSC</p>  <p>(F)Flange end, (S)single nut, (C)Super S</p> | <p>FST</p>  <p>(F)Flange end, (S)single nut, (T)Super T</p> | 155 |
| 156 | <p>FSW</p>  <p>(F)Flange end, (S)single nut, (W)tube within the nut diameter</p> | <p>RSV</p>  <p>(R)Round, (S)single nut, (V)tube above the nut diameter</p> | 157 |
| 158 | <p>RSB</p>  <p>(R)Round, (S)single nut, (B)bonded return tube</p> | <p>FSB</p>  <p>(F)Flange end, (S)single nut, (B)bonded return tube</p> | 159 |
| 160 | <p>FSV</p>  <p>(F)Flange end, (S)single nut, (V)tube above the nut diameter</p> | <p>SSV</p>  <p>(S)Square, (S)single nut, (V)tube above the nut diameter</p> | 161 |
| page | High Lead Type | | page |
| 162 | <p>FSH</p>  <p>Large lead, (F)flange mounted, (S)single nut, (H)end cap</p> | | 162 |

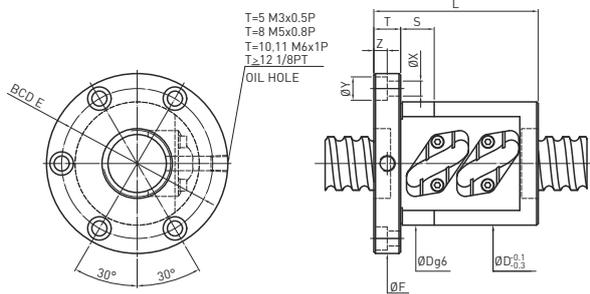
7.4 Dimensions for Rolled Ballscrews

FSC Type ◀ Standard Product

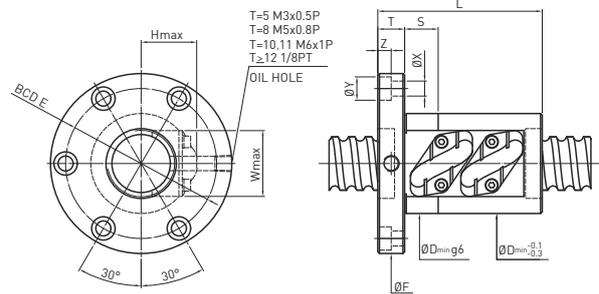


| Model | Size | | Ball Dia. | Circuits | Dynamic Load C(kgf) | Static Load Col(kgf) | Nut | | | Flange | | | | | | Oil Hole | | | Double starts | Incomplete Thread |
|---------|--------------|-------|-----------|----------|---------------------|----------------------|-----|-----|-----|--------|-------------|-------------|-------------|----|-----|----------|---|-----|---------------|-------------------|
| | Nominal Dia. | Lead | | | | | D | L1 | L2 | TYPE | Form A (D6) | Form B (L8) | Form C (L9) | L7 | D4 | D5 | M | L10 | | |
| 14-10K3 | 14 | 10 | 3.175 | 3 | 830 | 1610 | 28 | 10 | 46 | 1 | 48 | 40 | 44 | 38 | 5.5 | M5×0.8P | 6 | 5 | ● | ● |
| 15-16K2 | 15 | 16 | 3 | 2 | 550 | 1110 | 10 | 45 | | | | | | | | | | | | |
| 15-20K2 | 20 | 20 | 3.175 | 2 | 570 | 1130 | 10 | 50 | | | | | | | | | | | | |
| 16-16K2 | 16 | 16 | 3.175 | 2 | 620 | 1240 | 34 | 10 | 47 | | | | | | | | | | | |
| 20-10K4 | 20 | 10 | 3 | 4 | 1220 | 3050 | 10 | 55 | | | | | | | | | | | | |
| 20-20K2 | 20 | 20 | 3.175 | 2 | 690 | 1560 | 36 | 10 | 57 | | | | | | | | | | | |
| 20-8K5 | 8 | 4.763 | 5 | 2670 | 5850 | 45 | 10 | 64 | | | | | | | | | | | | |
| 25-25K2 | 25 | 25 | 3.175 | 2 | 760 | 1950 | 40 | 10 | 69 | | | | | | | | | | | |
| 25-6K5 | 6 | 3.969 | 5 | 2440 | 6470 | 42 | 10 | 50 | | | | | | | | | | | | |
| 25-20K3 | 20 | 20 | 3.969 | 3 | 1490 | 3670 | 45 | 10 | 80 | | | | | | | | | | | |
| 25-8K5 | 8 | 4.763 | 5 | 3130 | 7820 | 50 | 10 | 64 | | | | | | | | | | | | |
| 28-6K5 | 28 | 6 | 3.969 | 5 | 2620 | 7500 | 50 | 10 | 49 | | | | | | | | | | | |
| 32-20K3 | 32 | 20 | 3.969 | 3 | 1710 | 4890 | 20 | 87 | | | | | | | | | | | | |
| 32-32K2 | 32 | 32 | 3.969 | 2 | 1160 | 3170 | 50 | 20 | 87 | | | | | | | | | | | |
| 32-40K2 | 40 | 40 | 3.969 | 2 | 1120 | 3100 | 20 | 94 | | | | | | | | | | | | |
| 32-25K2 | 32 | 25 | 4.763 | 2 | 1490 | 3760 | 54 | 20 | 72 | | | | | | | | | | | |
| 32-32K2 | 32 | 32 | 4.763 | 2 | 1450 | 3700 | 54 | 20 | 88 | | | | | | | | | | | |
| 32-10K5 | 10 | 6.35 | 5 | 5270 | 13880 | 62 | 10 | 77 | | | | | | | | | | | | |
| 32-20K4 | 20 | 20 | 6.35 | 4 | 4240 | 10850 | 57 | 20 | 107 | | | | | | | | | | | |
| 36-6K5 | 6 | 3.969 | 5 | 2860 | 9230 | 56 | 10 | 51 | | | | | | | | | | | | |
| 36-10K5 | 10 | 10 | 6.35 | 5 | 5400 | 14800 | 66 | 20 | 80 | | | | | | | | | | | |
| 36-20K4 | 20 | 20 | 6.35 | 4 | 4360 | 11590 | 65 | 20 | 108 | | | | | | | | | | | |
| 38-40K2 | 38 | 40 | 6.35 | 2 | 2330 | 5910 | 25 | 102 | | | | | | | | | | | | |
| 40-6K5 | 6 | 3.969 | 5 | 3040 | 10600 | 63 | 20 | 52 | | | | | | | | | | | | |
| 40-8K5 | 8 | 4.763 | 5 | 3830 | 12300 | 20 | 68 | | | | | | | | | | | | | |
| 40-10K5 | 10 | 10 | 6.35 | 5 | 5690 | 16580 | 20 | 83 | | | | | | | | | | | | |
| 40-16K5 | 16 | 16 | 6.35 | 5 | 5670 | 16490 | 70 | 20 | 108 | | | | | | | | | | | |
| 40-20K4 | 20 | 20 | 6.35 | 4 | 4600 | 13010 | 20 | 110 | | | | | | | | | | | | |
| 40-40K2 | 40 | 40 | 6.35 | 2 | 2390 | 6260 | 67 | 25 | 101 | | | | | | | | | | | |
| 40-12K5 | 12 | 7.144 | 5 | 6680 | 18730 | 75 | 20 | 90 | | | | | | | | | | | | |
| 45-10K5 | 10 | 10 | 6.35 | 5 | 6130 | 19180 | 75 | 20 | 78 | | | | | | | | | | | |
| 45-12K5 | 12 | 12 | 7.144 | 5 | 7040 | 20960 | 80 | 20 | 88 | | | | | | | | | | | |
| 45-20K4 | 20 | 20 | 7.144 | 4 | 5720 | 16490 | 25 | 113 | | | | | | | | | | | | |
| 50-10K5 | 10 | 10 | 6.35 | 5 | 6330 | 20980 | 82 | 25 | 80 | | | | | | | | | | | |
| 50-16K5 | 16 | 16 | 6.35 | 5 | 6310 | 20910 | 25 | 109 | | | | | | | | | | | | |
| 50-12K5 | 12 | 12 | 7.938 | 5 | 8760 | 27250 | 85 | 25 | 97 | | | | | | | | | | | |
| 50-50K2 | 50 | 50 | 7.938 | 2 | 3580 | 9800 | 107 | 25 | 124 | | | | | | | | | | | |
| 50-20K4 | 20 | 20 | 9.525 | 4 | 8850 | 24750 | 88 | 25 | 120 | | | | | | | | | | | |
| 63-10K5 | 10 | 10 | 6.35 | 5 | 6950 | 26280 | 95 | 25 | 84 | | | | | | | | | | | |
| 63-40K2 | 40 | 40 | 6.35 | 2 | 2980 | 9990 | 25 | 110 | | | | | | | | | | | | |
| 63-12K5 | 12 | 12 | 7.938 | 5 | 9690 | 34130 | 98 | 25 | 94 | | | | | | | | | | | |
| 63-16K4 | 16 | 16 | 9.525 | 4 | 10180 | 32600 | 109 | 25 | 100 | | | | | | | | | | | |
| 63-20K5 | 20 | 20 | 9.525 | 5 | 12430 | 41100 | 107 | 25 | 140 | | | | | | | | | | | |
| 80-10K5 | 10 | 10 | 6.35 | 5 | 7760 | 34180 | 110 | 25 | 80 | | | | | | | | | | | |
| 80-16K4 | 16 | 16 | 9.525 | 4 | 11140 | 40490 | 125 | 25 | 105 | | | | | | | | | | | |
| 80-20K4 | 20 | 20 | 9.525 | 4 | 11140 | 40440 | 120 | 25 | 122 | | | | | | | | | | | |

FST Type ◀ Standard Product



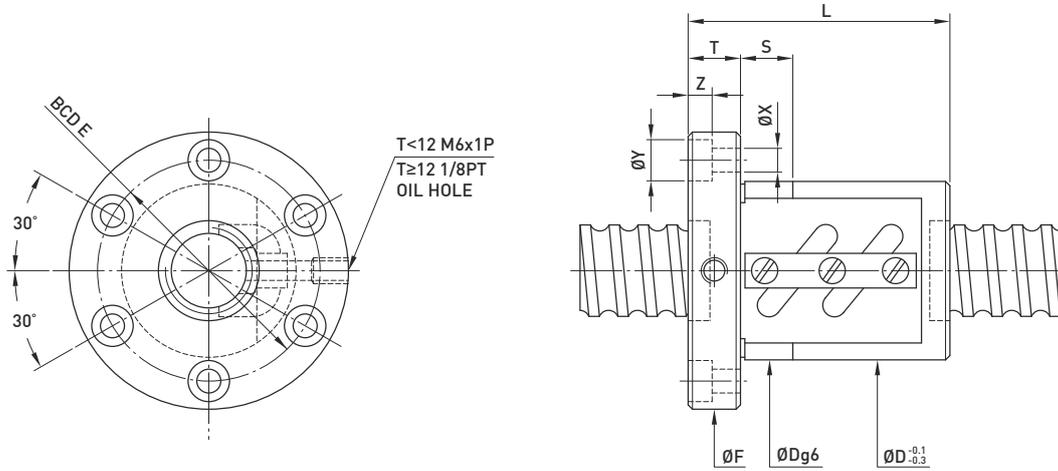
Re-circulation plate below the nut body



Re-circulation plate above the nut body

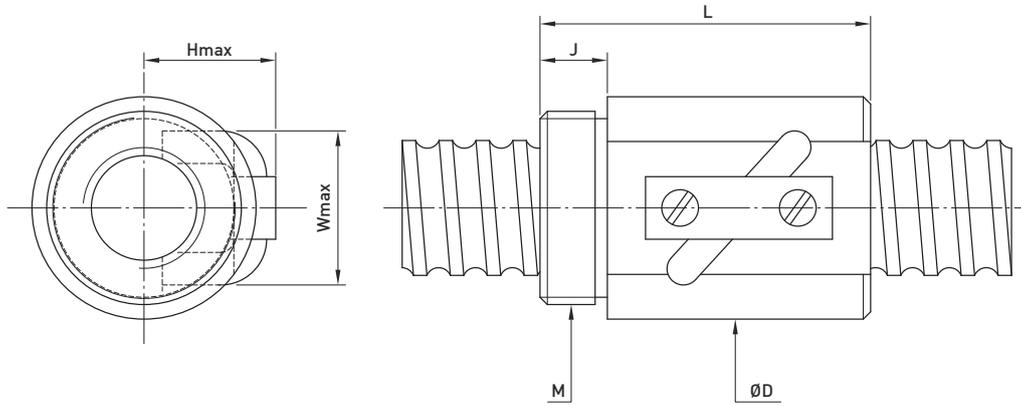
| Model | Size | | Ball Dia. | Circuits | Dynamic Load C(kgf) | Static Load Col(kgf) | Nut | | | Flange | | | Return Tube | | Bolt | | | Fit |
|----------|--------------|------|-----------|----------|---------------------|----------------------|-----|------------------|-----|--------|----|-------|-------------|----|------|------|-----|-----|
| | Nominal Dia. | Lead | | | | | D | D _{min} | L | F | T | BCD-E | W | H | X | Y | Z | |
| R8-3A1 | 8 | 3 | 2 | 1.6x1 | 200 | 310 | 21 | 17 | 28 | 36 | 5 | 28 | 14 | 12 | 4.5 | 0 | 0 | 0 |
| R8-5B1 | 8 | 5 | 2 | 2.6X1 | 320 | 540 | 24 | 18 | 37 | 44 | 8 | 34 | 15 | 13 | 4.5 | 8 | 4 | 0 |
| R10-4B1 | 10 | 4 | 2 | 2.6X1 | 350 | 650 | 24 | 20 | 39 | 46 | 10 | 36 | 16 | 13 | 4.5 | 8 | 4 | 10 |
| R10-5A1 | 10 | 5 | 2 | 1.6x1 | 230 | 390 | 23 | 19 | 30 | 46 | 10 | 36 | 15 | 13 | 4.5 | 8 | 4 | 10 |
| R10-4B1 | 10 | 4 | 2.381 | 2.6X1 | 450 | 780 | 27 | 23 | 41 | 49 | 10 | 37 | 17 | 16 | 4.5 | 8 | 4 | 10 |
| R12-5B1 | 12 | 5 | 2.381 | 2.6X1 | 510 | 980 | 31 | 24 | 40 | 50 | 10 | 40 | 18 | 18 | 4.5 | 8 | 4 | 12 |
| R12-6B1 | 12 | 6 | 2.381 | 2.6X1 | 500 | 980 | 29 | 24 | 43 | 50 | 10 | 40 | 20 | 16 | 4.5 | 8 | 4 | 12 |
| R12-10A1 | 12 | 10 | 2.381 | 1.6x1 | 320 | 590 | 30 | 24 | 42 | 50 | 10 | 40 | 17 | 17 | 4.5 | 8 | 4 | 12 |
| R12-10B1 | 12 | 10 | 2.381 | 2.6X1 | 490 | 960 | 31 | 25 | 50 | 50 | 10 | 40 | 19 | 18 | 4.5 | 8 | 4 | 12 |
| R14-4B1 | 14 | 4 | 2.381 | 2.6X1 | 540 | 1120 | 32 | 26 | 41 | 52 | 10 | 42 | 20 | 17 | 4.5 | 8 | 4 | 12 |
| R15-10B1 | 15 | 10 | 3.175 | 2.6X1 | 810 | 1620 | 34 | 30 | 55 | 57 | 11 | 45 | 24 | 19 | 5.5 | 9.5 | 5.5 | 12 |
| R15-20A1 | 15 | 20 | 3.175 | 1.6x1 | 520 | 1000 | 40 | 32 | 64 | 60 | 11 | 47 | 25 | 22 | 5.5 | 9.5 | 5.5 | 12 |
| R16-5B1 | 16 | 5 | 3.175 | 2.6X1 | 860 | 1760 | 38 | 31 | 45 | 64 | 12 | 51 | 24 | 20 | 5.5 | 9.5 | 5.5 | 12 |
| R16-5B2 | 16 | 5 | 3.175 | 2.6X2 | 1560 | 3520 | 38 | 31 | 60 | 64 | 12 | 51 | 24 | 20 | 5.5 | 9.5 | 5.5 | 12 |
| R20-5B1 | 20 | 5 | 3.175 | 2.6X1 | 970 | 2230 | 42 | 37 | 45 | 68 | 12 | 55 | 26 | 23 | 5.5 | 9.5 | 5.5 | 12 |
| R20-5B2 | 20 | 5 | 3.175 | 2.6X2 | 1760 | 4470 | 42 | 37 | 60 | 68 | 12 | 55 | 26 | 23 | 5.5 | 9.5 | 5.5 | 12 |
| R25-4B2 | 25 | 4 | 2.381 | 2.6X2 | 1290 | 4130 | 45 | 41 | 48 | 69 | 11 | 57 | 29 | 23 | 5.5 | 9.5 | 5.5 | 12 |
| R25-5B2 | 25 | 5 | 3.175 | 2.6X2 | 1950 | 5670 | 49 | 44 | 60 | 74 | 12 | 62 | 33 | 25 | 5.5 | 9.5 | 5.5 | 12 |
| R25-25A1 | 25 | 25 | 3.969 | 1.6X1 | 930 | 2170 | 55 | 50 | 78 | 82 | 12 | 69 | 37 | 29 | 6.6 | 11 | 6.5 | 12 |
| R25-10A2 | 25 | 10 | 4.763 | 1.6X2 | 2200 | 5190 | 55 | 49 | 75 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 12 |
| R25-10B1 | 25 | 10 | 4.763 | 2.6X1 | 1840 | 4220 | 55 | 49 | 65 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 12 |
| R25-10B2 | 25 | 10 | 4.763 | 2.6X2 | 3340 | 8440 | 55 | 49 | 97 | 86 | 15 | 73 | 35 | 30 | 6.6 | 11 | 6.5 | 12 |
| R28-5B1 | 28 | 5 | 3.175 | 2.6X1 | 1130 | 3190 | 54 | 48 | 45 | 85 | 12 | 69 | 34 | 28 | 6.6 | 11 | 6.5 | 12 |
| R28-5B2 | 28 | 5 | 3.175 | 2.6X2 | 2050 | 6390 | 54 | 48 | 60 | 85 | 12 | 69 | 34 | 28 | 6.6 | 11 | 6.5 | 12 |
| R32-4B2 | 32 | 4 | 2.381 | 2.6X2 | 1430 | 5340 | 52 | 49 | 55 | 84 | 12 | 71 | 34 | 27 | 6.6 | 11 | 6.5 | 12 |
| R32-5B2 | 32 | 5 | 3.175 | 2.6X2 | 2180 | 7340 | 57 | 52 | 60 | 84 | 12 | 71 | 34 | 29 | 6.6 | 11 | 6.5 | 12 |
| R32-6B2 | 32 | 6 | 3.969 | 2.6X2 | 2970 | 9240 | 60 | 56 | 63 | 88 | 12 | 75 | 39 | 31 | 6.6 | 11 | 6.5 | 12 |
| R32-10B2 | 32 | 10 | 3.969 | 2.6X2 | 2890 | 8850 | 58 | 54 | 87 | 84 | 12 | 71 | 38 | 31 | 6.6 | 11 | 6.5 | 12 |
| R32-8B2 | 32 | 8 | 4.763 | 2.6X2 | 3710 | 10640 | 62 | 58 | 86 | 96 | 16 | 78 | 40 | 33 | 9 | 14 | 8.5 | 15 |
| R32-25B1 | 32 | 25 | 4.763 | 2.6X1 | 2040 | 5430 | 63 | 58 | 110 | 102 | 16 | 84 | 41 | 32 | 9 | 14 | 8.5 | 15 |
| R32-10B2 | 32 | 10 | 6.35 | 2.6X2 | 5640 | 15040 | 74 | 65 | 98 | 108 | 16 | 90 | 48 | 39 | 9 | 14 | 8.5 | 15 |
| R36-10B2 | 36 | 10 | 6.35 | 2.6X2 | 5790 | 16030 | 72 | 65 | 102 | 125 | 18 | 98 | 45 | 38 | 11 | 17.5 | 11 | 15 |
| R36-20B1 | 36 | 20 | 6.35 | 2.6X1 | 3140 | 7930 | 76 | 66 | 100 | 120 | 18 | 98 | 47 | 39 | 11 | 17.5 | 11 | 15 |
| R40-8B2 | 40 | 8 | 4.763 | 2.6X2 | 4100 | 13320 | 75 | 72 | 86 | 108 | 16 | 90 | 47 | 37 | 9 | 14 | 8.5 | 15 |
| R40-10B2 | 40 | 10 | 6.35 | 2.6X2 | 6100 | 17960 | 78 | 74 | 102 | 125 | 18 | 104 | 53 | 41 | 11 | 17.5 | 11 | 15 |
| R40-16B2 | 40 | 16 | 6.35 | 2.6X2 | 6070 | 17860 | 81 | 73 | 139 | 128 | 18 | 106 | 48 | 41 | 11 | 17.5 | 11 | 15 |
| R40-12B1 | 40 | 12 | 7.144 | 2.6X1 | 3940 | 10140 | 82 | 74 | 81 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 20 |
| R40-12B2 | 40 | 12 | 7.144 | 2.6X2 | 7150 | 20290 | 82 | 74 | 117 | 128 | 18 | 106 | 51 | 42 | 11 | 17.5 | 11 | 20 |
| R45-10B1 | 45 | 10 | 6.35 | 2.6X1 | 3620 | 10390 | 84 | 77 | 74 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 15 |
| R45-10B2 | 45 | 10 | 6.35 | 2.6X2 | 6570 | 20780 | 84 | 77 | 104 | 132 | 18 | 110 | 53 | 44 | 11 | 17.5 | 11 | 15 |
| R55-10B2 | 55 | 10 | 6.35 | 2.6X2 | 7000 | 24650 | 95 | 92 | 103 | 144 | 18 | 122 | 62 | 48 | 11 | 17.5 | 11 | 20 |

FSW Type ◀ Standard Product

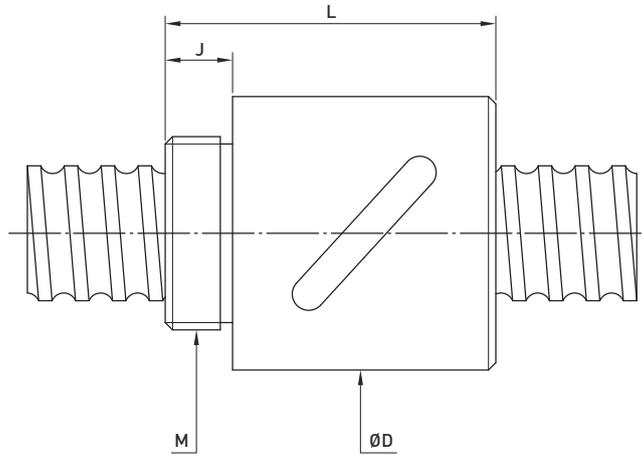


| Model | Size | | Ball Dia. | Circuits | Dynamic Load C [kgf] | Static Load Co [kgf] | Nut | | Flange | | | | | | | Fit |
|----------|--------------|------|-----------|----------|------------------------|------------------------|-----|-----|--------|-------|----|------|------|------|----|-----|
| | Nominal Dia. | Lead | | | | | L | D | F | BCD-E | T | Bolt | | | | |
| | | | | | | | | | | | | X | Y | Z | S | |
| 8-2.5B1 | 8 | 2.5 | 2.000 | 2.5x1 | 218 | 317 | 34 | 26 | 47 | 35 | 8 | 5.5 | 9.5 | 5.5 | 8 | |
| 10-2.5B1 | 10 | 2.5 | 2.000 | 2.5x1 | 252 | 405 | 34 | 28 | 52 | 38 | 8 | 5.5 | 9.5 | 5.5 | 8 | |
| 10-4B1 | 10 | 4 | 2.381 | 2.5x1 | 304 | 466 | 41 | 30 | 53 | 41 | 10 | 5.5 | 9.5 | 5.5 | 10 | |
| 12-4B1 | 12 | 4 | 2.381 | 2.5x1 | 344 | 574 | 41 | 30 | 50 | 40 | 10 | 5.5 | 9.5 | 5.5 | 12 | |
| 16-4B1 | 16 | 4 | 2.381 | 2.5x1 | 390 | 744 | 39 | 36 | 59 | 48 | 10 | 5.5 | 9.5 | 5.5 | 12 | |
| 16-5B1 | 16 | 5 | 3.175 | 2.5x1 | 678 | 1226 | 45 | 40 | 64 | 51 | 12 | 5.5 | 9.5 | 5.5 | 12 | |
| 16-10B1 | 16 | 10 | 3.175 | 2.5x1 | 667 | 1194 | 60 | 42 | 66 | 54 | 10 | 5.5 | 9.5 | 5.5 | 12 | |
| 20-5B1 | 20 | 5 | 3.175 | 2.5x1 | 746 | 1526 | 45 | 44 | 68 | 55 | 12 | 5.5 | 9.5 | 5.5 | 12 | |
| 20-5B2 | 20 | 5 | 3.175 | 2.5x2 | 1353 | 3052 | 60 | 44 | 68 | 55 | 12 | 5.5 | 9.5 | 5.5 | 12 | |
| 20-5C1 | 20 | 5 | 3.175 | 3.5x1 | 1001 | 2149 | 50 | 44 | 68 | 55 | 12 | 5.5 | 9.5 | 5.5 | 12 | |
| 20-10B1 | 20 | 10 | 4.763 | 2.5x1 | 1280 | 2314 | 54 | 46 | 74 | 59 | 13 | 6.6 | 11 | 6.5 | 12 | |
| 25-5B2 | 25 | 5 | 3.175 | 2.5x2 | 1534 | 3975 | 60 | 50 | 74 | 62 | 12 | 5.5 | 9.5 | 5.5 | 12 | |
| 25-10B1 | 25 | 10 | 4.763 | 2.5x1 | 1459 | 2983 | 65 | 60 | 86 | 73 | 16 | 6.6 | 11 | 6.5 | 12 | |
| 25-10B2 | 25 | 10 | 4.763 | 2.5x2 | 2652 | 5966 | 97 | 58 | 85 | 71 | 15 | 6.6 | 11 | 6.5 | 12 | |
| 28-5B1 | 28 | 5 | 3.175 | 2.5x1 | 893 | 2252 | 43 | 54 | 76 | 64 | 12 | 6.6 | 11 | 6.5 | 12 | |
| 28-5B2 | 28 | 5 | 3.175 | 2.5x2 | 1621 | 4503 | 58 | 54 | 76 | 64 | 12 | 6.6 | 11 | 6.5 | 12 | |
| 28-6A2 | 28 | 6 | 3.969 | 1.5x2 | 1395 | 3337 | 55 | 55 | 85 | 65 | 12 | 6.6 | 11 | 6.5 | 12 | |
| 32-5B2 | 32 | 5 | 3.175 | 2.5x2 | 1702 | 5098 | 60 | 58 | 84 | 71 | 12 | 6.6 | 11 | 6.5 | 12 | |
| 32-5C1 | 32 | 5 | 3.175 | 3.5x1 | 1200 | 3205 | 50 | 58 | 84 | 71 | 12 | 6.6 | 11 | 6.5 | 12 | |
| 32-6B2 | 32 | 6 | 3.969 | 2.5x2 | 2328 | 6317 | 63 | 62 | 89 | 75 | 12 | 6.6 | 11 | 6.5 | 12 | |
| 32-10B1 | 32 | 10 | 6.350 | 2.5x1 | 2416 | 5172 | 68 | 74 | 108 | 90 | 16 | 9 | 14 | 8.5 | 15 | |
| 32-10B2 | 32 | 10 | 6.350 | 2.5x2 | 4379 | 10345 | 98 | 74 | 108 | 90 | 16 | 9 | 14 | 8.5 | 15 | |
| 40-5B2 | 40 | 5 | 3.175 | 2.5x2 | 1859 | 6354 | 65 | 68 | 102 | 84 | 16 | 9 | 14 | 8.5 | 15 | |
| 40-6B2 | 40 | 6 | 3.969 | 2.5x2 | 2542 | 7967 | 72 | 70 | 104 | 86 | 16 | 9 | 14 | 8.5 | 15 | |
| 40-10B2 | 40 | 10 | 6.350 | 2.5x2 | 4812 | 12732 | 102 | 84 | 125 | 104 | 18 | 11 | 17.5 | 11 | 15 | |
| 40-12B2 | 40 | 12 | 7.144 | 2.5x2 | 5675 | 14433 | 117 | 90 | 130 | 110 | 18 | 11 | 17.5 | 11 | 15 | |
| 40-16A2 | 40 | 16 | 6.350 | 1.5x2 | 3059 | 7486 | 118 | 86 | 128 | 106 | 15 | 11 | 17.5 | 11 | 15 | |
| 40-16B1 | 40 | 16 | 6.350 | 2.5x1 | 2660 | 6363 | 102 | 86 | 128 | 106 | 15 | 11 | 17.5 | 11 | 15 | |
| 50-6B3 | 50 | 6 | 3.969 | 2.5x3 | 3954 | 15048 | 93 | 84 | 118 | 100 | 16 | 9 | 14 | 8.5 | 15 | |
| 50-6C2 | 50 | 6 | 3.969 | 3.5x2 | 3726 | 14045 | 80 | 84 | 118 | 100 | 18 | 9 | 14 | 8.5 | 15 | |
| 50-12B2 | 50 | 12 | 7.938 | 2.5x2 | 7247 | 20315 | 123 | 100 | 152 | 125 | 22 | 13 | 20 | 13 | 20 | |
| 50-20A2 | 50 | 20 | 6.350 | 1.5x2 | 3436 | 9597 | 114 | 94 | 135 | 114 | 18 | 11 | 17.5 | 11 | 15 | |
| 63-10B2 | 63 | 10 | 6.350 | 2.5x2 | 5873 | 20135 | 130 | 110 | 154 | 130 | 22 | 11 | 17.5 | 11 | 15 | |
| 63-10B3 | 63 | 10 | 6.350 | 2.5x3 | 8324 | 30202 | 137 | 110 | 152 | 130 | 20 | 11 | 17.5 | 11 | 15 | |
| 63-10C2 | 63 | 10 | 6.350 | 3.5x2 | 7868 | 28291 | 128 | 110 | 152 | 130 | 20 | 11 | 17.5 | 11 | 15 | |
| 63-20B2 | 63 | 20 | 9.525 | 2.5x2 | 13494 | 42233 | 176 | 124 | 172 | 147 | 22 | 13 | 20 | 13 | 20 | |
| 80-10B3 | 80 | 10 | 6.350 | 2.5x3 | 9189 | 38525 | 137 | 130 | 176 | 152 | 22 | 13 | 20 | 13 | 20 | |
| 80-10B4 | 80 | 10 | 6.350 | 2.5x4 | 11768 | 51366 | 169 | 130 | 178 | 152 | 22 | 13 | 20 | 13 | 20 | |
| 80-12B3 | 80 | 12 | 7.144 | 2.5x3 | 10811 | 43246 | 159 | 136 | 185 | 159 | 22 | 13 | 20 | 13 | 20 | |
| 80-16B3 | 80 | 16 | 9.525 | 2.5x3 | 21186 | 80675 | 204 | 145 | 192 | 166 | 28 | 13 | 20 | 13 | 25 | |
| 80-20B2 | 80 | 20 | 9.525 | 2.5x2 | 14976 | 53774 | 185 | 144 | 210 | 174 | 28 | 18 | 26 | 17.5 | 25 | |

RSV Type ◀ Standard Product

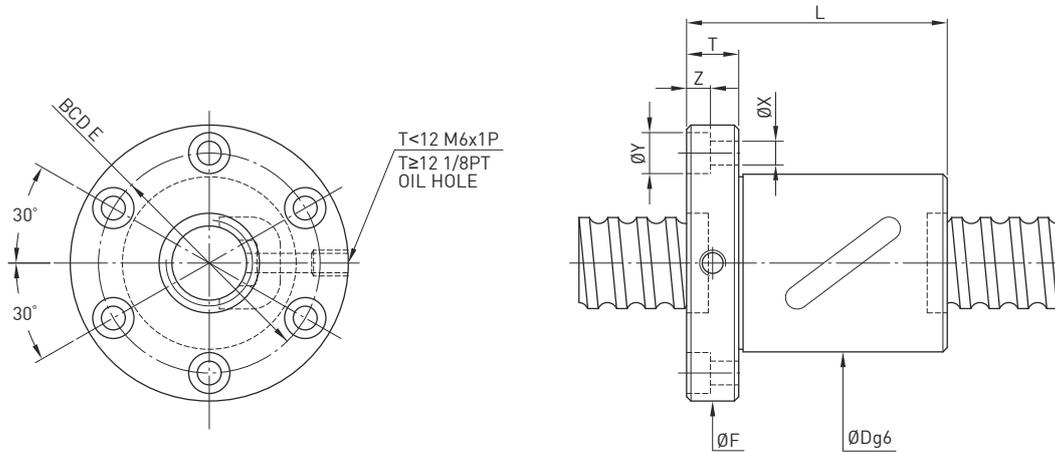


| Model | Size | | Ball Dia. | Circuits | Dynamic Load C [kgf] | Static Load Co [kgf] | Nut | | Mounting Thread M | Mounting Thread Length J | Return Tube Width W | Return Tube Height H |
|-----------|--------------|------|-----------|----------|------------------------|------------------------|-----|-----|-------------------|--------------------------|---------------------|----------------------|
| | Nominal Dia. | Lead | | | | | L | D | | | | |
| 8-2.5B1 | 8 | 2.5 | 2.000 | 2.5x1 | 218 | 317 | 28 | 18 | M18x1P | 10 | 15 | 15 |
| 10-2.5B1 | 10 | 2.5 | 2.000 | 2.5x1 | 252 | 405 | 30 | 20 | M18x1P | 10 | 17 | 17 |
| 10-4B1 | 10 | 4 | 2.381 | 2.5x1 | 305 | 466 | 32 | 23 | M22x1P | 10 | 20 | 20 |
| 12-4B1 | 12 | 4 | 2.381 | 2.5x1 | 344 | 574 | 32 | 25 | M24x1P | 10 | 22 | 21 |
| 16-5B1 | 16 | 5 | 3.175 | 2.5x1 | 679 | 1226 | 40 | 31 | M28x1.5P | 10 | 23 | 25 |
| 16-5.08B1 | 16 | 5.08 | 3.175 | 2.5x1 | 678 | 1226 | 45 | 30 | M25x1.5P | 13 | 24 | 21 |
| 16-5.08C1 | 16 | 5.08 | 3.175 | 3.5x1 | 905 | 1717 | 45 | 30 | M25x1.5P | 13 | 24 | 21 |
| 20-5C1 | 20 | 5 | 3.175 | 3.5x1 | 1001 | 2149 | 45 | 35 | M32x1.5P | 12 | 27 | 22 |
| 25-5B2 | 25 | 5 | 3.175 | 2.5x2 | 1534 | 3975 | 58 | 40 | M38x1.5P | 16 | 31 | 25 |
| 25-10B2 | 25 | 10 | 4.763 | 2.5x2 | 2663 | 6123 | 94 | 45 | M38x1.5P | 16 | 38 | 32 |
| 32-5B2 | 32 | 5 | 3.175 | 2.5x2 | 1702 | 5098 | 60 | 54 | M50x2P | 18 | 38 | 29 |
| 32-10B2 | 32 | 10 | 6.350 | 2.5x2 | 4379 | 10345 | 95 | 58 | M52x2P | 18 | 44 | 36 |
| 40-10B2 | 40 | 10 | 6.350 | 2.5x2 | 4812 | 12732 | 102 | 65 | M60x2P | 25 | 52 | 41 |
| 50-10C2 | 50 | 10 | 6.350 | 3.5x2 | 7146 | 22477 | 130 | 80 | M75x2P | 30 | 62 | 46 |
| 63-10C2 | 63 | 10 | 6.350 | 3.5x2 | 7869 | 28290 | 132 | 95 | M90x2P | 40 | 74 | 52 |
| 63-12C3 | 63 | 12 | 7.938 | 3.5x3 | 16828 | 58535 | 205 | 102 | M95x3P | 35 | 75 | 59 |

RSB Type ◀ Standard Product


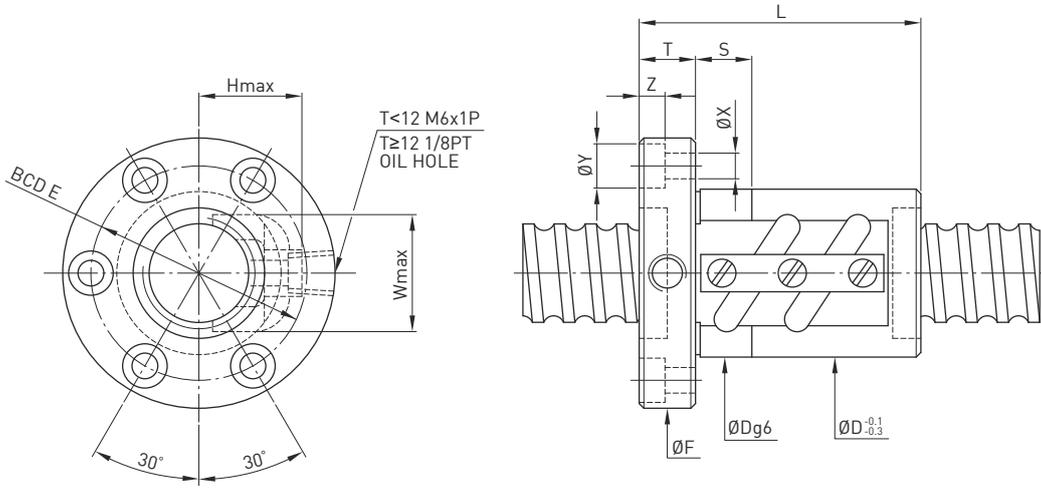
| Model | Size | | Ball Dia. | Circuits | Dynamic Load C (kgf) | Static Load Co (kgf) | Nut | | Mounting Thread M | Mounting Thread Length J |
|----------|--------------|------|-----------|----------|------------------------|------------------------|-----|------|-------------------|--------------------------|
| | Nominal Dia. | Lead | | | | | L | D | | |
| 8-2.5B1 | 8 | 2.5 | 2.000 | 2.5x1 | 218 | 317 | 24 | 22 | M18x1P | 7.5 |
| 10-2.5B1 | 10 | 2.5 | 2.000 | 2.5x1 | 252 | 405 | 24 | 24 | M20x1P | 7.5 |
| 10-4B1 | 10 | 4 | 2.381 | 2.5x1 | 305 | 466 | 34 | 26 | M22x1P | 10 |
| 12-4B1 | 12 | 4 | 2.381 | 2.5x1 | 344 | 574 | 34 | 25.5 | M20x1P | 10 |
| 12-5B1 | 12 | 5 | 2.000 | 2.5x1 | 275 | 481 | 38 | 26 | M20x1P | 8 |
| 16-5B1 | 16 | 5 | 3.175 | 2.5x1 | 678 | 1226 | 42 | 36 | M30x1.5P | 12 |
| 16-10B1 | 16 | 10 | 3.175 | 2.5x1 | 667 | 1194 | 57 | 36 | M30x1.5P | 12 |
| 20-5B1 | 20 | 5 | 3.175 | 2.5x1 | 746 | 1526 | 45 | 38 | M35x1.5P | 15 |
| 20-5C1 | 20 | 5 | 3.175 | 3.5x1 | 1001 | 2149 | 54 | 40 | M36x1.5P | 14 |
| 20-10B1 | 20 | 10 | 4.763 | 2.5x1 | 1280 | 2314 | 60 | 52 | M40x1.5P | 15 |
| 25-5B2 | 25 | 5 | 3.175 | 2.5x2 | 1534 | 3975 | 69 | 46 | M42x1.5P | 19 |
| 32-5B2 | 32 | 5 | 3.175 | 2.5x2 | 1702 | 5098 | 69 | 54 | M50x2P | 19 |
| 32-10B2 | 32 | 10 | 6.350 | 2.5x2 | 4384 | 10345 | 105 | 68 | M62x2P | 19 |
| 40-5B2 | 40 | 5 | 3.175 | 2.5x2 | 1859 | 6354 | 62 | 66 | M62x2P | 19 |
| 40-10B2 | 40 | 10 | 6.350 | 2.5x2 | 4812 | 12732 | 110 | 76 | M70x2P | 24 |
| 50-5B2 | 50 | 5 | 3.175 | 2.5x2 | 2004 | 7941 | 70 | 79 | M70x2P | 24 |
| 50-10C2 | 50 | 10 | 6.350 | 3.5x2 | 7145 | 22477 | 135 | 88 | M82x2P | 29 |
| 63-10C2 | 63 | 10 | 6.350 | 3.5x2 | 7868 | 28291 | 135 | 104 | M95x2P | 29 |

FSB Type ◀ Standard Product



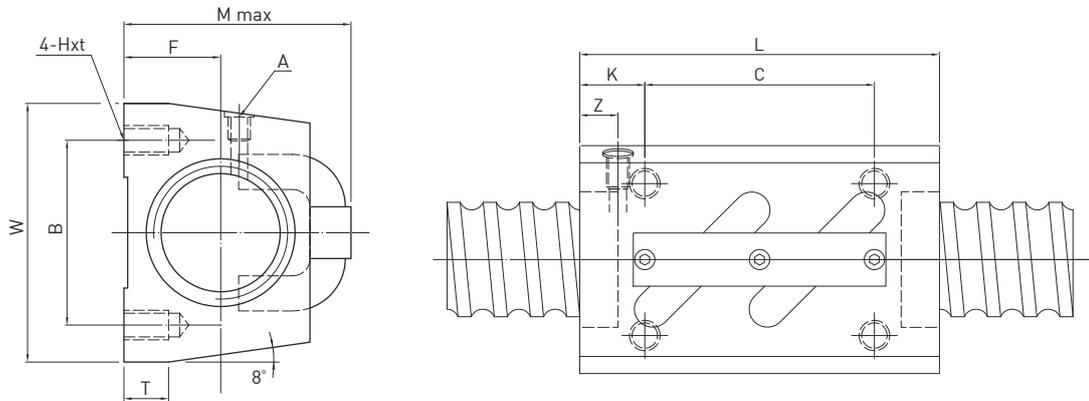
| Model | Size | | Ball Dia. | Circuits | Dynamic Load C [kgf] | Static Load Co [kgf] | Nut | | Flange | | | | | |
|----------|--------------|------|-----------|----------|------------------------|------------------------|-----|-----|--------|-------|----|------|------|-----|
| | Nominal Dia. | Lead | | | | | L | D | F | BCD-E | T | Bolt | | |
| | | | | | | | | | | | | X | Y | Z |
| 8-2.5B1 | 8 | 2.5 | 2.000 | 2.5x1 | 218 | 317 | 34 | 22 | 43 | 31 | 8 | 5.5 | 9.5 | 5.5 |
| 10-2.5B1 | 10 | 2.5 | 2.000 | 2.5x1 | 252 | 405 | 34 | 24 | 46 | 34 | 8 | 5.5 | 9.5 | 5.5 |
| 10-4B1 | 10 | 4 | 2.381 | 2.5x1 | 304 | 466 | 41 | 26 | 49 | 37 | 10 | 5.5 | 9.5 | 5.5 |
| 12-4B1 | 12 | 4 | 2.381 | 2.5x1 | 344 | 574 | 41 | 28 | 51 | 39 | 10 | 5.5 | 9.5 | 5.5 |
| 12-4C1 | 12 | 4 | 2.381 | 3.5x1 | 459 | 803 | 44 | 30 | 50 | 40 | 10 | 4.5 | 8 | 4.5 |
| 14-4C1 | 14 | 4 | 2.381 | 3.5x1 | 498 | 943 | 40 | 31 | 50 | 40 | 10 | 4.5 | 8 | 4.5 |
| 14-5B1 | 14 | 5 | 3.175 | 2.5x1 | 636 | 1095 | 40 | 32 | 50 | 40 | 10 | 4.5 | 8 | 4.5 |
| 16-4B1 | 16 | 4 | 2.381 | 2.5x1 | 390 | 744 | 41 | 35 | 56 | 43 | 10 | 5.5 | 9.5 | 5.5 |
| 16-5B1 | 16 | 5 | 3.175 | 2.5x1 | 679 | 1226 | 43 | 36 | 60 | 47 | 10 | 5.5 | 9.5 | 5.5 |
| 16-10B1 | 16 | 10 | 3.175 | 2.5x1 | 667 | 1194 | 52 | 36 | 60 | 47 | 12 | 6.6 | 11 | 6.5 |
| 20-4C1 | 20 | 4 | 2.381 | 3.5x1 | 582 | 1329 | 40 | 40 | 60 | 50 | 10 | 4.5 | 8 | 4.5 |
| 20-5B1 | 20 | 5 | 3.175 | 2.5x1 | 745 | 1526 | 40 | 40 | 60 | 50 | 10 | 4.5 | 8 | 4.5 |
| 20-5C1 | 20 | 5 | 3.175 | 3.5x1 | 1001 | 2149 | 50 | 40 | 64 | 51 | 12 | 5.5 | 9.5 | 5.5 |
| 20-10B1 | 20 | 10 | 4.763 | 2.5x1 | 1280 | 2314 | 61 | 52 | 82 | 67 | 12 | 6.6 | 11 | 6.5 |
| 25-5B1 | 25 | 5 | 3.175 | 2.5x1 | 845 | 1987 | 40 | 43 | 67 | 55 | 10 | 5.5 | 9.5 | 5.5 |
| 25-5B2 | 25 | 5 | 3.175 | 2.5x2 | 1534 | 3975 | 60 | 46 | 70 | 58 | 12 | 5.5 | 9.5 | 5.5 |
| 25-10B2 | 25 | 10 | 4.763 | 2.5x2 | 2652 | 5966 | 98 | 60 | 96 | 78 | 15 | 5.5 | 9.5 | 5.5 |
| 32-5B2 | 32 | 5 | 3.175 | 2.5x2 | 1702 | 5098 | 60 | 54 | 80 | 67 | 12 | 6.6 | 11 | 6.5 |
| 32-10B1 | 32 | 10 | 6.350 | 2.5x1 | 2416 | 5172 | 68 | 68 | 102 | 84 | 16 | 9 | 14 | 8.5 |
| 32-10B2 | 32 | 10 | 6.350 | 2.5x2 | 4379 | 10345 | 98 | 68 | 102 | 84 | 16 | 9 | 14 | 8.5 |
| 40-10B2 | 40 | 10 | 6.350 | 2.5x2 | 4812 | 12732 | 102 | 76 | 117 | 96 | 18 | 11 | 17.5 | 11 |
| 50-10C2 | 50 | 10 | 6.350 | 3.5x2 | 7146 | 22477 | 126 | 88 | 129 | 108 | 18 | 11 | 17.5 | 11 |
| 63-10C2 | 63 | 10 | 6.350 | 3.5x2 | 7869 | 28290 | 128 | 104 | 146 | 124 | 20 | 11 | 17.5 | 11 |

FSV Type ◀ Standard Product



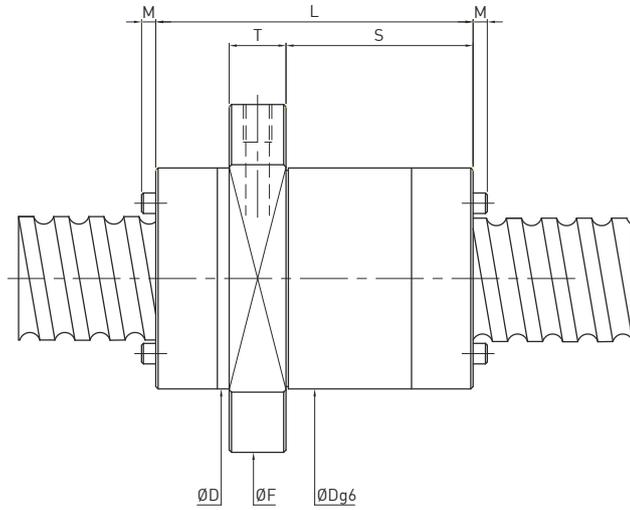
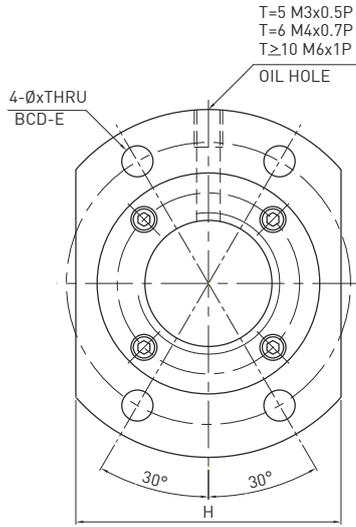
| Model | Size | | Ball Dia. | Circuits | Dynamic Load C (kgf) | Static Load Co (kgf) | Nut | | Flange | | Return Tube | | | Bolt | | Fit | |
|----------|--------------|------|-----------|----------|------------------------|------------------------|-----|-----|--------|-------|-------------|-----|------|------|----|-----|----|
| | Nominal Dia. | Lead | | | | | L | D | F | BCD-E | T | X | Y | Z | W | | H |
| 8-2.5B1 | 8 | 2.5 | 2.000 | 2.5x1 | 218 | 317 | 34 | 18 | 41 | 29 | 8 | 5.5 | 9.5 | 5.5 | 15 | 15 | 8 |
| 10-2.5B1 | 10 | 2.5 | 2.000 | 2.5x1 | 252 | 405 | 34 | 20 | 43 | 31 | 8 | 5.5 | 9.5 | 5.5 | 17 | 17 | 8 |
| 10-4B1 | 10 | 4 | 2.381 | 2.5x1 | 304 | 466 | 41 | 23 | 46 | 34 | 10 | 5.5 | 9.5 | 5.5 | 20 | 20 | 10 |
| 12-4B1 | 12 | 4 | 2.381 | 2.5x1 | 344 | 574 | 41 | 25 | 48 | 36 | 10 | 5.5 | 9.5 | 5.5 | 22 | 21 | 12 |
| 16-5B1 | 16 | 5 | 3.175 | 2.5x1 | 679 | 1226 | 43 | 31 | 55 | 42 | 10 | 5.5 | 9.5 | 5.5 | 23 | 25 | 12 |
| 16-10B1 | 16 | 10 | 3.175 | 2.5x1 | 667 | 1194 | 54 | 30 | 53 | 41 | 10 | 5.5 | 9.5 | 5.5 | 23 | 22 | 12 |
| 20-5B1 | 20 | 5 | 3.175 | 1.5x1 | 746 | 1526 | 46 | 34 | 58 | 46 | 12 | 5.5 | 9.5 | 5.5 | 28 | 25 | 12 |
| 20-5B2 | 20 | 5 | 3.175 | 2.5x2 | 1353 | 3052 | 60 | 34 | 58 | 46 | 12 | 5.5 | 9.5 | 5.5 | 28 | 25 | 12 |
| 20-5C1 | 20 | 5 | 3.175 | 3.5x1 | 1001 | 2149 | 50 | 35 | 59 | 46 | 12 | 5.5 | 9.5 | 5.5 | 27 | 22 | 12 |
| 25-5B2 | 25 | 5 | 3.175 | 2.5x2 | 1534 | 3975 | 60 | 40 | 64 | 52 | 12 | 5.5 | 9.5 | 5.5 | 31 | 25 | 12 |
| 32-5B2 | 32 | 5 | 6.350 | 2.5x2 | 1702 | 5098 | 60 | 54 | 80 | 67 | 12 | 6.6 | 11 | 6.5 | 38 | 29 | 12 |
| 32-10B2 | 32 | 10 | 6.350 | 2.5x2 | 4379 | 10345 | 98 | 58 | 92 | 74 | 16 | 9 | 14 | 8.5 | 44 | 36 | 15 |
| 32-20B1 | 32 | 20 | 6.350 | 2.5x1 | 2415 | 5173 | 100 | 54 | 88 | 70 | 15 | 9 | 14 | 8.5 | 43 | 35 | 15 |
| 40-5B2 | 40 | 5 | 3.175 | 2.5x2 | 1859 | 6354 | 65 | 58 | 92 | 72 | 16 | 9 | 14 | 8.5 | 46 | 34 | 15 |
| 40-10B2 | 40 | 10 | 6.350 | 2.5x2 | 4812 | 12732 | 102 | 65 | 106 | 85 | 18 | 11 | 17.5 | 11 | 52 | 41 | 15 |
| 40-10C2 | 40 | 10 | 6.350 | 3.5x2 | 6473 | 17975 | 120 | 65 | 114 | 90 | 20 | 11 | 17.5 | 11 | 53 | 42 | 15 |
| 50-10C2 | 50 | 10 | 6.350 | 3.5x2 | 7146 | 22477 | 126 | 80 | 121 | 100 | 18 | 11 | 17.5 | 11 | 62 | 46 | 20 |
| 63-10C2 | 63 | 10 | 6.350 | 3.5x2 | 7869 | 28290 | 128 | 95 | 137 | 115 | 20 | 11 | 17.5 | 11 | 74 | 52 | 20 |
| 63-16B2 | 63 | 16 | 9.525 | 2.5x2 | 13676 | 43030 | 153 | 100 | 150 | 123 | 22 | 13 | 20 | 13 | 78 | 62 | 20 |
| 80-10B3 | 80 | 10 | 6.350 | 2.5x3 | 9189 | 38525 | 139 | 115 | 163 | 137 | 22 | 14 | 20 | 13 | 90 | 64 | 20 |
| 80-20B2 | 80 | 20 | 9.525 | 2.5x2 | 14976 | 53774 | 225 | 125 | 190 | 152 | 28 | 18 | 26 | 17.5 | 95 | 75 | 20 |
| 80-20B3 | 80 | 20 | 9.525 | 2.5x3 | 21224 | 80661 | 245 | 125 | 190 | 152 | 28 | 18 | 26 | 17.5 | 95 | 72 | 20 |

SSV Type ◀ Standard Product



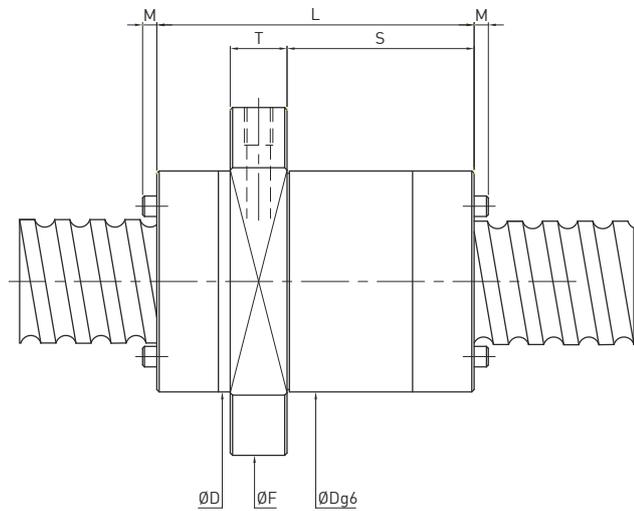
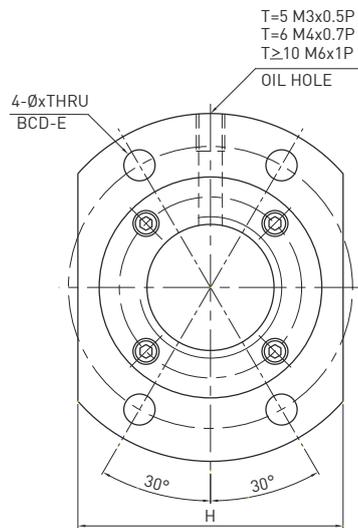
| Model | Size | | Ball Dia. | Circuits | Dynamic Load C [kgf] | Static Load Co [kgf] | W | Hxt | F | L | B | C | K | T | A | M (max) | Z |
|---------|--------------|------|-----------|----------|------------------------|------------------------|-----|--------|----|-----|----|----|------|------|----|---------|----|
| | Nominal Dia. | Lead | | | | | | | | | | | | | | | |
| 14-4B1 | 14 | 4 | 2.381 | 2.5x1 | 376 | 682 | 34 | M4x7 | 13 | 35 | 26 | 22 | 6.5 | 6 | M6 | 30 | 6 |
| 14-4C1 | 14 | 4 | 2.381 | 3.5x1 | 498 | 943 | 34 | M4x7 | 13 | 35 | 26 | 22 | 6.5 | 6 | M6 | 30 | 6 |
| 14-5B1 | 14 | 5 | 3.175 | 2.5x1 | 636 | 1095 | 34 | M4x7 | 13 | 35 | 26 | 22 | 6.5 | 6 | M6 | 31 | 6 |
| 16-5B1 | 16 | 5 | 3.175 | 2.5x1 | 679 | 1226 | 42 | M5x8 | 16 | 36 | 32 | 22 | 7 | 21.5 | M6 | 36 | 6 |
| 20-5B1 | 20 | 5 | 3.175 | 2.5x1 | 745 | 1526 | 48 | M6x10 | 17 | 35 | 35 | 22 | 6.5 | 9 | M6 | 39 | 5 |
| 20-10B1 | 20 | 10 | 4.763 | 2.5x1 | 1280 | 2314 | 48 | M6x10 | 18 | 58 | 35 | 35 | 11.5 | 9 | M6 | 46 | 10 |
| 25-5B1 | 25 | 5 | 3.175 | 2.5x1 | 845 | 1987 | 60 | M8x12 | 20 | 35 | 40 | 22 | 6.5 | 9.5 | M6 | 45 | 7 |
| 25-10B2 | 25 | 10 | 6.350 | 2.5x2 | 3816 | 7968 | 60 | M8x12 | 23 | 94 | 40 | 60 | 17 | 10 | M6 | 54 | 10 |
| 28-6B1 | 28 | 6 | 3.969 | 2.5x1 | 1203 | 2796 | 60 | M8x12 | 22 | 42 | 40 | 18 | 12 | 10 | M6 | 50 | 8 |
| 28-6B2 | 28 | 6 | 3.969 | 2.5x2 | 2184 | 5592 | 60 | M8x12 | 22 | 67 | 40 | 40 | 13.5 | 10 | M6 | 50 | 8 |
| 32-10B1 | 32 | 10 | 6.350 | 2.5x1 | 2413 | 5172 | 70 | M8x12 | 26 | 64 | 50 | 45 | 9.5 | 12 | M6 | 62 | 10 |
| 32-10B2 | 32 | 10 | 6.350 | 2.5x2 | 4379 | 10345 | 70 | M8x12 | 26 | 94 | 50 | 60 | 17 | 12 | M6 | 67 | 10 |
| 36-10B2 | 36 | 10 | 6.350 | 2.5x2 | 4592 | 11403 | 86 | M10x16 | 29 | 96 | 60 | 60 | 18 | 17 | M6 | 67 | 11 |
| 45-12B2 | 45 | 12 | 7.144 | 2.5x2 | 5963 | 16110 | 100 | M12x20 | 36 | 115 | 75 | 75 | 20 | 20.5 | M6 | 80 | 13 |

DFSH Type ◀ High Lead



| Model | Size | | Ball Dia. | Circuits | Dynamic Load C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | | Bolt X | Fit | |
|---------|--------------|------|-----------|----------|------------------------|------------------------|-----|-----|--------|----|-------|-----|--------|------|---|
| | Nominal Dia. | Lead | | | | | D | L | F | T | BCD-E | H | | S | M |
| 10-20V2 | 10 | 20 | 1.5 | 0.8x2 | 100 | 240 | 20 | 23 | 37 | 5 | 29 | 22 | 4.5 | 13 | 0 |
| 12-12S2 | 12 | 12 | 2.381 | 1.8x2 | 460 | 1030 | 26 | 30 | 44 | 6 | 35 | 28 | 4.5 | 15 | 0 |
| 15-10U2 | 15 | 10 | 3.175 | 2.8x2 | 1090 | 2570 | 34 | 44 | 57 | 10 | 45 | 40 | 5.5 | 24 | 0 |
| 15-30S2 | 15 | 30 | 3.175 | 1.8x2 | 700 | 1720 | 34 | 63 | 51 | 10 | 42 | 36 | 4.5 | 43 | 0 |
| 16-16S2 | 16 | 16 | 3.175 | 1.8x2 | 780 | 1830 | 32 | 38 | 53 | 10 | 42 | 38 | 4.5 | 21.5 | 0 |
| 16-16S2 | 16 | 16 | 3.175 | 1.8x2 | 780 | 1830 | 32 | 48 | 53 | 10 | 42 | 38 | 4.5 | 26 | 0 |
| 16-16S2 | 16 | 16 | 3.175 | 1.8x2 | 780 | 1830 | 33 | 48 | 58 | 10 | 45 | 38 | 6.6 | 26 | 0 |
| 16-32V2 | 16 | 32 | 3.175 | 0.8x2 | 340 | 760 | 34 | 34 | 55 | 10 | 45 | 36 | 5.5 | 13.5 | 0 |
| 20-20S2 | 20 | 20 | 3.175 | 1.8x2 | 870 | 2290 | 38 | 45 | 62 | 10 | 50 | 46 | 5.5 | 23.6 | 0 |
| 20-20S2 | 20 | 20 | 3.175 | 1.8x2 | 870 | 2290 | 38 | 58 | 62 | 10 | 50 | 46 | 5.5 | 32.5 | 3 |
| 20-40V2 | 20 | 40 | 3.175 | 0.8x2 | 390 | 980 | 35 | 41 | 58 | 10 | 48 | 40 | 5.5 | 20 | 0 |
| 25-20S2 | 25 | 20 | 3.969 | 1.8x2 | 1280 | 3470 | 47 | 53 | 74 | 12 | 60 | 49 | 6.6 | 30 | 0 |
| 25-25S2 | 25 | 25 | 3.969 | 1.8x2 | 1300 | 3600 | 47 | 55 | 74 | 12 | 60 | 56 | 6.6 | 35 | 0 |
| 25-25S2 | 25 | 25 | 3.969 | 1.8x2 | 1300 | 3600 | 47 | 67 | 74 | 12 | 60 | 56 | 6.6 | 39.5 | 3 |
| 32-32S2 | 32 | 32 | 4.763 | 1.8x2 | 1840 | 5450 | 58 | 70 | 92 | 12 | 74 | 60 | 9 | 42 | 0 |
| 32-32S2 | 32 | 32 | 4.763 | 1.8x2 | 1840 | 5450 | 58 | 85 | 92 | 15 | 74 | 68 | 9 | 48 | 0 |
| 32-64V2 | 32 | 64 | 4.763 | 0.8x2 | 860 | 2460 | 58 | 62 | 89 | 15 | 71 | 58 | 9 | 37 | 0 |
| 38-40S2 | 38 | 40 | 3.969 | 1.8x2 | 1530 | 5360 | 63 | 85 | 93 | 14 | 78 | 70 | 9 | 64 | 0 |
| 40-40S2 | 40 | 40 | 6.350 | 1.8x2 | 3030 | 9220 | 72 | 102 | 114 | 17 | 93 | 84 | 11 | 60 | 0 |
| 50-50S2 | 50 | 50 | 7.938 | 1.8x2 | 4520 | 14440 | 90 | 107 | 135 | 20 | 112 | 92 | 14 | 66.5 | 0 |
| 50-50S2 | 50 | 50 | 7.938 | 1.8x2 | 4520 | 14440 | 90 | 125 | 135 | 20 | 112 | 104 | 14 | 83.5 | 0 |

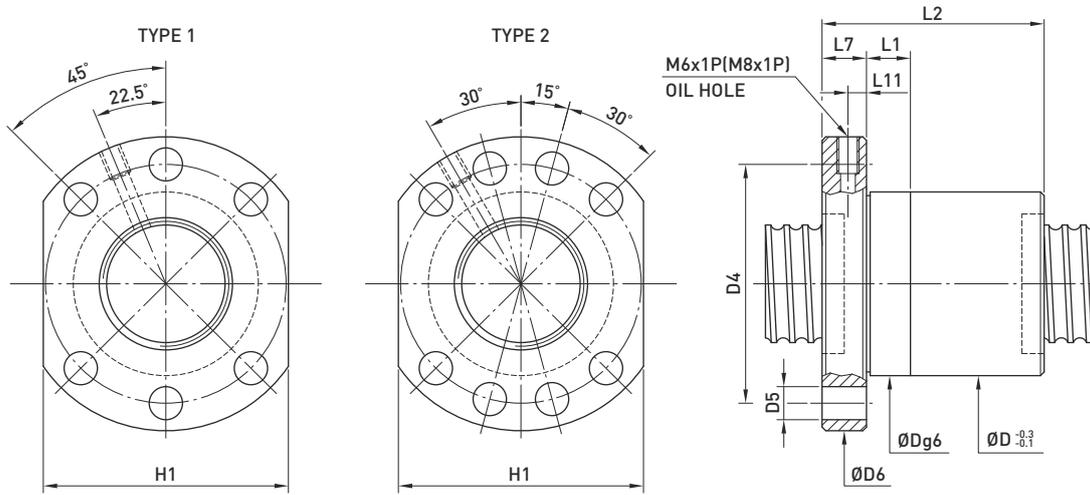
QFSH Type ◀ High Lead



| Model | Size | | Ball Dia. | Circuits | Dynamic Load C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | | Bolt X | Fit | |
|---------|--------------|------|-----------|----------|----------------------|----------------------|-----|-----|--------|----|-------|-----|--------|------|---|
| | Nominal Dia. | Lead | | | | | D | L | F | T | BCD-E | H | | S | M |
| 10-20V4 | 10 | 20 | 1.5 | 0.8x4 | 190 | 480 | 20 | 23 | 37 | 5 | 29 | 22 | 4.5 | 13 | 0 |
| 12-12S4 | 12 | 12 | 2.381 | 1.8x4 | 840 | 2060 | 26 | 30 | 44 | 6 | 35 | 28 | 4.5 | 15 | 0 |
| 15-30S4 | 15 | 30 | 3.175 | 1.8x4 | 1280 | 3450 | 34 | 63 | 51 | 10 | 42 | 36 | 4.5 | 43 | 0 |
| 16-16S4 | 16 | 16 | 3.175 | 1.8x4 | 1420 | 3670 | 32 | 38 | 53 | 10 | 42 | 38 | 4.5 | 21.5 | 0 |
| 16-16S4 | 16 | 16 | 3.175 | 1.8x4 | 1420 | 3670 | 32 | 48 | 53 | 10 | 42 | 38 | 4.5 | 26 | 0 |
| 16-16S4 | 16 | 16 | 3.175 | 1.8x4 | 1420 | 3670 | 33 | 48 | 58 | 10 | 45 | 38 | 6.6 | 26 | 0 |
| 16-32V4 | 16 | 32 | 3.175 | 0.8x4 | 620 | 1520 | 34 | 34 | 55 | 10 | 45 | 36 | 5.5 | 13.5 | 0 |
| 20-20S4 | 20 | 20 | 3.175 | 1.8x4 | 1580 | 4590 | 38 | 45 | 62 | 10 | 50 | 46 | 5.5 | 23.6 | 0 |
| 20-20S4 | 20 | 20 | 3.175 | 1.8x4 | 1580 | 4590 | 38 | 58 | 62 | 10 | 50 | 46 | 5.5 | 32.5 | 3 |
| 20-40V4 | 20 | 40 | 3.175 | 0.8x4 | 710 | 1970 | 35 | 41 | 58 | 10 | 48 | 40 | 5.5 | 20 | 0 |
| 25-25S4 | 25 | 25 | 3.969 | 1.8x4 | 2360 | 7200 | 47 | 55 | 74 | 12 | 60 | 56 | 6.6 | 35 | 0 |
| 25-25S4 | 25 | 25 | 3.969 | 1.8x4 | 2360 | 7200 | 47 | 67 | 74 | 12 | 60 | 56 | 6.6 | 39.5 | 3 |
| 32-32S4 | 32 | 32 | 4.763 | 1.8x4 | 3340 | 10900 | 58 | 70 | 92 | 12 | 74 | 60 | 9 | 42 | 0 |
| 32-32S4 | 32 | 32 | 4.763 | 1.8x4 | 3340 | 10900 | 58 | 85 | 92 | 15 | 74 | 68 | 9 | 48 | 0 |
| 32-64V4 | 32 | 64 | 4.763 | 0.8x4 | 1560 | 4930 | 58 | 62 | 89 | 15 | 71 | 58 | 9 | 37 | 0 |
| 38-40S4 | 38 | 40 | 3.969 | 1.8x4 | 2790 | 10720 | 63 | 85 | 93 | 14 | 78 | 70 | 9 | 64 | 0 |
| 40-40S4 | 40 | 40 | 6.350 | 1.8x4 | 5500 | 18450 | 72 | 102 | 114 | 17 | 93 | 84 | 11 | 60 | 0 |
| 50-50S4 | 50 | 50 | 7.938 | 1.8x4 | 8220 | 28880 | 90 | 107 | 135 | 20 | 112 | 92 | 14 | 66.5 | 0 |
| 50-50S4 | 50 | 50 | 7.938 | 1.8x4 | 8220 | 28880 | 90 | 125 | 135 | 20 | 112 | 104 | 14 | 83.5 | 0 |

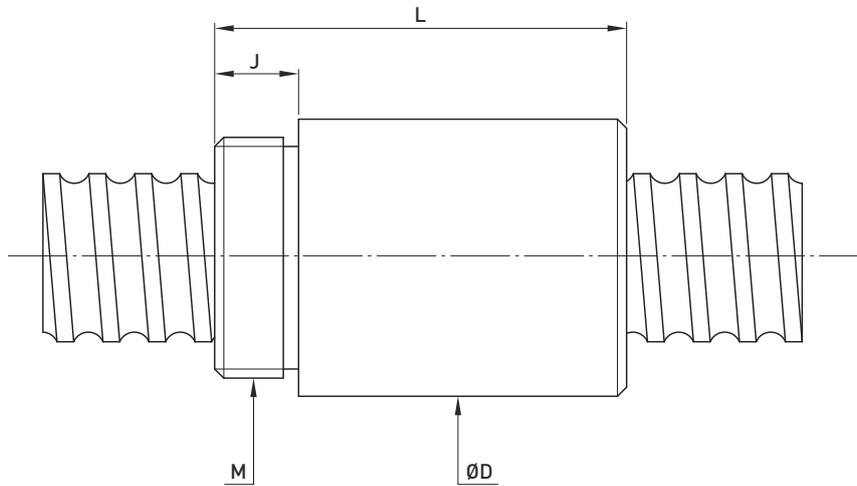
7.5 Dimensions for DIN Rolled Ballscrews

FSC / FSI Type (DIN 69051 part 5 form B) ◀ Stock



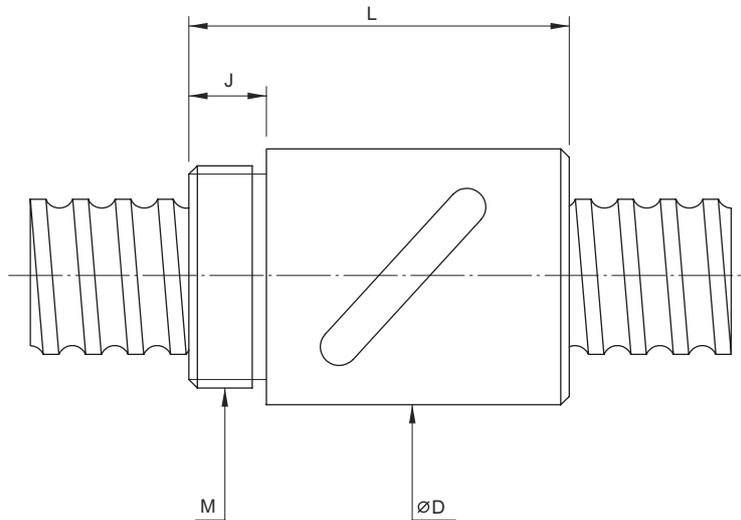
| Model | Size | | Ball Dia. | Circuits | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | Nut | | Flange | | | | | | | | PCD | |
|---------|--------------|------|-----------|----------|---|-------------------------|-----|----|--------|-----|-----|----|----|------|----|-----|-------|------------|
| | Nominal Dia. | Lead | | | | | L2 | D | D4 | D5 | D6 | H1 | L7 | TYPE | L1 | L11 | | M-Oil Hold |
| 15-5K3 | 15 | 5 | 3 | 3 | 990 | 1580 | 38 | 28 | 38 | 5.5 | 48 | 40 | 10 | 1 | 10 | 5 | M6×1P | 14.93 |
| 16-5T3 | 16 | 5 | 3.175 | 3 | 1000 | 2000 | 40 | 28 | 38 | 5.5 | 48 | 40 | 10 | 1 | 10 | 5 | M6×1P | 16.175 |
| 20-5K3 | 20 | 5 | 3.175 | 3 | 1280 | 2410 | 36 | 36 | 47 | 6.6 | 58 | 44 | 10 | 1 | 10 | 5 | M6×1P | 20.2 |
| 20-5K4 | 20 | 5 | 3.175 | 4 | 1670 | 3270 | 40 | 36 | 47 | 6.6 | 58 | 44 | 10 | 1 | 10 | 5 | M6×1P | 20.2 |
| 25-5K3 | 25 | 5 | 3.175 | 3 | 1420 | 3050 | 38 | 40 | 51 | 6.6 | 62 | 48 | 10 | 1 | 10 | 5 | M6×1P | 25.57 |
| 25-5K4 | 25 | 5 | 3.175 | 4 | 1850 | 4150 | 43 | 40 | 51 | 6.6 | 62 | 48 | 10 | 1 | 10 | 5 | M6×1P | 25.57 |
| 25-10K5 | 25 | 10 | 3.175 | 5 | 2260 | 5200 | 70 | 40 | 51 | 6.6 | 62 | 48 | 10 | 1 | 10 | 5 | M6×1P | 25.1 |
| 32-5K4 | 32 | 5 | 3.175 | 4 | 2070 | 5360 | 38 | 50 | 65 | 9 | 80 | 62 | 12 | 1 | 10 | 6 | M6×1P | 32.4 |
| 32-5K6 | 32 | 5 | 3.175 | 6 | 2980 | 8190 | 48 | 50 | 65 | 9 | 80 | 62 | 12 | 1 | 10 | 6 | M6×1P | 32.4 |
| 32-10T3 | 32 | 10 | 6.35 | 3 | 3650 | 8660 | 74 | 50 | 65 | 9 | 80 | 62 | 12 | 1 | 16 | 6 | M6×1P | 34.25 |
| 32-10T4 | 32 | 10 | 6.35 | 4 | 4680 | 11550 | 85 | 50 | 65 | 9 | 80 | 62 | 12 | 1 | 16 | 6 | M6×1P | 34.26 |
| 32-10K5 | 32 | 10 | 3.969 | 5 | 3390 | 8160 | 73 | 50 | 65 | 9 | 80 | 62 | 12 | 1 | 10 | 6 | M6×1P | 32.62 |
| 32-10K6 | 32 | 10 | 3.969 | 6 | 3990 | 9860 | 83 | 50 | 65 | 9 | 80 | 62 | 12 | 1 | 10 | 6 | M6×1P | 32.62 |
| 40-5K4 | 40 | 5 | 3.175 | 4 | 2240 | 6590 | 40 | 63 | 78 | 9 | 93 | 70 | 14 | 2 | 10 | 7 | M8×1P | 40.03 |
| 40-5K6 | 40 | 5 | 3.175 | 6 | 3220 | 10060 | 50 | 63 | 78 | 9 | 93 | 70 | 14 | 2 | 10 | 7 | M8×1P | 40.03 |
| 38-10K3 | 38 | 10 | 6.35 | 3 | 4350 | 9140 | 60 | 63 | 78 | 9 | 93 | 70 | 14 | 2 | 20 | 7 | M8×1P | 39.3 |
| 40-10T3 | 40 | 10 | 6.35 | 3 | 4030 | 10680 | 74 | 63 | 78 | 9 | 93 | 70 | 14 | 2 | 16 | 7 | M8×1P | 41.85 |
| 38-10K4 | 38 | 10 | 6.35 | 4 | 5660 | 12410 | 70 | 63 | 78 | 9 | 93 | 70 | 14 | 2 | 20 | 7 | M8×1P | 39.3 |
| 40-10T4 | 40 | 10 | 6.35 | 4 | 5170 | 14240 | 87 | 63 | 78 | 9 | 93 | 70 | 14 | 2 | 16 | 7 | M8×1P | 41.85 |
| 50-5K4 | 50 | 5 | 3.175 | 4 | 2450 | 8330 | 40 | 75 | 93 | 11 | 110 | 85 | 16 | 2 | 10 | 8 | M8×1P | 50.05 |
| 50-5K6 | 50 | 5 | 3.175 | 6 | 3530 | 12720 | 50 | 75 | 93 | 11 | 110 | 85 | 16 | 2 | 10 | 8 | M8×1P | 50.05 |
| 50-10K3 | 50 | 10 | 6.35 | 3 | 4960 | 12240 | 60 | 75 | 93 | 11 | 110 | 85 | 16 | 2 | 20 | 8 | M8×1P | 51.93 |
| 50-10K4 | 50 | 10 | 6.35 | 4 | 6450 | 16610 | 70 | 75 | 93 | 11 | 110 | 85 | 16 | 2 | 20 | 8 | M8×1P | 51.93 |
| 50-10K6 | 50 | 10 | 6.35 | 6 | 9280 | 25350 | 90 | 75 | 93 | 11 | 110 | 85 | 16 | 2 | 20 | 8 | M8×1P | 51.93 |
| 63-10K6 | 63 | 10 | 6.35 | 6 | 10180 | 31750 | 94 | 90 | 108 | 11 | 125 | 95 | 18 | 2 | 10 | 9 | M8×1P | 64.534 |

RSI Type (with V-thread) ◀ Stock



| Model | Size | | Ball Dia. | Circuits | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | L | D | M | J |
|----------|--------------|------|-----------|----------|---|---------------------------|------|------|--------|-----|
| | Nominal Dia. | Lead | | | | | | | | |
| 8-2.5T2 | 8 | 2.5 | 2.000 | 2 | 133 | 178 | 23.5 | 17.5 | M15x1P | 7.5 |
| 10-2.5T2 | 10 | | | 2 | 178 | 263 | 25 | 19.5 | M17x1P | 7.5 |
| 10-4T2 | 10 | 4 | 2.381 | 2 | 198 | 282 | 32 | 24 | M22x1P | 10 |

RSB Type (with V-thread) ◀ Stock



| Model | Size | | Ball Dia. | Circuits | Dynamic Load 1x10 ⁶ revs C (kgf) | Static Load Co (kgf) | L | D | M | J |
|--------|--------------|------|-----------|----------|---|---------------------------|----|------|--------|----|
| | Nominal Dia. | Lead | | | | | | | | |
| 12-4B1 | 12 | 4 | 2.381 | 2.5x1 | 344 | 574 | 34 | 25.5 | M20x1P | 10 |

8. Composite Ball Screw

8.1 E2 Self-lubricant



• Features:

• Cost savings:

The E2 series saves cost by eliminating piping joint systems, change and waste disposal, and by reducing oil purchases.

• Greatly extends the maintenance period:

The E2 series will supply proper lubrication for long periods of time extending the maintenance period.

• Easy maintenance:

The special construction of the E2 design requires no tools to replace the oil cartridge. There is no disassembly required when adding the E2 option.

• Ideal lubrication position:

The lubrication point is located inside the ball nut allowing for the lubrication to be firmly applied onto the ball tracks.

• Effortless and flexible installation:

The lubrication performs properly in every direction so there are no restrictions when installing the E2.

• Clean and environmentally friendly:

Prevents oil leakage, making the E2 the ideal solution for clean room environments.

• Interchangeable oil selection:

The replaceable oil cartridge can be refilled with any approved lubrication oil.

• Applications for special environments:

The lubrication oil can be combined with grease for better results, especially in dusty, dirty, or wet environments.

• Design Structure:

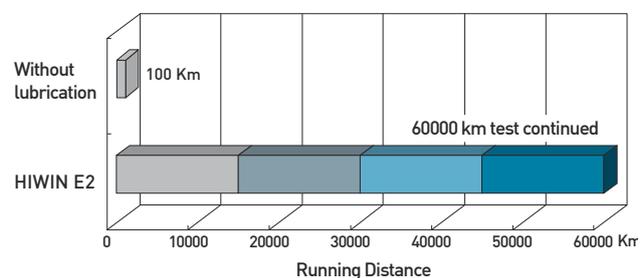
Developed by HIWIN for the purpose of extending the service cycle of a ball screw, this self-lubricant ball screw with a removable oil kit is easy to remove and refill without the need for uninstalling the ball screw from the machine, thus saving the time for service and maintenance.

• Performance:

The E2 series will extend the maintenance period by supplying proper lubrication for long periods of time.

| Test condition : | |
|------------------|------------------------|
| Specification | R40-40K2-FSC |
| Oil | Mobil SHC 636 [50C.C.] |
| Speed | 3000 rpm |
| Stroke | 1000mm |

E2 Performance Test



* Note : above test with no grease added

• Lubricant oil characteristics:

The E2 self-lubricant cartridge is equipped with synthetic hydrocarbon based oil. The lubricant oil has a viscosity grade of ISO VG680.

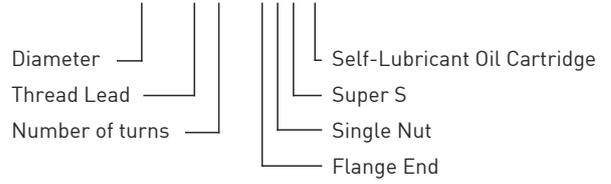
- The E2 is compatible with mineral, hydrocarbon, and ester based greases.
- The E2 can accept synthetic oils with stable characteristics.
- A high viscosity grade will work well in conditions where there are high and low temperatures.
- The low fluid draft factor prevents excessive power consumption.
- Anti-corrosion and rust.
 - ◇ A compatible lubricate oil with the same viscosity grade can also be used in the replaceable cartridge.

• **Application:**

- Industrial machinery : printing machine, paper-processing machine, automatic machine, textile machine, etc.
- Electronic machinery : robots, measuring equipment, X-Y tables, etc.
- Miscellaneous: medical equipment, factory automation equipment, etc.

• **Specification number:**

Example: R40 - 20K3 - FSCE2 - 1200 - 1600 - 0.008



• **Temperature range:**

The ideal E2 temperature range is from -10°C to 60°C, please notify Hiwin engineers if the temperature requirement is out of this range.

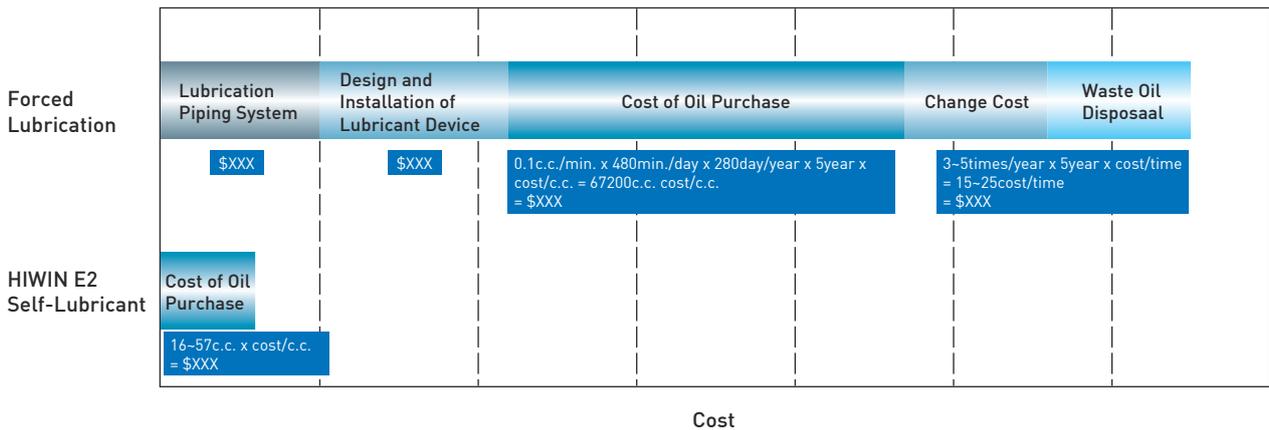
• **Specification:**

Nut type : FSV, FDV, FSW, FDW, PFDW, OFSW, Super S
Please contact HIWIN engineers for other specification needs.

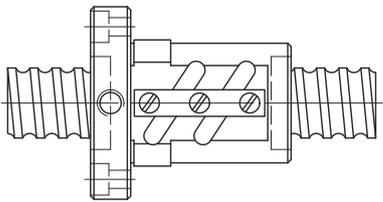
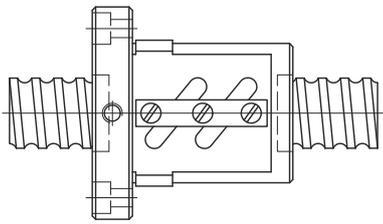
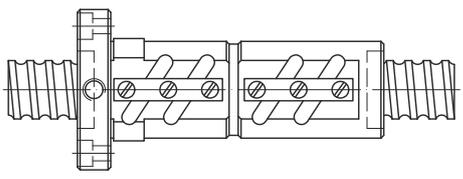
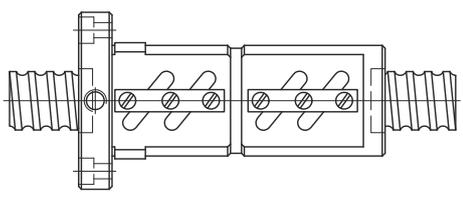
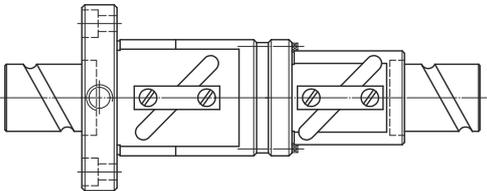
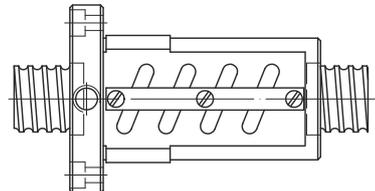
In order to get good lubrication efficiency; please notify HIWIN engineers of the ballscrew installation direction.

• **Cost saving:**

The E2 series saves cost by eliminating piping joint systems, change and waste disposal, and by reducing oil purchases.

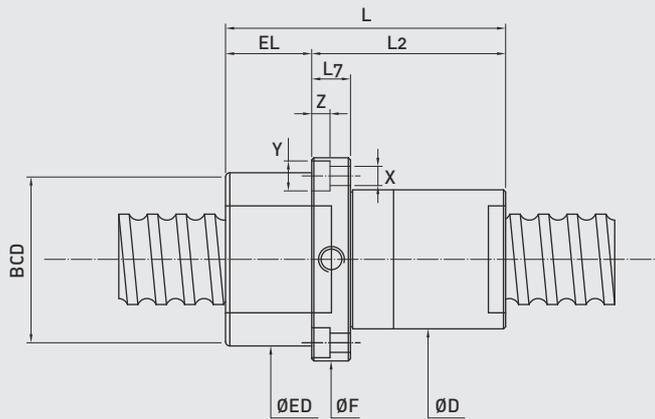


HIWIN E2 Precision Ground Ballscrews

| General Type | |
|--|---|
| <p>FSV</p>  <p>(F)Flange end, (S)single nut, (V)tube above nut diameter</p> | <p>FSW</p>  <p>(F)Flange end, (S)single nut, (W)tube within nut diameter</p> |
| <p>FDV</p>  <p>(F)Flange end, (D)double nut, (V)tube above nut diameter</p> | <p>FDW</p>  <p>(F)Flange end, (D)double nut, (W)tube within nut diameter</p> |
| <p>PFDW</p>  <p>(PF)Flange to flange, (D)double nut, (W)tube within nut diameter</p> | <p>OFSW</p>  <p>(O)Offset pitch preload, (F)flange end, (S)single nut, (W)tube within nut diameter</p> |

Dimension table for E2

(Nut diameter is smaller than the oil cartridge)

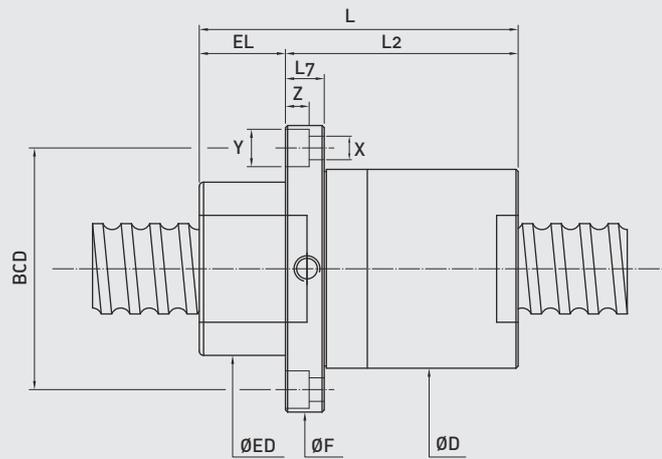


Please remove oil cartridge when installing the nut

| Model | Specification | | | Nut Size | | | | | | | | | E2 Size | | |
|---------|---------------|------|-----------|----------|-----|-----|----|-----|-----|------|-----|----|---------|-----|--|
| | Nominal Dia. | Lead | Ball Dia. | D | L2 | F | L7 | BCD | X | Y | Z | EL | ED | L | |
| 20-10K3 | 20 | 10 | 3.175 | 36 | 47 | 62 | 12 | 47 | 6.6 | 11 | 6.5 | 40 | 49 | 87 | |
| 20-20K2 | 20 | 20 | 3.175 | 36 | 56 | 62 | 12 | 47 | 6.6 | 11 | 6.5 | 40 | 49 | 96 | |
| 25-10K3 | 25 | 10 | 3.175 | 40 | 50 | 66 | 12 | 51 | 6.6 | 11 | 6.5 | 40 | 49 | 90 | |
| 25-25K2 | 25 | 25 | 3.175 | 40 | 69 | 66 | 12 | 51 | 6.6 | 11 | 6.5 | 40 | 49 | 109 | |
| 25-12K4 | 25 | 12 | 3.969 | 45 | 67 | 69 | 12 | 54 | 6.6 | 11 | 6.5 | 40 | 49 | 107 | |
| 32-5K4 | 32 | 5 | 3.175 | 48 | 38 | 77 | 12 | 59 | 9 | 14 | 8.5 | 40 | 62 | 78 | |
| 32-8K5 | 32 | 8 | 3.969 | 50 | 59 | 83 | 12 | 65 | 9 | 14 | 8.5 | 40 | 62 | 99 | |
| 32-10K5 | 32 | 10 | 3.969 | 50 | 73 | 83 | 12 | 65 | 9 | 14 | 8.5 | 40 | 62 | 113 | |
| 32-20K3 | 32 | 20 | 3.969 | 50 | 87 | 83 | 12 | 65 | 9 | 14 | 8.5 | 40 | 62 | 127 | |
| 32-32K2 | 32 | 32 | 3.969 | 50 | 87 | 83 | 12 | 65 | 9 | 14 | 8.5 | 40 | 62 | 127 | |
| 32-10K5 | 32 | 10 | 4.763 | 56 | 79 | 89 | 14 | 71 | 9 | 14 | 8.5 | 40 | 62 | 119 | |
| 32-12K5 | 32 | 12 | 4.763 | 56 | 88 | 89 | 14 | 71 | 9 | 14 | 8.5 | 40 | 62 | 128 | |
| 32-10K5 | 32 | 10 | 6.35 | 62 | 77 | 95 | 18 | 77 | 9 | 14 | 8.5 | 36 | 81 | 113 | |
| 32-12K5 | 32 | 12 | 6.35 | 62 | 87 | 95 | 18 | 77 | 9 | 14 | 8.5 | 36 | 81 | 123 | |
| 32-16K4 | 32 | 16 | 6.35 | 62 | 92 | 95 | 18 | 77 | 9 | 14 | 8.5 | 36 | 81 | 128 | |
| 32-20K3 | 32 | 20 | 6.35 | 62 | 87 | 95 | 18 | 77 | 9 | 14 | 8.5 | 36 | 81 | 123 | |
| 36-8K5 | 36 | 8 | 4.763 | 59 | 64 | 92 | 14 | 74 | 9 | 14 | 8.5 | 36 | 81 | 100 | |
| 36-10K5 | 36 | 10 | 6.35 | 66 | 80 | 99 | 18 | 81 | 9 | 14 | 8.5 | 36 | 81 | 116 | |
| 36-12K5 | 36 | 12 | 6.35 | 66 | 87 | 99 | 18 | 81 | 9 | 14 | 8.5 | 36 | 81 | 123 | |
| 36-16K5 | 36 | 16 | 6.35 | 66 | 109 | 99 | 18 | 81 | 9 | 14 | 8.5 | 36 | 81 | 145 | |
| 36-20K4 | 36 | 20 | 6.35 | 61 | 108 | 94 | 18 | 76 | 9 | 14 | 8.5 | 36 | 81 | 144 | |
| 36-36K2 | 36 | 36 | 6.35 | 61 | 95 | 94 | 18 | 76 | 9 | 14 | 8.5 | 36 | 81 | 131 | |
| 38-8K5 | 38 | 8 | 4.763 | 61 | 64 | 94 | 14 | 76 | 9 | 14 | 8.5 | 36 | 81 | 100 | |
| 38-16K5 | 38 | 16 | 6.35 | 63 | 108 | 96 | 18 | 78 | 9 | 14 | 8.5 | 36 | 81 | 144 | |
| 38-20K4 | 38 | 20 | 6.35 | 63 | 108 | 96 | 18 | 78 | 9 | 14 | 8.5 | 36 | 81 | 144 | |
| 38-25K4 | 38 | 25 | 6.35 | 63 | 127 | 96 | 18 | 78 | 9 | 14 | 8.5 | 36 | 81 | 162 | |
| 38-40K2 | 38 | 40 | 6.35 | 63 | 103 | 96 | 18 | 78 | 9 | 14 | 8.5 | 36 | 81 | 137 | |
| 40-8K5 | 40 | 8 | 4.763 | 63 | 64 | 96 | 14 | 78 | 9 | 14 | 8.5 | 36 | 81 | 100 | |
| 40-10K5 | 40 | 10 | 6.35 | 70 | 83 | 103 | 18 | 85 | 9 | 14 | 8.5 | 36 | 81 | 119 | |
| 40-12K5 | 40 | 12 | 6.35 | 70 | 86 | 103 | 18 | 85 | 9 | 14 | 8.5 | 36 | 81 | 122 | |
| 40-16K5 | 40 | 16 | 6.35 | 70 | 108 | 103 | 18 | 85 | 9 | 14 | 8.5 | 36 | 81 | 144 | |
| 40-20K4 | 40 | 20 | 6.35 | 70 | 110 | 103 | 18 | 85 | 9 | 14 | 8.5 | 36 | 81 | 146 | |
| 40-25K4 | 40 | 25 | 6.35 | 65 | 127 | 98 | 18 | 80 | 9 | 14 | 8.5 | 36 | 81 | 163 | |
| 40-40K2 | 40 | 40 | 6.35 | 65 | 101 | 98 | 18 | 80 | 9 | 14 | 8.5 | 36 | 81 | 137 | |
| 45-10K5 | 45 | 10 | 6.35 | 75 | 78 | 115 | 18 | 93 | 11 | 17.5 | 11 | 36 | 92 | 114 | |
| 45-12K5 | 45 | 12 | 6.35 | 75 | 89 | 115 | 18 | 93 | 11 | 17.5 | 11 | 36 | 92 | 125 | |
| 45-16K5 | 45 | 16 | 6.35 | 75 | 108 | 115 | 18 | 93 | 11 | 17.5 | 11 | 36 | 92 | 144 | |
| 45-20K4 | 45 | 20 | 6.35 | 75 | 108 | 115 | 18 | 93 | 11 | 17.5 | 11 | 36 | 92 | 144 | |
| 45-25K4 | 45 | 25 | 6.35 | 70 | 129 | 110 | 18 | 88 | 11 | 17.5 | 11 | 36 | 92 | 165 | |
| 45-40K3 | 45 | 40 | 6.35 | 70 | 145 | 110 | 18 | 88 | 11 | 17.5 | 11 | 36 | 92 | 181 | |
| 50-10K5 | 50 | 10 | 6.35 | 82 | 80 | 122 | 18 | 100 | 11 | 17.5 | 11 | 36 | 92 | 116 | |
| 50-12K5 | 50 | 12 | 6.35 | 82 | 90 | 122 | 18 | 100 | 11 | 17.5 | 11 | 36 | 92 | 126 | |
| 50-16K5 | 50 | 16 | 6.35 | 82 | 109 | 122 | 18 | 100 | 11 | 17.5 | 11 | 36 | 92 | 145 | |
| 50-20K4 | 50 | 20 | 6.35 | 82 | 106 | 122 | 18 | 100 | 11 | 17.5 | 11 | 36 | 92 | 142 | |
| 50-25K4 | 50 | 25 | 6.35 | 75 | 129 | 115 | 18 | 93 | 11 | 17.5 | 11 | 36 | 92 | 165 | |
| 50-30K4 | 50 | 30 | 6.35 | 75 | 147 | 115 | 18 | 93 | 11 | 17.5 | 11 | 36 | 92 | 183 | |
| 50-40K3 | 50 | 40 | 6.35 | 75 | 145 | 115 | 18 | 93 | 11 | 17.5 | 11 | 36 | 92 | 181 | |
| 50-30K2 | 50 | 30 | 7.144 | 82 | 92 | 122 | 18 | 100 | 11 | 17.5 | 11 | 36 | 92 | 128 | |

Dimension table for E2

(Nut diameter is larger than the oil cartridge)



| Model | Specification | | | Nut Size | | | | | | | | E2 Size | | |
|---------|---------------|------|-----------|----------|-----|-----|----|-----|-----|------|-----|---------|----|-----|
| | Nominal Dia. | Lead | Ball Dia. | D | L2 | F | L7 | BCD | X | Y | Z | EL | ED | L |
| 20-10K3 | 20 | 10 | 3.175 | 51 | 47 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 40 | 49 | 87 |
| 20-20K2 | 20 | 20 | 3.175 | 51 | 56 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 40 | 49 | 96 |
| 25-10K3 | 25 | 10 | 3.175 | 51 | 50 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 40 | 49 | 90 |
| 25-25K2 | 25 | 25 | 3.175 | 51 | 69 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 40 | 49 | 109 |
| 25-12K4 | 25 | 12 | 3.969 | 51 | 67 | 76 | 12 | 62 | 6.6 | 11 | 6.5 | 40 | 49 | 107 |
| 32-5K4 | 32 | 5 | 3.175 | 64 | 38 | 95 | 12 | 78 | 9 | 14 | 8.5 | 40 | 62 | 78 |
| 32-8K5 | 32 | 8 | 3.969 | 64 | 59 | 95 | 12 | 78 | 9 | 14 | 8.5 | 40 | 62 | 99 |
| 32-10K5 | 32 | 10 | 3.969 | 64 | 73 | 95 | 12 | 78 | 9 | 14 | 8.5 | 40 | 62 | 113 |
| 32-20K3 | 32 | 20 | 3.969 | 64 | 87 | 95 | 12 | 78 | 9 | 14 | 8.5 | 40 | 62 | 127 |
| 32-32K2 | 32 | 32 | 3.969 | 64 | 87 | 95 | 12 | 78 | 9 | 14 | 8.5 | 40 | 62 | 127 |
| 32-10K5 | 32 | 10 | 4.763 | 64 | 79 | 95 | 14 | 78 | 9 | 14 | 8.5 | 40 | 62 | 119 |
| 32-12K5 | 32 | 12 | 4.763 | 64 | 88 | 95 | 14 | 78 | 9 | 14 | 8.5 | 40 | 62 | 128 |
| 32-10K5 | 32 | 10 | 6.35 | 83 | 77 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 113 |
| 32-12K5 | 32 | 12 | 6.35 | 83 | 87 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 123 |
| 32-16K4 | 32 | 16 | 6.35 | 83 | 92 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 128 |
| 32-20K3 | 32 | 20 | 6.35 | 83 | 87 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 123 |
| 36-8K5 | 36 | 8 | 4.763 | 83 | 64 | 114 | 14 | 97 | 9 | 14 | 8.5 | 36 | 81 | 100 |
| 36-10K5 | 36 | 10 | 6.35 | 83 | 80 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 116 |
| 36-12K5 | 36 | 12 | 6.35 | 83 | 87 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 123 |
| 36-16K5 | 36 | 16 | 6.35 | 83 | 109 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 145 |
| 36-20K4 | 36 | 20 | 6.35 | 83 | 108 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 144 |
| 36-36K2 | 36 | 36 | 6.35 | 83 | 95 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 131 |
| 38-8K5 | 38 | 8 | 4.763 | 83 | 64 | 114 | 14 | 97 | 9 | 14 | 8.5 | 36 | 81 | 100 |
| 38-16K5 | 38 | 16 | 6.35 | 83 | 108 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 144 |
| 38-20K4 | 38 | 20 | 6.35 | 83 | 108 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 144 |
| 38-25K4 | 38 | 25 | 6.35 | 83 | 127 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 162 |
| 38-40K2 | 38 | 40 | 6.35 | 83 | 103 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 137 |
| 40-8K5 | 40 | 8 | 4.763 | 83 | 64 | 114 | 14 | 97 | 9 | 14 | 8.5 | 36 | 81 | 100 |
| 40-10K5 | 40 | 10 | 6.35 | 83 | 83 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 119 |
| 40-12K5 | 40 | 12 | 6.35 | 83 | 86 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 122 |
| 40-16K5 | 40 | 16 | 6.35 | 83 | 108 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 144 |
| 40-20K4 | 40 | 20 | 6.35 | 83 | 110 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 146 |
| 40-25K4 | 40 | 25 | 6.35 | 83 | 127 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 163 |
| 40-40K2 | 40 | 40 | 6.35 | 83 | 101 | 114 | 18 | 97 | 9 | 14 | 8.5 | 36 | 81 | 137 |
| 45-10K5 | 45 | 10 | 6.35 | 94 | 78 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 114 |
| 45-12K5 | 45 | 12 | 6.35 | 94 | 89 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 125 |
| 45-16K5 | 45 | 16 | 6.35 | 94 | 108 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 144 |
| 45-20K4 | 45 | 20 | 6.35 | 94 | 108 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 144 |
| 45-25K4 | 45 | 25 | 6.35 | 94 | 129 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 165 |
| 45-40K3 | 45 | 40 | 6.35 | 94 | 145 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 181 |
| 50-10K5 | 50 | 10 | 6.35 | 94 | 80 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 116 |
| 50-12K5 | 50 | 12 | 6.35 | 94 | 90 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 126 |
| 50-16K5 | 50 | 16 | 6.35 | 94 | 109 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 145 |
| 50-20K4 | 50 | 20 | 6.35 | 94 | 106 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 142 |
| 50-25K4 | 50 | 25 | 6.35 | 94 | 129 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 165 |
| 50-30K4 | 50 | 30 | 6.35 | 94 | 147 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 183 |
| 50-40K3 | 50 | 40 | 6.35 | 94 | 145 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 181 |
| 50-30K2 | 50 | 30 | 7.144 | 94 | 92 | 133 | 18 | 112 | 11 | 17.5 | 11 | 36 | 92 | 128 |

8.2 Rotating Nut

8.2.1 R1 Rotating Nut



• **Application:**

Semi-conductor industries, Robots, Wood Processing machines, Laser cutting machines, Transporting equipment.

• **Features:**

R1 series ball screw integrates the ball nut with a bearing.

1. Compact and high positioning:

A compact design using nut and support bearing as an integrated unit. A 45-degree steel ball contact angle provides a better axial load. Zero backlash and high stiffness construction for highly accurate positioning.

2. Simple installation:

Nut easily bolts directly to housing.

3. Rapid feed:

The integrated unit rotating on a fixed shaft produces no inertial resistance allowing rapid feed with lower power requirements.

4. Stiffness:

The integrated unit has an angular contact construction and zero backlash when rotating for increased load and moment stiffness.

5. Quiet:

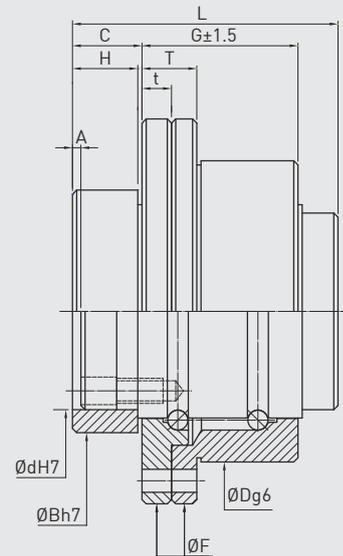
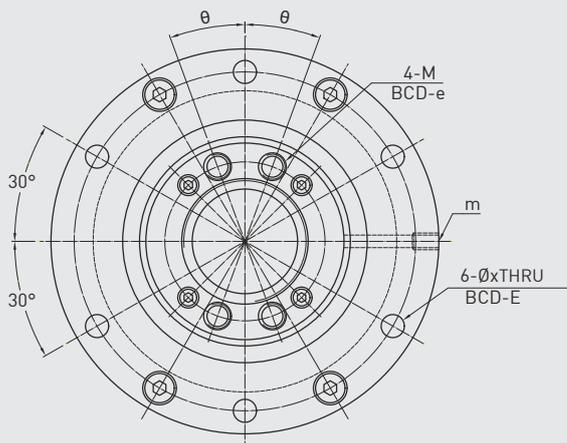
A special end cap design allows steel balls to circulate inside the nut. Noise generated by high speed operation is lower than in an ordinary ballscrew.

• **Specification:**

Example: 2R40-40S2-DFSHR1-800-1000-0.018

↓
HIWIN R1 code

R1 ROTATING NUT



| Model | Bearing | | Nut | | | | Flange | | | | Bolt | | | | Bush | | | | Oil hole |
|---------|-------------------|------------------|-----|----|-----|------|--------|----|----|-------|-------|----|----------|-----|------|-----|------|---|----------|
| | Dynamic Load(kgf) | Static Load(kgf) | D | G | L | C | F | T | t | BCD-E | BCD-e | θ | M | X | d | B | H | A | |
| 16-16S2 | 798 | 1392 | 52 | 25 | 44 | 11.4 | 68 | 13 | 6 | 60 | 26 | 20 | M4x0.7P | 4.5 | 33 | 40 | 11 | 2 | M4x0.7P |
| 20-20S2 | 1115 | 2005 | 62 | 30 | 50 | 12 | 78 | 13 | 6 | 70 | 31 | 20 | M5x0.8P | 4.5 | 39 | 50 | 11 | 2 | M4x0.7P |
| 25-25S2 | 1228 | 2486 | 72 | 37 | 63 | 16.5 | 92 | 13 | 7 | 81 | 38 | 20 | M6x1P | 5.5 | 47 | 58 | 15.5 | 2 | M4x0.7P |
| 32-32S2 | 2010 | 4134 | 80 | 47 | 80 | 21 | 105 | 20 | 10 | 91 | 48 | 25 | M6x1P | 6.6 | 58 | 66 | 20 | 3 | M6x0.75P |
| 40-40S2 | 3127 | 6906 | 110 | 62 | 98 | 22.5 | 140 | 20 | 10 | 123 | 61 | 25 | M8x1.25P | 9 | 73 | 90 | 21.5 | 3 | M6x0.75P |
| 50-50S2 | 4280 | 9623 | 120 | 77 | 126 | 29 | 156 | 20 | 10 | 136 | 75 | 25 | M10x1.5P | 11 | 90 | 100 | 28 | 4 | M6x0.75P |

8.2.1 R2 Rotating Nut



• Application:

Semi-conductor industries, Robots, Wood Processing machines , Laser cutting machines, Transporting equipment.

• Features:

1. **Compact:**
The integrated nut/ bearing and reduced flange thickness design offers a compact assembly much smaller than conventional designs.
2. **Simple installation:**
Nut easily bolts directly to housing.
3. **Energy saving:**
The fixed screw creates no inertial force

reducing the need for additional motor drive force on long strokes.

4. Increased outer ring rigidity:

The outer ring bearing has a back-to back-design. The longer support distance resists bending moments and increases rigidity 20-30% above traditional face-to-face bearings.

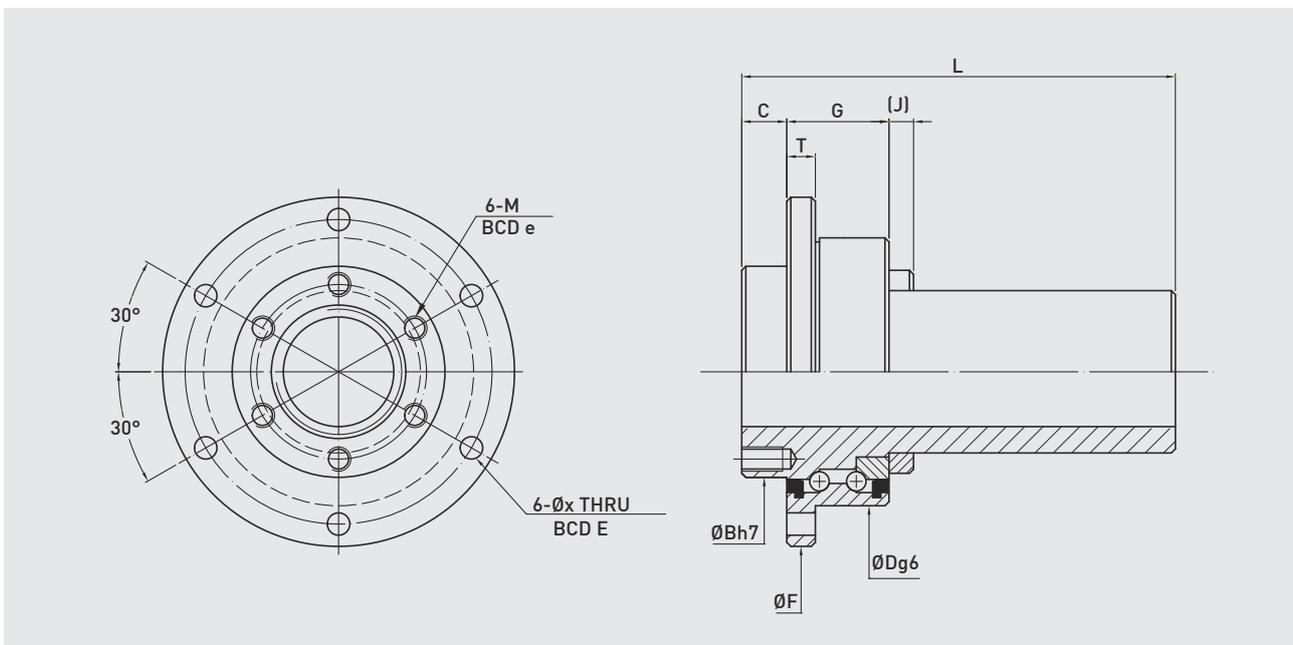
5. Improved dust resistance

A dustproof component has been added between the bearing and the nut body to reduce the gap present in traditional designs and improve contamination resistance.

• Specification:

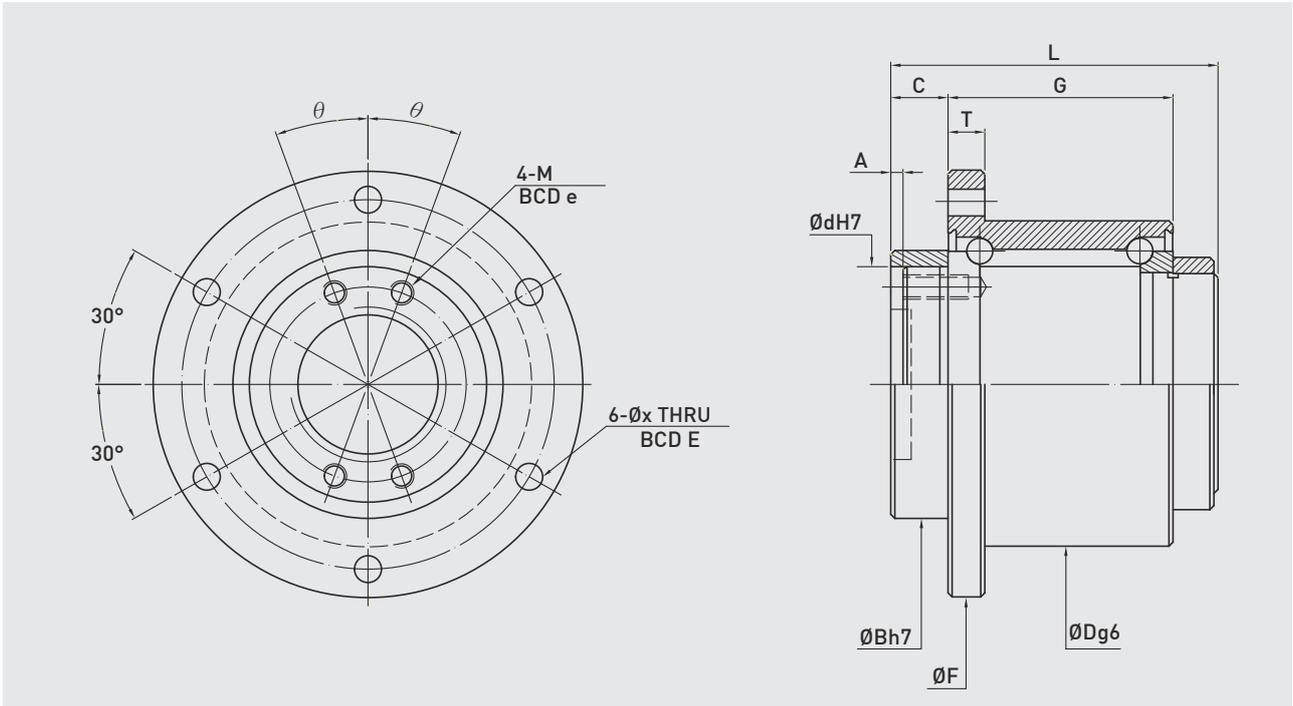
Example: 4R25 - 25K4 - DFSCR2EW - 800 - 1000 - 0.05

↓
HIWIN R2 code



| Model | Bearing | | Nut | | | | Flange | | | Bolt | | | |
|---------|-------------------|------------------|-----|----|-----|----|--------|-----|----|-------|-------|----------|-----|
| | Dynamic Load(kgf) | Static Load(kgf) | D | G | L | C | J | F | T | BCD-E | BCD-e | M | X |
| 25-5T6 | 1243 | 2567 | 66 | 25 | 92 | 13 | 6 | 86 | 7 | 75 | 43 | M6x1P | 5.5 |
| 25-10T6 | 1243 | 2567 | 66 | 25 | 106 | 11 | 6 | 86 | 7 | 75 | 43 | M6x1P | 5.5 |
| 32-5T6 | 2050 | 4277 | 78 | 25 | 94 | 11 | 10 | 103 | 8 | 89 | 53 | M6x1P | 6.6 |
| 32-6T6 | 2050 | 4277 | 78 | 25 | 102 | 11 | 10 | 103 | 8 | 89 | 53 | M6x1P | 6.6 |
| 32-10T6 | 2050 | 4277 | 78 | 25 | 134 | 11 | 10 | 103 | 8 | 89 | 53 | M6x1P | 6.6 |
| 36-10T6 | 2574 | 5594 | 92 | 33 | 151 | 14 | 10 | 122 | 10 | 105 | 61 | M8x1.25P | 9 |

R2 ROTATING NUT



| Model | Bearing | | Nut | | | | Flange | | Bolt | | | | Collar | | | |
|---------|-------------------|------------------|-----|----|-----|----|--------|----|-------|-------|----------|----------|--------|----|-----|---|
| | Dynamic Load(kgf) | Static Load(kgf) | D | G | L | C | F | T | BCD-E | BCD-e | θ | M | X | d | B | A |
| 25-25K4 | 1243 | 2567 | 72 | 43 | 65 | 8 | 92 | 8 | 81 | 38 | 20 | M6x1P | 5.5 | 47 | 58 | 3 |
| 32-32K4 | 2046 | 4277 | 80 | 55 | 80 | 9 | 105 | 9 | 91 | 48 | 20 | M6x1P | 6.6 | 58 | 66 | 3 |
| 50-50K4 | 4368 | 10264 | 120 | 80 | 126 | 12 | 156 | 12 | 136 | 75 | 25 | M10x1.5P | 11 | 90 | 100 | 2 |

8.3 Heavy Load Ballscrew HL Series

HIWIN Heavy load ballscrews come with a special thread and return design which improves the load force a ballscrew can sustain. Compared to a normal ballscrew, it has a higher service life when applied under heavy load force.

• Application:

Heavy Load ballscrews can be used on All-electric injection molding machines, Die-cast machines, Semi-conductor manufacturing machines, Heavy duty actuators, Forging machines etc.

• Features:

1. Heavy Load:

Load Capacity can be up to 2-3 times higher compared to standard series. It sustains a much heavier axial load and higher acceleration and deceleration.

2. Accuracy:

JIS grade C7 accuracy.

3. High Speed:

Super S and RD Series adopt tangent return design, DN Value is up to 160,000.

4. Quietness:

RD Series Heavy Load Ballscrews adopt a tangent return design with spacers inserted in between the balls to help reduce noise created by friction between the balls.

Nominal Diameter: $\varnothing 40\sim\varnothing 125\text{mm}$

Lead: 10~25mm

DN Value: Max. 130,000



External return type Heavy Load Ballscrew
(External Return Type)

Nominal Diameter: $\varnothing 36\sim\varnothing 125\text{mm}$

Lead: 10~50mm

DN Value: Max. 160,000

(can include Q1 spacers)



External type Heavy Load Ballscrew
(RD Series)

Nominal Diameter: $\varnothing 50\sim\varnothing 80\text{mm}$

Lead: 30~50mm

DN Value: Max. 160,000



Cassette return type Heavy Load Ballscrew
(Super S Type)

• Technical Illustration:

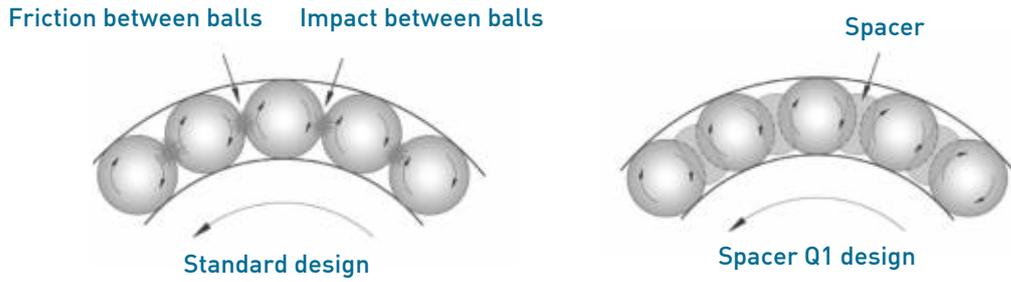
1. High Load Design

(1) Special Groove design:

Heavy Load ballscrew HL Series uses special groove and optimum geometric design to reduce the axial load it can sustain and also improve its service life.

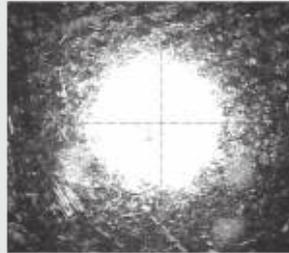
(2) Spacer (Q1)

In high load operation, strong friction will lower the service life of ballscrews. The Q1 spacer design eliminates the impact between the balls and further to improve the service life.

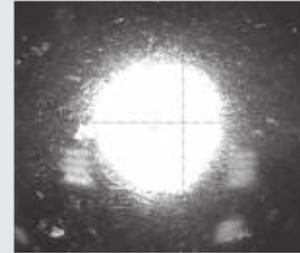


High Load sustainability test

Specification: R80-20Z2-FSPQ1
 Max. Load: 277kN
 Max. Speed: 1200RPM
 Cycle time: 4s
 Test distance: 1 million times
 Lubricant: HIWIN G01



Ball surface without spacer

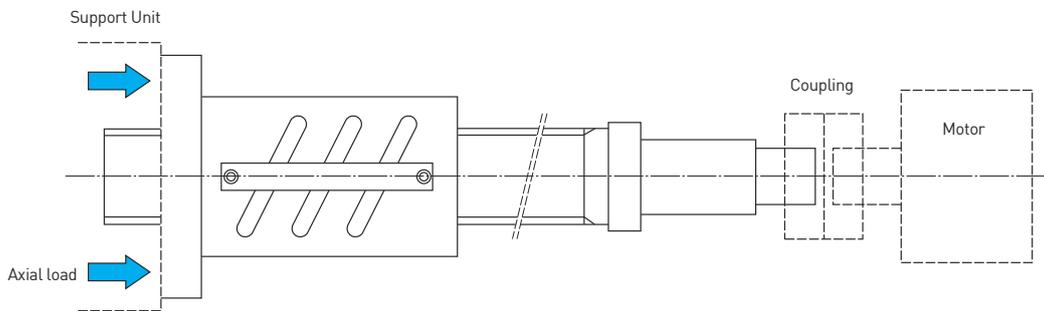


Ball surface with spacer

※ Recommend for temperatures not exceeding 70°C.

2.Recommended Installation

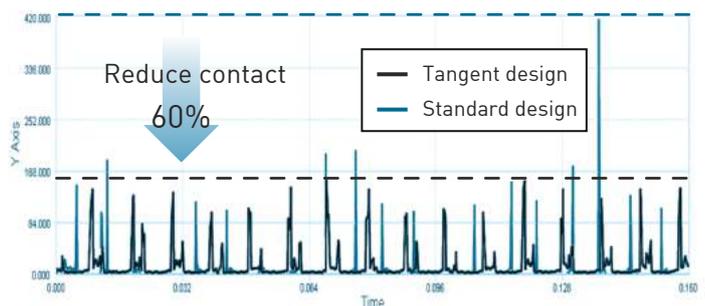
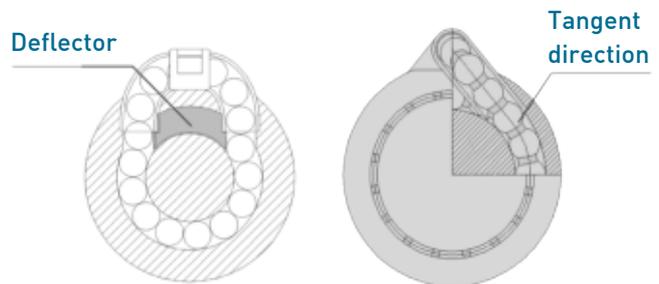
It is recommended to install the heavy load ball screws as per the picture illustrated below in order to protect balls from excessive wear and increase the service life of the ballscrew.



3.High Dm-N Design

(1) External Return Type
 To reduce the wear caused by external force when at high speed, the return system is designed with a strong structure deflector and its DmN value can reach up to 130,000 MAX.

(2) Super S & RD Series
 Super S and RD series uses tangent path recirculation design which helps to minimize the impact when balls pass through the return element and also improve the smoothness of the ballscrew. It can also reduce the operation noise, the DmN value can reach 160,000 max.



3. Quietness

RD series uses tangent return design and spacers between the balls which eliminates the contact of balls with the return element and also between the balls. It can reduce the noise of the ballscrew 5~7dBA as compared to the traditional external return design.

• Precautions:

1. Lubrication

Sufficient lubrication is required for ballscrew operation in order to achieve the service life of the ballscrew. The grease will gradually deteriorate with use so it is important to periodically lubricate in order to maintain the efficiency of the ballscrew.

- ※ It is recommended that the grease used for lubrication to contains extreme pressure additives or use HIWIN G01 series grease.
- ※ To ensure the grease can lubricate the ball screw directly, it is recommended to have a lubrication hole on each circuit.

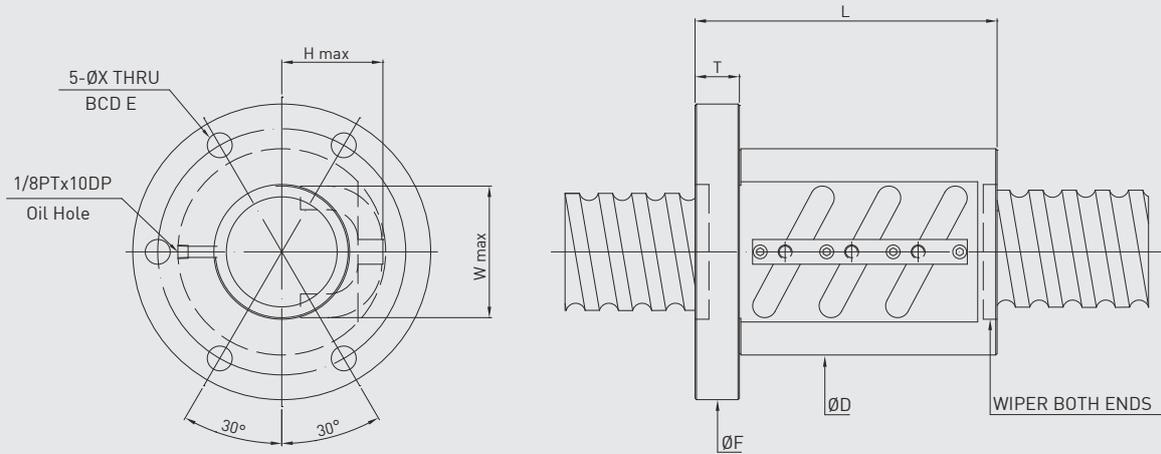
2. Lead Accuracy and Axial backlash

The standard accuracy for Heavy load ball screw (HL Series) is JIS C7 (0.05). To ensure the service life of the ball screw and avoid excessive rise in temperature, nuts are not preloaded. Standard backlash is 0.02~0.05mm MAX.

3. Axial Load

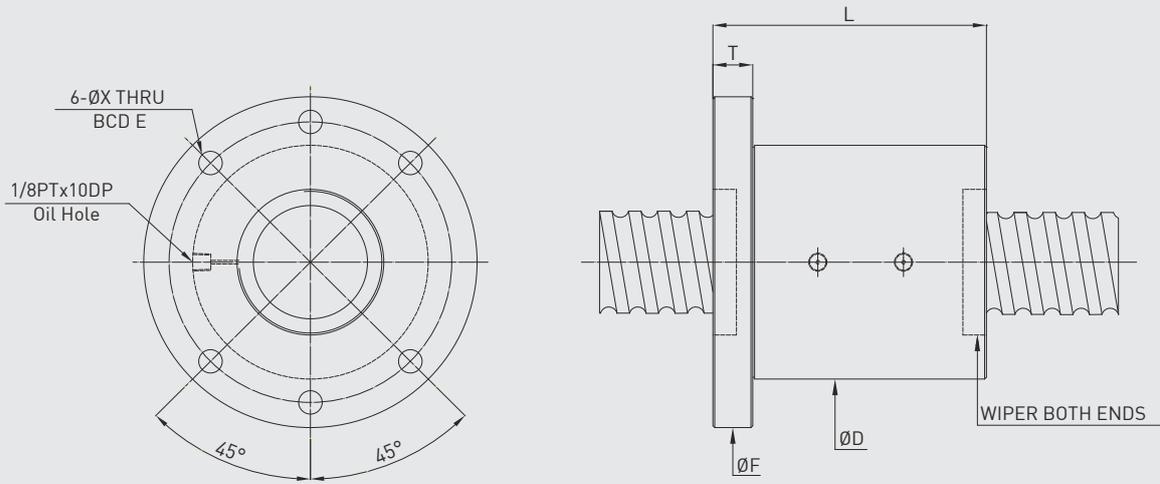
The dynamic load rating of the ballscrew should be about 3 to 5 times the expected axial load on the ballscrew in order to achieve a good service life.

External return type Heavy Load Ballscrew (FSV)



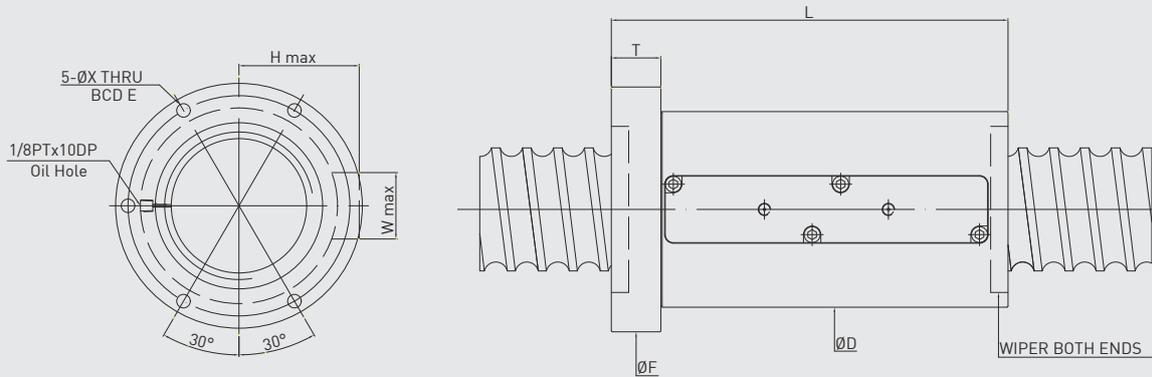
| Model No. | Shaft diameter | Lead | Ball Dia. | Turns Circuits | Dynamic C | | Static Co | | D | L | F | T | E | X | H | W | Pmax |
|-----------|----------------|------|-----------|----------------|-----------|------|-----------|------|-----|-----|-----|----|-----|----|------|-----|-------|
| | | | | | kgf | kN | kgf | kN | | | | | | | | | |
| R40-10B3 | 40 | 10 | 7.144 | 2.5X3 | 14150 | 138 | 44530 | 436 | 66 | 135 | 100 | 18 | 82 | 9 | 46 | 54 | 42.2 |
| R45-10B3 | 45 | 10 | 7.144 | 2.5X3 | 14840 | 145 | 49820 | 488 | 70 | 143 | 104 | 18 | 87 | 9 | 47 | 57 | 48.6 |
| R45-12B3 | 45 | 12 | 7.144 | 2.5X3 | 17050 | 167 | 55000 | 539 | 72 | 155 | 104 | 22 | 89 | 9 | 47 | 57 | 48.6 |
| R50-10B3 | 50 | 10 | 7.144 | 2.5X3 | 15470 | 151 | 55090 | 539 | 75 | 143 | 109 | 18 | 92 | 9 | 49 | 57 | 55.3 |
| R50-12B3 | 50 | 12 | 7.938 | 2.5X3 | 17930 | 175 | 61480 | 602 | 77 | 152 | 114 | 18 | 96 | 9 | 52 | 62 | 60 |
| R50-16B3 | 50 | 16 | 12.7 | 2.5X3 | 33680 | 330 | 99140 | 971 | 95 | 223 | 129 | 28 | 112 | 9 | 61 | 66 | 84.9 |
| R55-10B3 | 55 | 10 | 7.144 | 2.5X3 | 16050 | 157 | 60360 | 591 | 80 | 143 | 114 | 18 | 97 | 9 | 52 | 67 | 61.7 |
| R55-12B3 | 55 | 12 | 7.938 | 2.5X3 | 18740 | 183 | 67960 | 666 | 82 | 160 | 114 | 22 | 97 | 9 | 54 | 69 | 67.3 |
| R55-16B3 | 55 | 16 | 12.7 | 2.5X3 | 35040 | 343 | 107620 | 1054 | 99 | 223 | 133 | 28 | 116 | 9 | 71 | 70 | 96.2 |
| R63-12B3 | 63 | 12 | 7.938 | 2.5X3 | 19790 | 193 | 77710 | 761 | 92 | 171 | 126 | 22 | 109 | 9 | 59 | 70 | 79.1 |
| R63-16B3 | 63 | 16 | 12.7 | 2.5X3 | 37610 | 368 | 124230 | 1217 | 105 | 213 | 139 | 28 | 122 | 9 | 73 | 82 | 114.9 |
| R63-16C3 | 63 | 16 | 12.7 | 3.5X3 | 50230 | 492 | 173920 | 1704 | 105 | 271 | 139 | 28 | 122 | 9 | 73 | 82 | 161.1 |
| R63-20B3 | 63 | 20 | 15.875 | 2.5X3 | 50290 | 492 | 155020 | 1519 | 117 | 243 | 157 | 32 | 137 | 11 | 80 | 81 | 134.5 |
| R80-14B3 | 80 | 14 | 9.525 | 2.5X3 | 28550 | 279 | 121130 | 1187 | 116 | 200 | 150 | 28 | 133 | 9 | 72 | 94 | 121.7 |
| R80-16B3 | 80 | 16 | 12.7 | 2.5X3 | 41820 | 409 | 157530 | 1543 | 120 | 218 | 158 | 32 | 139 | 9 | 81 | 98 | 153.9 |
| R80-20B3 | 80 | 20 | 15.875 | 2.5X3 | 56060 | 549 | 194320 | 1904 | 130 | 270 | 170 | 32 | 150 | 11 | 89.5 | 96 | 183.4 |
| R80-20C3 | 80 | 20 | 15.875 | 3.5X3 | 74870 | 733 | 272050 | 2666 | 130 | 333 | 170 | 32 | 150 | 11 | 89.5 | 96 | 257.3 |
| R80-25B3 | 80 | 25 | 19.05 | 2.5X3 | 72920 | 714 | 241490 | 2366 | 145 | 338 | 185 | 40 | 165 | 11 | 102 | 100 | 208 |
| R100-16B3 | 100 | 16 | 12.7 | 2.5X3 | 46230 | 453 | 198970 | 1949 | 145 | 227 | 185 | 32 | 165 | 11 | 91 | 117 | 201.3 |
| R100-20C3 | 100 | 20 | 15.875 | 3.5X3 | 83460 | 817 | 344600 | 3377 | 145 | 320 | 185 | 32 | 165 | 11 | 98 | 113 | 337.8 |
| R100-25B3 | 100 | 25 | 19.05 | 2.5X3 | 80480 | 788 | 298050 | 2920 | 159 | 338 | 199 | 40 | 179 | 11 | 109 | 118 | 278.1 |
| R100-25C3 | 100 | 25 | 19.05 | 3.5X3 | 107490 | 1053 | 417280 | 4089 | 159 | 413 | 199 | 40 | 179 | 11 | 109 | 118 | 390.1 |
| R120-25B3 | 120 | 25 | 19.05 | 2.5X3 | 86740 | 850 | 354400 | 3473 | 173 | 316 | 213 | 40 | 193 | 11 | 111 | 135 | 348.4 |
| R120-25C3 | 120 | 25 | 19.05 | 3.5X3 | 115850 | 1135 | 496160 | 4862 | 173 | 400 | 213 | 40 | 193 | 11 | 111 | 135 | 486.4 |

Cassette return type Heavy Load Ballscrew (FSC)



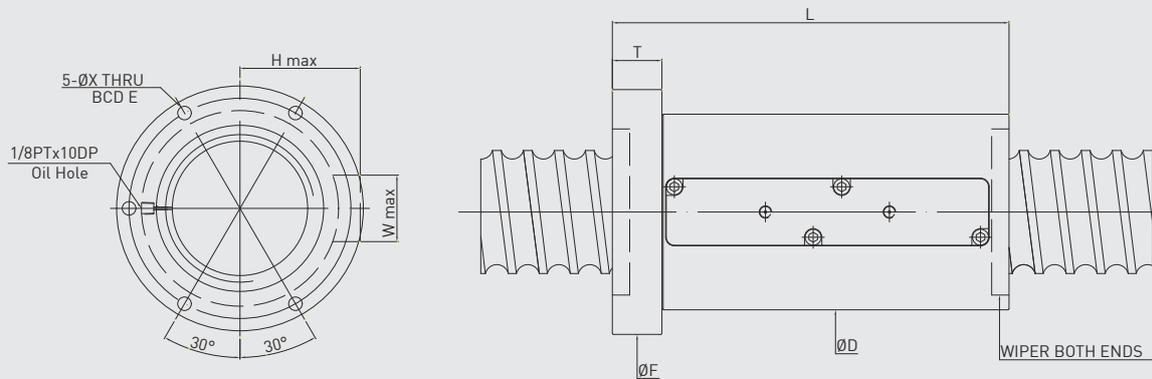
| Model No. | Shaft diameter | Lead | Ball Dia. | Turns Circuits | Dynamic C | | Static Co | | D | L | F | T | E | X | Pmax kN |
|-----------|----------------|------|-----------|----------------|-----------|-------|-----------|--------|-----|-----|-----|----|-----|----|------------|
| | | | | | kgf | kN | kgf | kN | | | | | | | |
| 2R50-30K6 | 50 | 30 | 7.144 | 6 | 12160 | 119.2 | 42360 | 415.1 | 85 | 123 | 135 | 20 | 115 | 12 | 43.6 |
| 2R50-40K6 | 50 | 40 | 12.7 | 6 | 25410 | 249 | 72310 | 708.6 | 115 | 159 | 165 | 28 | 140 | 14 | 66.0 |
| 2R50-40K8 | 50 | 40 | 12.7 | 8 | 33040 | 323.8 | 98130 | 961.7 | 115 | 199 | 165 | 28 | 140 | 14 | 88.0 |
| 2R63-40K6 | 63 | 40 | 15.875 | 6 | 38440 | 376.7 | 114220 | 1119.4 | 140 | 163 | 200 | 32 | 170 | 18 | 105.9 |
| 2R63-40K8 | 63 | 40 | 15.875 | 8 | 49990 | 489.9 | 155010 | 1519.1 | 140 | 203 | 200 | 32 | 170 | 18 | 140.8 |
| 2R80-50K6 | 80 | 50 | 15.875 | 6 | 42770 | 419.1 | 142960 | 1401 | 175 | 194 | 250 | 40 | 210 | 22 | 144.2 |
| 2R80-50K8 | 80 | 50 | 15.875 | 8 | 55620 | 545.1 | 194010 | 1901.3 | 175 | 244 | 250 | 40 | 210 | 22 | 192.3 |

External type Heavy Load Ballscrew (FSP)



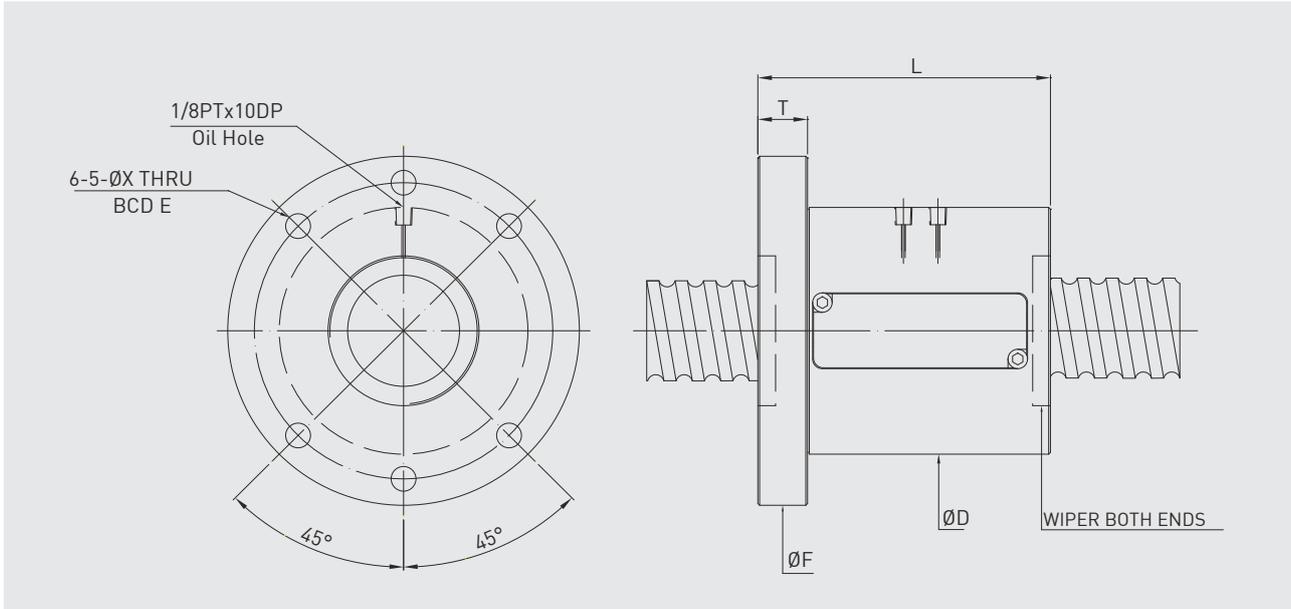
| Model No. | Shaft diameter | Lead | Ball Dia. | Turns Circuits | Dynamic C | | Static Co | | D | L | F | T | E | X | H | W | Pmax kN |
|-----------|----------------|------|-----------|----------------|-----------|-------|-----------|--------|-----|-----|-----|----|-----|----|------|----|------------|
| | | | | | kgf | kN | kgf | kN | | | | | | | | | |
| R32-10X2 | 32 | 10 | 7.144 | 2.8×2 | 9630 | 94.4 | 25460 | 25460 | 58 | 116 | 92 | 18 | 75 | 9 | 40.5 | 26 | 23.6 |
| R36-10X2 | 36 | 10 | 7.144 | 2.8×2 | 10350 | 101.4 | 29350 | 29350 | 62 | 116 | 96 | 18 | 79 | 9 | 42 | 26 | 27.5 |
| R36-10Z1 | 36 | 10 | 7.144 | 4.8×1 | 9070 | 88.9 | 25160 | 25160 | 62 | 96 | 96 | 18 | 79 | 9 | 42 | 26 | 23.6 |
| R36-12X2 | 36 | 12 | 7.144 | 2.8×2 | 10330 | 101.2 | 29310 | 29310 | 66 | 129 | 100 | 18 | 80 | 9 | 45 | 27 | 27.5 |
| R40-10Y2 | 40 | 10 | 7.144 | 3.8×2 | 14310 | 140.2 | 45130 | 45130 | 66 | 135 | 100 | 18 | 82 | 9 | 45 | 27 | 42.8 |
| R40-10Z1 | 40 | 10 | 7.144 | 4.8×1 | 9640 | 94.5 | 28500 | 28500 | 66 | 95 | 100 | 18 | 82 | 9 | 45 | 27 | 26.8 |
| R50-10X1 | 50 | 10 | 7.144 | 2.8×1 | 6630 | 65.0 | 20560 | 20560 | 75 | 76 | 109 | 18 | 92 | 9 | 49 | 26 | 20.5 |
| R50-12Y2 | 50 | 12 | 7.938 | 3.8×2 | 18140 | 177.8 | 62300 | 62300 | 77 | 161 | 111 | 22 | 94 | 9 | 49.5 | 29 | 60.8 |
| R50-12Z2 | 50 | 12 | 7.938 | 4.8×2 | 22170 | 217.3 | 78700 | 78700 | 77 | 185 | 111 | 22 | 94 | 9 | 49.5 | 27 | 76.9 |
| R50-14Y2 | 50 | 14 | 9.525 | 3.8×2 | 23360 | 228.9 | 75440 | 75440 | 80 | 189 | 114 | 28 | 97 | 9 | 54 | 32 | 69.9 |
| R50-16X3 | 50 | 16 | 12.7 | 2.8×3 | 37130 | 363.9 | 111030 | 111030 | 95 | 243 | 129 | 28 | 112 | 9 | 59.5 | 36 | 95.3 |
| R50-16Y2 | 50 | 16 | 12.7 | 3.8×2 | 34060 | 333.8 | 100460 | 100460 | 95 | 209 | 129 | 28 | 112 | 9 | 61 | 36 | 85.8 |
| R50-16Y3 | 50 | 16 | 12.7 | 3.8×3 | 48280 | 473.1 | 150690 | 150690 | 95 | 291 | 129 | 28 | 112 | 9 | 61 | 36 | 129.1 |
| R50-16Z1 | 50 | 16 | 12.7 | 4.8×1 | 22940 | 224.8 | 63450 | 63450 | 95 | 145 | 129 | 28 | 112 | 9 | 61 | 33 | 53.7 |
| R63-10Y2 | 63 | 10 | 7.144 | 3.8×2 | 17420 | 170.7 | 71750 | 71750 | 90 | 139 | 125 | 18 | 109 | 9 | 55 | 27 | 73.1 |
| R63-14Z2 | 63 | 14 | 9.525 | 4.8×2 | 31490 | 308.6 | 119310 | 119310 | 94 | 217 | 128 | 28 | 111 | 9 | 60.5 | 32 | 117.7 |
| R63-16X2 | 63 | 16 | 12.7 | 2.8×2 | 29250 | 286.7 | 92760 | 92760 | 105 | 179 | 139 | 28 | 122 | 9 | 67 | 37 | 85.7 |
| R63-16Y2 | 63 | 16 | 12.7 | 3.8×2 | 38040 | 372.8 | 125880 | 125880 | 105 | 209 | 139 | 28 | 122 | 9 | 65.5 | 37 | 116.8 |
| R63-16Y3 | 63 | 16 | 12.7 | 3.8×3 | 53910 | 528.3 | 188830 | 188830 | 105 | 289 | 139 | 28 | 122 | 9 | 65.5 | 37 | 175.2 |
| R63-16Z2 | 63 | 16 | 12.7 | 4.8×2 | 46500 | 455.7 | 159010 | 159010 | 105 | 243 | 139 | 28 | 122 | 9 | 67 | 36 | 146.9 |
| R63-20X2 | 63 | 20 | 15.875 | 2.8×2 | 39120 | 383.4 | 115750 | 115750 | 117 | 217 | 157 | 32 | 137 | 11 | 72.5 | 41 | 100.5 |
| R63-20Y2 | 63 | 20 | 15.875 | 3.8×2 | 50870 | 498.5 | 157090 | 157090 | 117 | 257 | 157 | 32 | 137 | 11 | 72.5 | 41 | 135.9 |
| R63-20Z2 | 63 | 20 | 15.875 | 4.8×2 | 62180 | 609.4 | 198430 | 198430 | 117 | 299 | 157 | 32 | 137 | 11 | 75.5 | 42 | 171.2 |
| R63-25Y2 | 63 | 25 | 12.7 | 3.8×2 | 37830 | 370.7 | 125350 | 125350 | 117 | 294 | 157 | 32 | 137 | 11 | 66 | 37 | 116.3 |
| R80-16Y2 | 80 | 16 | 12.7 | 3.8×2 | 42300 | 414.5 | 159630 | 1564.4 | 120 | 215 | 154 | 32 | 137 | 9 | 74 | 39 | 156.9 |
| R80-16Y3 | 80 | 16 | 12.7 | 3.8×3 | 59950 | 587.5 | 239440 | 2346.5 | 120 | 295 | 154 | 32 | 137 | 9 | 74 | 39 | 235.3 |
| R80-16Z2 | 80 | 16 | 12.7 | 4.8×2 | 51710 | 506.8 | 201630 | 1976.0 | 120 | 247 | 154 | 32 | 137 | 9 | 74 | 39 | 198.1 |
| R80-16Z3 | 80 | 16 | 12.7 | 4.8×3 | 73290 | 718.2 | 302450 | 2964.0 | 120 | 343 | 154 | 32 | 137 | 9 | 74 | 39 | 296.6 |
| R80-20Y2 | 80 | 20 | 15.875 | 3.8×2 | 56700 | 555.7 | 196910 | 1929.7 | 130 | 259 | 170 | 32 | 150 | 11 | 80 | 45 | 186.3 |

External type Heavy Load Ballscrew (FSP)



| Model No. | Shaft diameter | Lead | Ball Dia. | Turns Circuits | Dynamic C | | Static Co | | D | L | F | T | E | X | H | W | Pmax kN |
|-----------|----------------|------|-----------|----------------|-----------|--------|-----------|--------|-----|-----|-----|----|-----|----|-------|----|------------|
| | | | | | kgf | kN | kgf | kN | | | | | | | | | |
| R80-20Y3 | 80 | 20 | 15.875 | 3.8×3 | 80360 | 787.5 | 295370 | 2894.6 | 130 | 359 | 170 | 32 | 150 | 11 | 80 | 45 | 279.5 |
| R80-20Z2 | 80 | 20 | 15.875 | 4.8×2 | 69320 | 679.3 | 248730 | 2437.6 | 130 | 299 | 170 | 32 | 150 | 11 | 80 | 45 | 235.1 |
| R80-25Y2 | 80 | 25 | 19.05 | 3.8×2 | 73750 | 722.8 | 244710 | 2398.2 | 145 | 320 | 185 | 40 | 165 | 11 | 90 | 54 | 212.0 |
| R80-25Y3 | 80 | 25 | 19.05 | 3.8×3 | 104520 | 1024.3 | 367070 | 3597.3 | 145 | 445 | 185 | 40 | 165 | 11 | 90 | 54 | 318.0 |
| R80-25Z2 | 80 | 25 | 19.05 | 4.8×2 | 90160 | 883.6 | 309110 | 3029.3 | 145 | 372 | 185 | 40 | 165 | 11 | 90 | 54 | 266.0 |
| R100-20Y2 | 100 | 20 | 15.875 | 3.8×2 | 63210 | 619.5 | 249430 | 2444.4 | 145 | 255 | 185 | 32 | 165 | 11 | 90 | 49 | 245.1 |
| R100-20Y3 | 100 | 20 | 15.875 | 3.8×3 | 89580 | 877.9 | 374140 | 3666.6 | 145 | 355 | 185 | 32 | 165 | 11 | 90 | 49 | 367.7 |
| R100-20Z1 | 100 | 20 | 15.875 | 4.8×1 | 42570 | 417.2 | 157530 | 1543.8 | 145 | 175 | 185 | 32 | 165 | 11 | 90 | 49 | 154 |
| R100-20Z2 | 100 | 20 | 15.875 | 4.8×2 | 77270 | 757.2 | 315070 | 3087.7 | 145 | 295 | 185 | 32 | 165 | 11 | 90 | 49 | 309.5 |
| R100-20Z3 | 100 | 20 | 15.875 | 4.8×3 | 109510 | 1073.2 | 472600 | 4631.5 | 145 | 415 | 185 | 32 | 165 | 11 | 90 | 49 | 463.5 |
| R100-25X2 | 100 | 25 | 19.05 | 2.8×2 | 62600 | 613.5 | 222540 | 2180.9 | 159 | 266 | 199 | 40 | 179 | 11 | 100 | 55 | 206.9 |
| R100-25Y2 | 100 | 25 | 19.05 | 3.8×2 | 81410 | 797.8 | 302030 | 2959.9 | 159 | 320 | 199 | 40 | 179 | 11 | 100 | 59 | 282.4 |
| R100-25Y3 | 100 | 25 | 19.05 | 3.8×3 | 115370 | 1130.6 | 453040 | 4439.8 | 159 | 445 | 199 | 40 | 179 | 11 | 100 | 59 | 422.5 |
| R100-25Z2 | 100 | 25 | 19.05 | 4.8×2 | 99520 | 975.3 | 381510 | 3738.8 | 159 | 366 | 199 | 40 | 179 | 11 | 98 | 58 | 355.7 |
| R120-25Y2 | 120 | 25 | 19.05 | 3.8×2 | 87740 | 859.9 | 359120 | 3519.4 | 173 | 316 | 213 | 40 | 193 | 11 | 109 | 56 | 352.9 |
| R120-25Y3 | 120 | 25 | 19.05 | 3.8×3 | 124340 | 1218.5 | 538690 | 5279.2 | 173 | 441 | 213 | 40 | 193 | 11 | 109 | 59 | 529.4 |
| R120-25Z2 | 120 | 25 | 19.05 | 4.8×2 | 107260 | 1051.1 | 453630 | 4445.6 | 173 | 366 | 213 | 40 | 193 | 11 | 110 | 62 | 445.7 |
| R125-20Y2 | 125 | 20 | 15.875 | 3.8×2 | 69870 | 684.7 | 315040 | 3087.4 | 173 | 267 | 213 | 40 | 193 | 11 | 102.5 | 46 | 317.9 |
| R125-20Y3 | 125 | 20 | 15.875 | 3.8×3 | 99030 | 970.5 | 472570 | 4631.2 | 173 | 367 | 213 | 40 | 193 | 11 | 102.5 | 46 | 477.6 |
| R125-20Z2 | 125 | 20 | 15.875 | 4.8×2 | 85420 | 837.1 | 397950 | 3899.9 | 173 | 307 | 213 | 40 | 193 | 11 | 102.5 | 46 | 401.9 |
| R125-25Y2 | 125 | 25 | 19.05 | 3.8×2 | 89890 | 880.9 | 377880 | 3703.2 | 180 | 316 | 220 | 40 | 200 | 11 | 114 | 56 | 370 |
| R125-25Z2 | 125 | 25 | 19.05 | 4.8×2 | 109890 | 1076.9 | 477320 | 4677.7 | 180 | 366 | 220 | 40 | 200 | 11 | 114 | 56 | 468.2 |

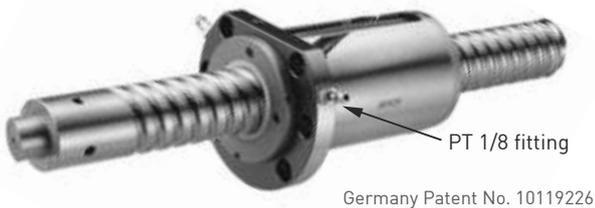
External type Heavy Load Ballscrew (FSS)



| Model No. | Shaft diameter | Lead | Ball Dia. | Turns Circuits | Dynamic C | | Static Co | | D | L | F | T | E | X | Pmax kN |
|-----------|----------------|------|-----------|----------------|-----------|-------|-----------|--------|-----|-----|-----|----|-----|----|------------|
| | | | | | kgf | KN | kgf | KN | | | | | | | |
| 2R50-40X2 | 50 | 40 | 12.7 | 2.8×2 | 25410 | 249.0 | 72310 | 708.6 | 115 | 189 | 165 | 32 | 140 | 14 | 61.8 |
| R63-32X1 | 63 | 32 | 15.875 | 2.8×1 | 21350 | 209.2 | 57470 | 563.2 | 140 | 173 | 190 | 32 | 165 | 14 | 49.9 |
| R63-32Y1 | 63 | 32 | 15.875 | 3.8×1 | 27770 | 272.1 | 78000 | 764.4 | 140 | 206 | 190 | 32 | 165 | 14 | 67.5 |
| R63-32Z1 | 63 | 32 | 15.875 | 4.8×1 | 33950 | 332.7 | 98520 | 965.5 | 140 | 238 | 190 | 32 | 165 | 14 | 85.0 |
| 2R63-40X2 | 63 | 40 | 12.7 | 2.8×2 | 28670 | 281.0 | 91350 | 895.2 | 130 | 189 | 190 | 32 | 160 | 18 | 84.4 |
| 2R63-40Y2 | 63 | 40 | 12.7 | 3.8×2 | 37290 | 365.4 | 123970 | 1214.9 | 130 | 229 | 190 | 32 | 160 | 18 | 115.0 |
| 2R63-50Y2 | 63 | 50 | 12.7 | 3.8×2 | 36810 | 360.7 | 122740 | 1202.9 | 130 | 275 | 190 | 36 | 160 | 18 | 113.9 |
| 2R70-40X2 | 70 | 40 | 12.7 | 2.8×2 | 30590 | 299.8 | 103750 | 1016.8 | 142 | 191 | 210 | 32 | 175 | 18 | 96.9 |
| 2R80-50X2 | 80 | 50 | 15.875 | 2.8×2 | 42770 | 419.1 | 142960 | 1401.0 | 175 | 233 | 250 | 40 | 210 | 22 | 134.0 |
| 2R80-50Y2 | 80 | 50 | 15.875 | 3.8×2 | 55620 | 545.1 | 194010 | 1901.3 | 175 | 283 | 250 | 40 | 210 | 22 | 183.6 |

8.4 Cool Type

8.4.1 Extra High Dm-N Value Ballscrew - Cool Type I



• Cool type I:

- New era for high speed ballscrew - achieving extra high Dm-N value (up to 200,000) and high positioning accuracy.
- Cool type I and a hollow shaft design.
- High speed machine tools and machining center.

• Design Principle:

The cool type series features forced cooling fluid passing through the nut, to minimize heat generation and thermal expansion during ballscrew operation.

• Cool type I as shown in the Figure 8.1:

Flowing fluids are circulated in passages inside the nut, and exchanges heat with the cooler as shown in the Figure 8.2. In cooperation with the hollow shaft design, it creates high quality thermal control and maintains high accuracy. This combination is most suitable for high-speed machine tools.

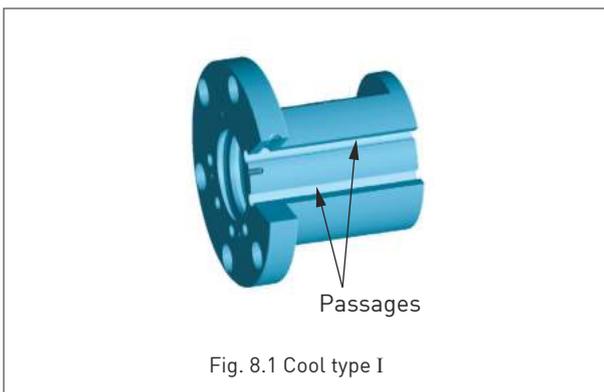


Fig. 8.1 Cool type I

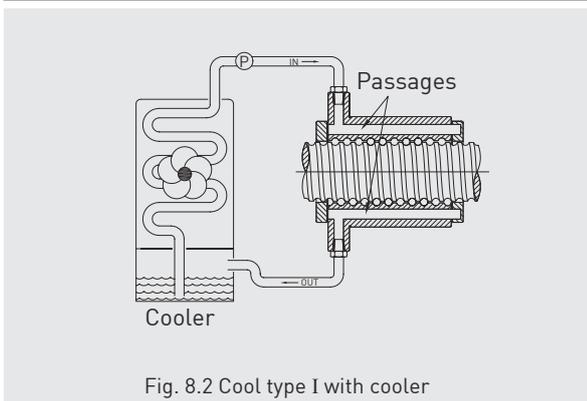


Fig. 8.2 Cool type I with cooler

• Specification:

1. We recommend shaft a diameter above $\varnothing 32\text{mm}$ for cool type design.
2. Nut type: FSV, FSW, PFDW, OFSW, DFSV, FSH, FSI, etc.
3. Please contact HIWIN with other specifications you need.
4. The cool type I, compared with standard specifications, will cause a minor external dimension change of the nut, please contact HIWIN.

• Specification number:

Example: R50 - 30C1 - OFSWC1 - 1180 - 1539 - 0.008



C1: HIWIN cool type ballscrew for type I

• Performance Comparison:

For high-speed machine tools, the hollow shaft design only is not enough protection against heat generation and thermal expansion, because nut itself is a heat source, as shown in Figure 8.3.

Test condition :

specification : $\varnothing 50$, lead 30 mm
 speed : 2500 rpm (75 m/min),
 back and forth feed continuously
 acceleration : 9.8 m/sec²
 stroke : 1180 mm
 preload : 205 kgf
 moving weight : 300 kgf
 cooling rate : oil 2.5 liter/min
 inlet temperature : 16°C
 room temperature : 25°C

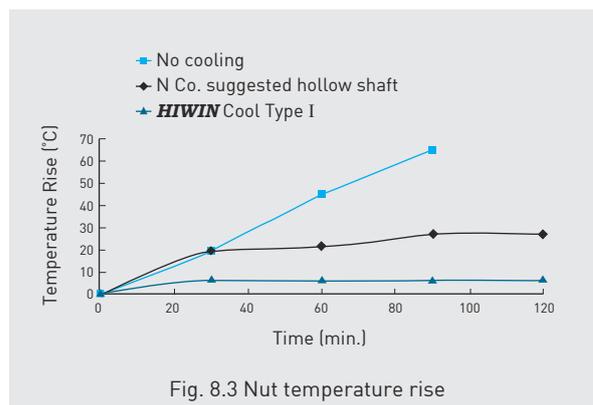


Fig. 8.3 Nut temperature rise

Cool type I Performance (1)

Specification: $\varnothing 50$, lead 30 mm
 Dm-N value: 150,000
 Acceleration: 9.8 m/sec²

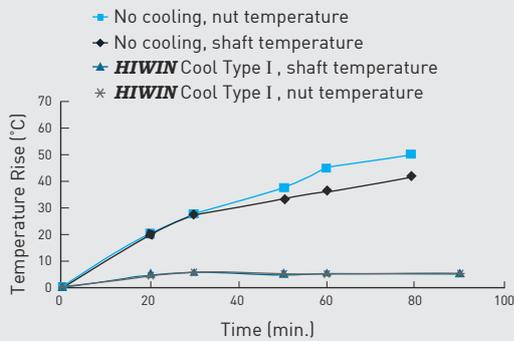


Fig. 8.4 Cool type I : Temperature rise of ballscrew

Cool type I Performance (2)

Specification: $\varnothing 50$, lead 30 mm
 Dm-N value: 200,000
 Acceleration: 9.8 m/sec²

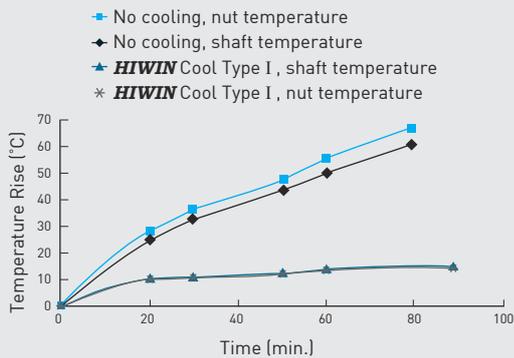


Fig. 8.5 Cool type I : Temperature rise of ballscrew

• Features:

- 1. Optimized design for high reliability:**
Through use of computer simulation and FEM analysis, the cool type ballscrew features excellent thermal protection and high reliability.
- 2. Promote higher speed rotation and extra high Dm-N value (up to 200,000):**
Cool type ballscrews will eliminate high-speed rotation aftereffect, i. e., thermal problems, and promote higher speed rotation.
- 3. Prevent thermal distortion:**
Optimized heat transfer design minimizes heat generation and prevents thermal distortion.
- 4. Strengthen durability:**
When operating repeatedly, friction between balls causes heat generation. That may cause balls to oxidize or decarburize, and shorten the service life. Cool type ballscrews will strengthen durability under a cooling environment.
- 5. Extended lubricant life cycle:**
When using lubrication, minimum heat generation further inhibits deterioration in the quality of lubrication and extends the lubricant life cycle.
- 6. Keep temperature uniform and reduce warm-up time:**
During high-speed operation, nut and shaft cooling effect keeps feed-system temperature constant and reduces warm-up time.
- 7. Higher feeding accuracy:**
Cooling effect of cool type ballscrew will stabilize against thermal expansion and equalize feeding accuracy.



Fig. 8.6 FEM analysis for cool type ballscrew

8.4.2 High Load Ballscrew - Cool Type II



Germany Patent No. 20119457.0
Taiwan Patent No. 193878

• Cool type II:

- New era for ballscrews applied in electric - driven injection machines, presses, power units, and other replaceable hydraulic drives.
- Electric-driven injection machines, presses, power units and other replaceable hydraulic drives.

• Design Principle:

The cool type series features forced cooling fluid passing through the nut, to minimize heat generation and thermal expansion during ballscrew operation.

• Cool type II as shown in the Figure 8.7:

Flowing fluids are circulated through a space, inside the nut, and exchanges heat with the cooler as shown in the Figure 8.8. It is most suitable for electric-driven injection machines, presses, and power units. The cool type II, compared with the standard specifications, will cause a minor external dimension change of the nut. Please contact HIWIN .

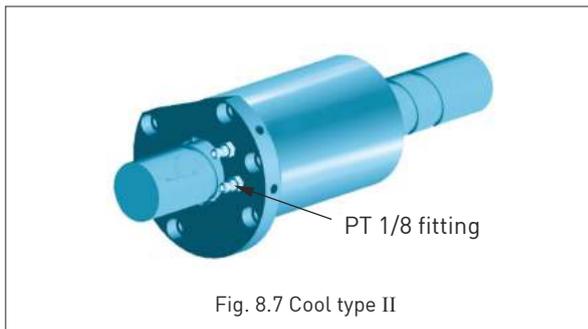


Fig. 8.7 Cool type II

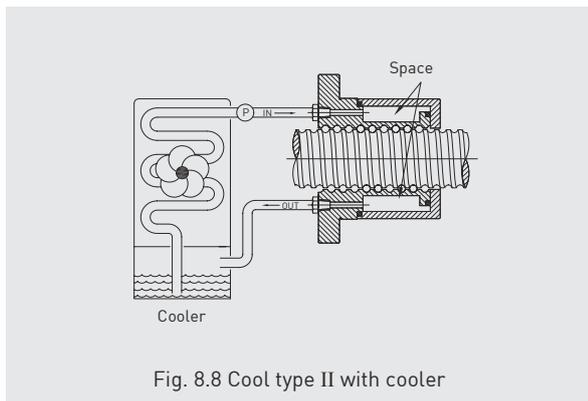


Fig. 8.8 Cool type II with cooler

• Specification:

1. We recommend a shaft diameter above $\varnothing 32\text{mm}$ for cool type design.
2. Nut type: FSV, FSW, PFDW, OFSW, DFSV, FSH, FSI, etc.
3. Please contact HIWIN with other specifications you need.
4. The cool type II, compared with standard specifications, will cause a minor external dimension change of the nut, please contact HIWIN.

• Specification number:

Example: R63 - 16B3 - RSWC2 - 400 - 600- 0.05



C2 : HIWIN cool type ballscrew for type II

• Performance Comparison:

Test condition :

specification : $\varnothing 50$, lead 30 mm
speed : 1500 rpm (45 m/min),
back and forth feed continuously
acceleration : 4.9 m/sec²
stroke : 300 mm
preload : 205 kgf
moving weight : 300 kgf
cooling rate : oil 2.5 liter/min
inlet temperature : 16°C
room temperature : 25°C

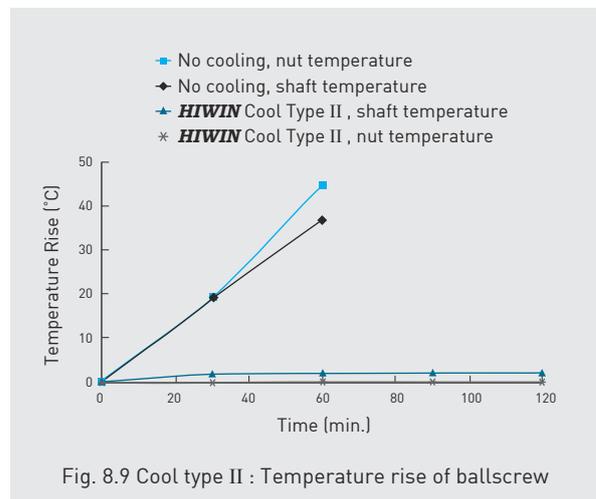


Fig. 8.9 Cool type II : Temperature rise of ballscrew

• Features:

1. Optimized design for high reliability:

Through use of computer simulation and FEM analysis, the cool type ballscrew features excellent thermal protection and high reliability.

2. Promote higher speed rotation and extra high Dm-N value (up to 200,000):

Cool type ballscrews will eliminate high-speed rotation aftereffect, i. e., thermal problems, and promote higher speed rotation.

3. Prevent thermal distortion:

Optimized heat transfer design minimizes heat generation and prevents thermal distortion.

4. Strengthen durability:

When operating repeatedly, friction between balls causes heat generation, It may cause oxidization and decarburization of the rolling elements, which will affect service life of ballscrews. Cool type ballscrews will strengthen durability under a cooling environment.

5. Extended lubricant life cycle:

When using lubrication, minimum heat generation further inhibits deterioration in the quality of lubrication and extends the lubricant life cycle.

6. Higher feeding accuracy:

Cooling effect of cool type ballscrew will stabilize against thermal expansion and equalize feeding accuracy.

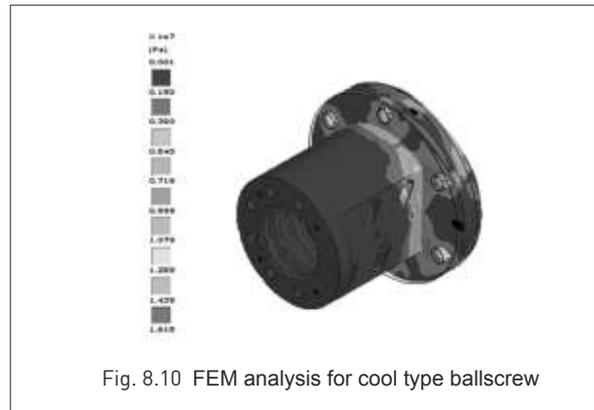


Fig. 8.10 FEM analysis for cool type ballscrew

Average Life Cycle for Injection Machine Ballscrew

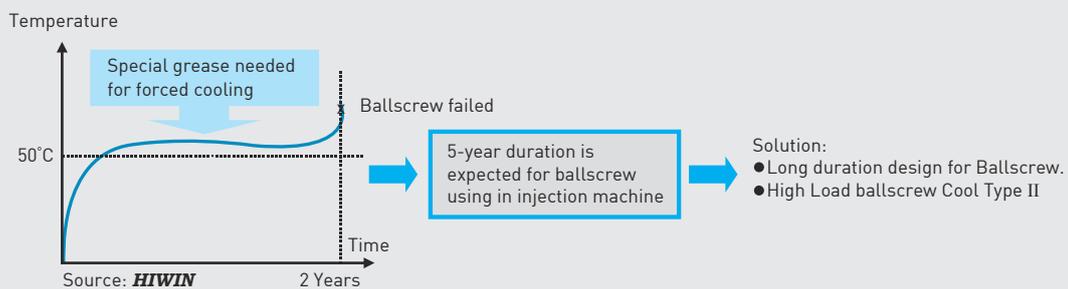


Fig 8.11 Life cycle for ballscrew using in general injection machine

8.5 Dust-proof Type



• Features:

The dust-proof ballscrew is designed to prevent particles or debris entering the ballnut, especially under special operating conditions such as saw dust, iron filings, etc.

• Dust-proof specification:

4R25-25K2-FSCSH-1835-1959-0.023



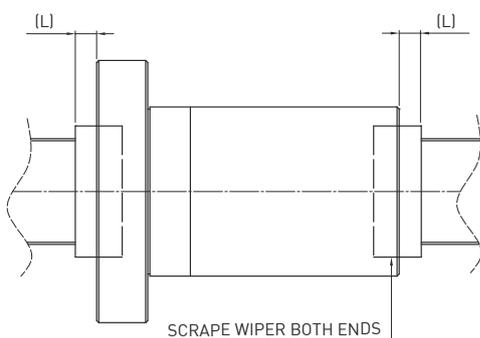
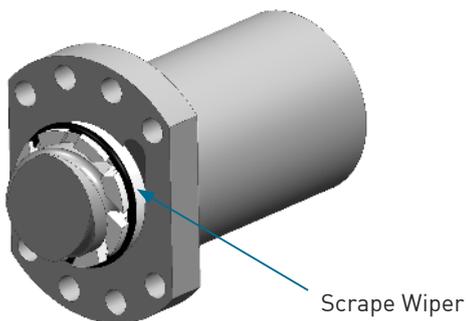
HIWIN Dust-Proof Code (SS, SH, NW, EW)

• Dust-proof Type

1. SS (Scrape Wiper)

Protruding from the end surface of a ball nut, flexible finger parts are pressed by a spring to eliminate the gap, fit the shaft surface perfectly, and improve the dustproof ability dramatically.

The slit between the fingers can remove the particles scraped from the shaft surface. Available sizes for SS type ballscrew are shown in the table.

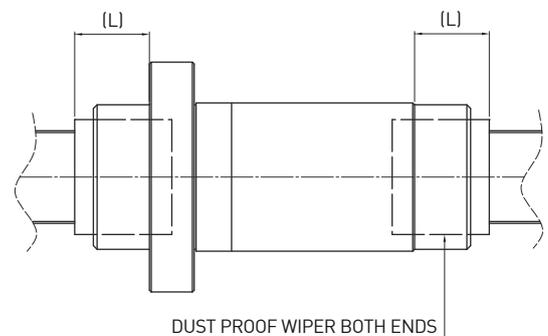
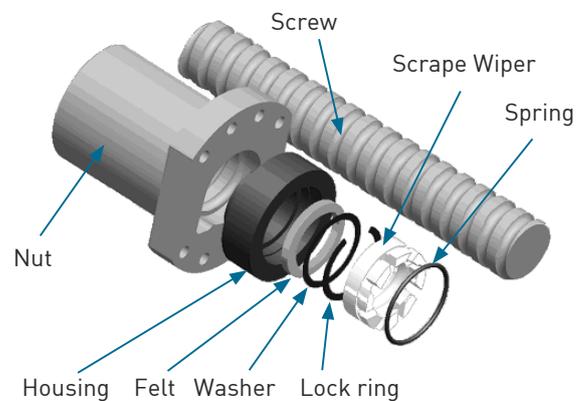


| Nominal diameter | Lead | L Max. |
|------------------|------|--------|
| 25 | - | 5 |
| 32 | - | 5 |
| 36 | < 10 | 5 |
| | ≥ 10 | 6 |
| 40 | < 10 | 5 |
| | ≥ 10 | 6 |
| 45 | < 10 | 5 |
| | ≥ 10 | 6 |
| 50 | < 10 | 5 |
| | ≥ 10 | 6 |

Unit:mm

2. SH (Felt + Scrape Wiper)

Finger wiper and high dense felt prevents powdery dust and improve dustproof effect.

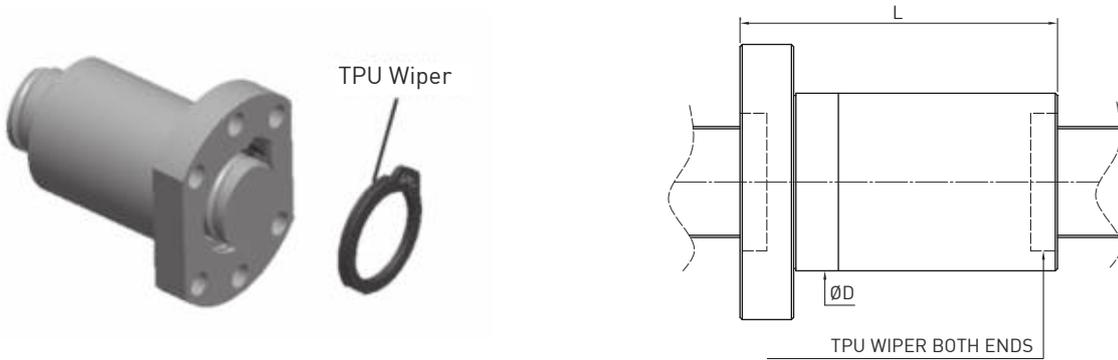


| Nominal diameter | Lead | L Max. |
|------------------|------|--------|
| 25 | - | 20 |
| 32 | < 10 | 20 |
| | ≥ 10 | 25 |
| 36 | < 10 | 20 |
| | ≥ 10 | 25 |
| 40 | < 10 | 20 |
| | ≥ 10 | 30 |
| 45 | < 10 | 20 |
| | ≥ 10 | 30 |
| 50 | < 10 | 20 |
| | ≥ 10 | 30 |

Unit:mm

3. EW (Wiper)

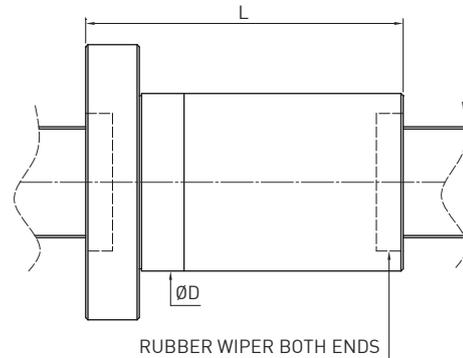
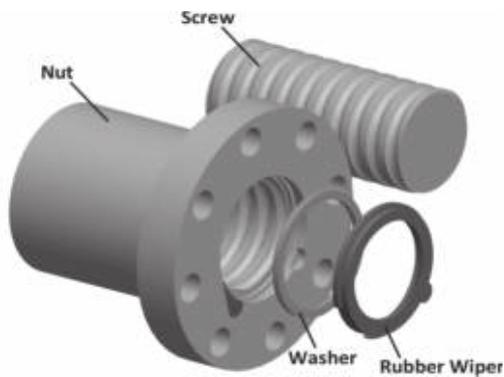
High dust-proof EW wiper is designed for standard DIN nut of Roller ballscrew, suited for applications like woodworking machining, graphite machining etc.



| Model | Ball Dia. (mm) | Nominal Dia. (mm) | Lead (mm) | Dynamic Load C(kgf) | Static Load Co(kgf) | ØD | L |
|-----------|----------------|-------------------|-----------|---------------------|---------------------|----|-----|
| R12-5K3 | 2 | 12 | 5 | 540 | 900 | 24 | 28 |
| 2R12-10K2 | 2.381 | 12 | 10 | 440 | 660 | 24 | 33 |
| R15-5K4 | 3 | 15 | 5 | 1290 | 2140 | 28 | 38 |
| L15-5K4 | 3 | 15 | 5 | 1290 | 2140 | 28 | 38 |
| 2R15-10K3 | 3 | 15 | 10 | 1010 | 1670 | 28 | 45 |
| 4R15-16K3 | 3 | 15 | 16 | 1010 | 1730 | 28 | 61 |
| R20-5K4 | 3 | 20 | 5 | 1500 | 2930 | 36 | 40 |
| 2R20-10K4 | 3 | 20 | 10 | 1520 | 3050 | 36 | 60 |
| 4R20-20K3 | 3.175 | 20 | 20 | 1250 | 2420 | 36 | 77 |
| R25-5K5 | 3 | 25 | 5 | 2040 | 4680 | 38 | 57 |
| R25-10K4 | 3 | 25 | 10 | 1660 | 3680 | 40 | 64 |
| 4R25-25K4 | 3.175 | 25 | 25 | 1380 | 3990 | 40 | 71 |
| R32-5K4 | 3.175 | 32 | 5 | 2070 | 5360 | 50 | 48 |
| R32-10K5 | 3.969 | 32 | 10 | 3390 | 8160 | 50 | 77 |
| 2R32-20K3 | 3.969 | 32 | 20 | 2130 | 4890 | 50 | 84 |
| 4R32-32K2 | 3.969 | 32 | 32 | 1440 | 3170 | 50 | 88 |
| R38-10K4 | 6.35 | 38 | 10 | 5660 | 12410 | 63 | 70 |
| 2R38-20K3 | 6.35 | 38 | 20 | 4300 | 9060 | 63 | 88 |
| 4R38-40K2 | 6.35 | 38 | 20 | 2900 | 5910 | 63 | 108 |

4. NW (Wiper)

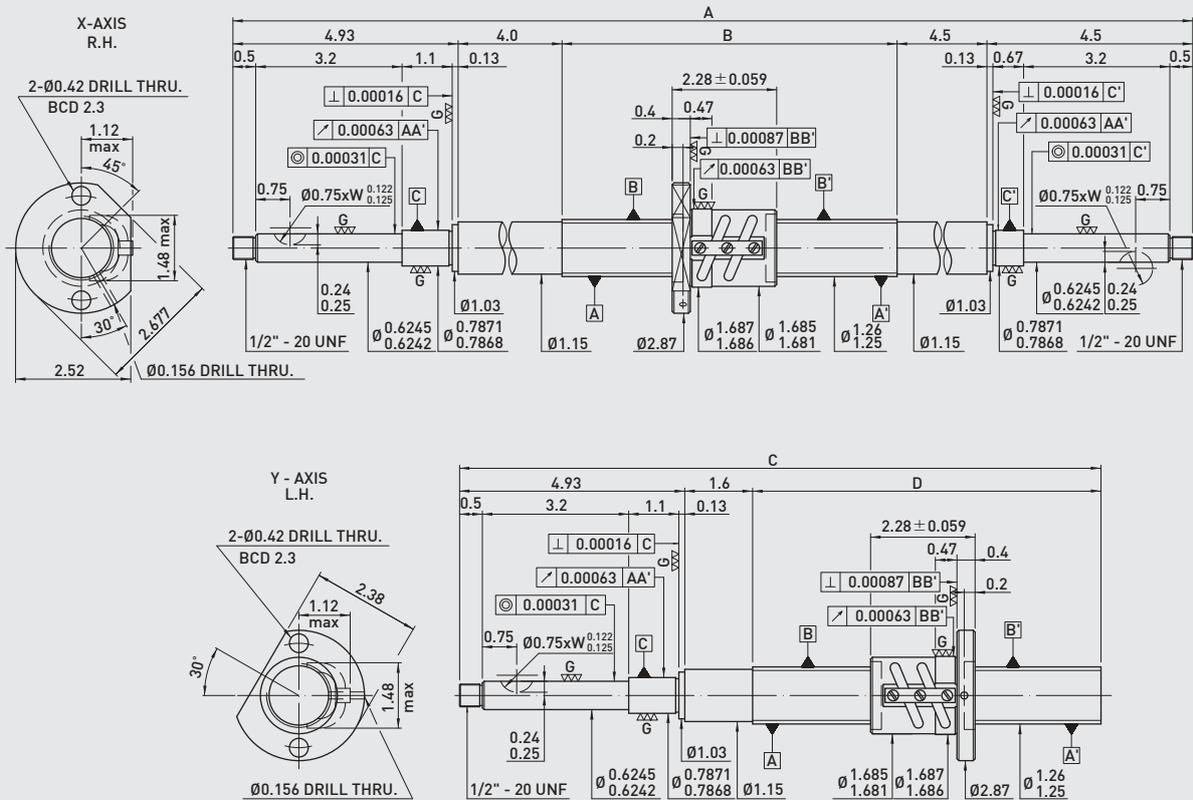
Seal type NW wiper is designed for standard DIN nut of Roller ballscrew, suited for applications like transport equipment, automation equipment etc.



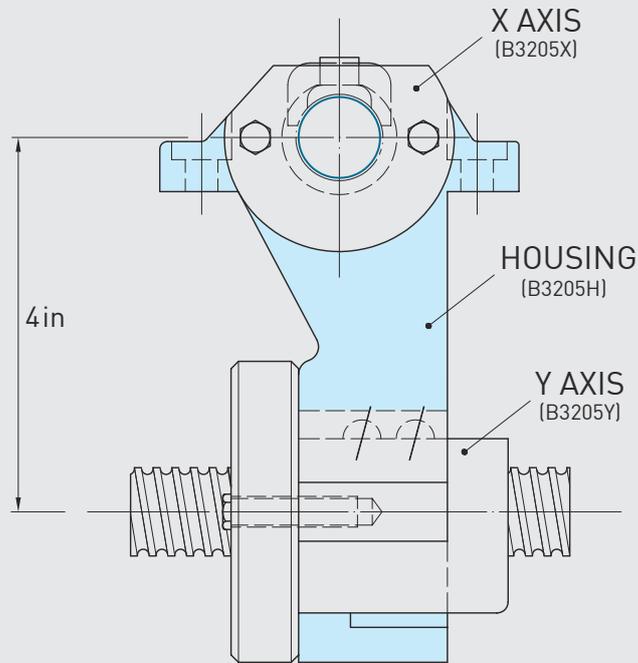
| Model | Ball Dia. (mm) | Nominal Dia. (mm) | Lead (mm) | Dynamic Load C(kgf) | Static Load Co(kgf) | ØD | L |
|-----------|----------------|-------------------|-----------|---------------------|---------------------|----|-----|
| 2R12-10K3 | 2.381 | 12 | 10 | 520 | 1030 | 24 | 43 |
| 2R15-10K3 | 3.175 | 15 | 10 | 860 | 1740 | 34 | 44 |
| 4R15-16K3 | 3 | 15 | 16 | 810 | 1730 | 28 | 61 |
| 4R15-20K2 | 3.175 | 15 | 20 | 570 | 1130 | 34 | 50 |
| R16-5T3 | 3.175 | 16 | 5 | 664 | 1195 | 28 | 40 |
| R16-10T3 | 3.175 | 16 | 10 | 623 | 1102 | 28 | 60 |
| R20-5K4 | 3.175 | 20 | 5 | 1340 | 3270 | 36 | 40 |
| R20-10K3 | 3.175 | 20 | 10 | 990 | 2260 | 36 | 47 |
| 4R20-20K2 | 3.175 | 20 | 20 | 690 | 1560 | 36 | 57 |
| R25-5K5 | 3.175 | 25 | 5 | 1820 | 5240 | 40 | 48 |
| R25-10K4 | 3.175 | 25 | 10 | 1480 | 4120 | 40 | 61 |
| 4R25-25K2 | 3.175 | 25 | 25 | 760 | 1950 | 40 | 70 |
| R32-5K4 | 3.175 | 32 | 5 | 1660 | 5370 | 50 | 38 |
| R32-10K4 | 3.969 | 32 | 10 | 2210 | 6470 | 50 | 63 |
| 2R32-20K3 | 3.969 | 32 | 20 | 1710 | 4890 | 50 | 88 |
| 4R32-32K2 | 3.969 | 32 | 32 | 1160 | 3170 | 50 | 88 |
| R38-10K4 | 6.35 | 38 | 10 | 4550 | 12410 | 63 | 70 |
| 2R38-20K4 | 6.35 | 38 | 20 | 4490 | 12290 | 63 | 108 |
| 4R38-40K2 | 6.35 | 38 | 40 | 2330 | 5910 | 63 | 102 |
| R40-5K5 | 3.175 | 40 | 5 | 2200 | 8320 | 63 | 45 |
| R40-10T3 | 6.35 | 40 | 10 | 2651 | 6366 | 63 | 74 |
| 4R40-40K2 | 6.35 | 40 | 40 | 2390 | 6260 | 70 | 102 |
| R48-10K6 | 6.35 | 48 | 10 | 7330 | 24280 | 75 | 90 |
| R50-5K6 | 3.175 | 50 | 5 | 2830 | 12720 | 75 | 50 |
| R50-10T4 | 6.35 | 50 | 10 | 3899 | 11112 | 75 | 89 |
| R63-10T4 | 6.35 | 63 | 10 | 4369 | 14273 | 90 | 91 |

8.6 Ballscrew Retrofit Kits for Manual Milling Machine

1. Precision ground, lead accuracy within $\pm 0.0005''$ /ft.
2. Stock size meet various CNC systems' requirements.
3. High strength and long service life.



unit: inch



| Traverse Screw (X Axis) in | | | |
|----------------------------|----|-------|-------------|
| Traverse Screw | A | B | Part Number |
| 32 | 42 | 24.07 | B3205X-32 |
| 36 | 46 | 28.07 | B3205X-36 |
| 42 | 52 | 34.07 | B3205X-42 |
| 48 | 58 | 40.07 | B3205X-48 |

| Crossfeed Screw (Y Axis) in. | | | |
|------------------------------|------|-------|-------------|
| Table Size | C | D | Part Number |
| 9 | 20.3 | 13.77 | B3205Y-9 |
| 12 | 23.3 | 16.77 | B3205Y-12 |
| 16 | 27.3 | 20.77 | B3205Y-16 |

| | |
|--------------------------------------|------------------------|
| P.C.Dia. | 1.28" |
| Ball Dia. | 0.125" |
| Lead Angle | 2.84° |
| Circuits | 2.5x2 |
| Lead | 5TPI |
| Static Load | 12491 lbf |
| Dynamic Load(1x10 ⁶ revs) | 4158 lbf |
| Lead Accuracy | 0.0003"/2π; 0.0005"/ft |
| Drag Torque(Preload) | 3.5in-lb (280lbs) |

9. HIWIN GREASE

9.1 HIWIN G01 Heavy-load Grease

• Features

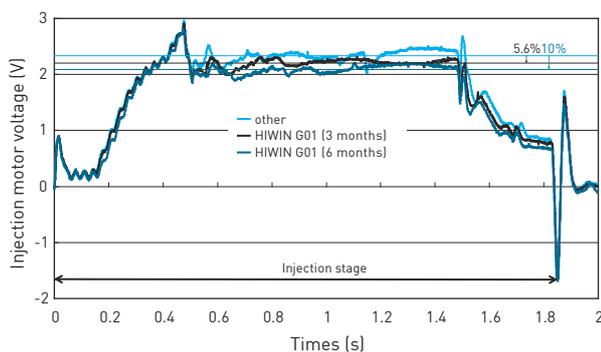
1. Excellent wear resistance and extreme pressure resistance under heavy load conditions.
2. Low friction in low temperatures.
3. Water resistant.
4. Can be applied by a central lubrication system.
5. Suitable for all-electric injection molding machine, die-stamping machines, semi-conductor manufacturing equipment, heavy load actuator, industry machine and forging machine.

• Basic Properties

| | | HIWIN G01 |
|----------------------|---|-----------------|
| Color | | Light yellow |
| Base Oil | | Mineral oil |
| Consistency Enhancer | | Polyurea |
| Additive | | Solid lubricant |
| Service Temp. (°C) | | -15~115 |
| NLGI-grade [0.1mm] | | 310-340 |
| Viscosity (cst) | 40°C | 500 |
| | 100°C | 30 |
| Drop Point (°C) | | > 170 |
| 4-ball test | Load on boundary lubrication when 900rpm (N) | >1700 |
| | Load on boundary lubrication when 1770rpm (N) | >1300 |

| | HIWIN G01 | other | Note | |
|-----------------------------------|-----------|----------|--------------------------|-----------|
| Property of anti extreme pressure | ● | ▲ | 4-ball test 900rpm | 42% more |
| | | | 1770rpm | 30% more |
| Anti wear | ● | ▲ | 4-ball test 80kgf 30rpm | 23% more |
| Low friction | ● | ▲ | Injection motor voltage | 10% lower |
| Water resistance | ● | ● | | |
| Rust proof | ● | ● | Corrosion on copper test | |
| Service temperature range | -15 ~115 | -20 ~130 | | |

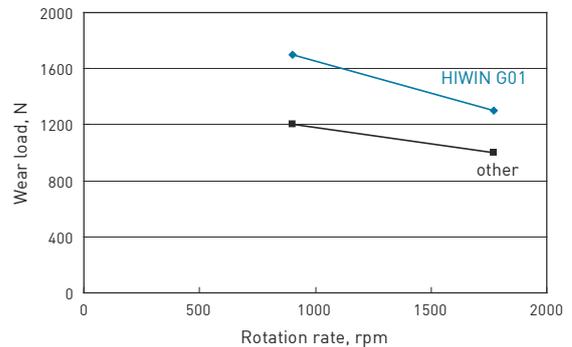
• All-electric injection molding machine(80ton) — motor driving voltage of injection unit BS



• Test of Resistance to Extreme Pressure

Test Condition and Measurement

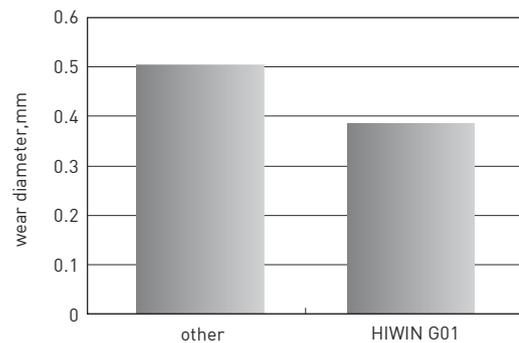
| | |
|------------------|---|
| Ball diameter | 1/2 in |
| Temperature | 27°C |
| Test time | 10 sec |
| Rotational speed | 900、1770 rpm |
| measurement | Load when ball wear diameter become 500μm |



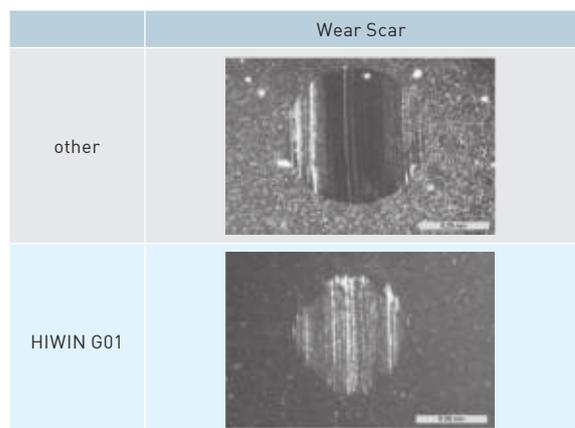
• Test of Anti-wear

Test Condition and Measurement

| | |
|------------------|-------------------------------------|
| Ball diameter | 1/2 in |
| Temperature | 75°C |
| Test time | 60 min |
| Rotational speed | 30 rpm |
| load | 80 kgf |
| measurement | Wear diameter of ball contact point |



Comparison of wear diameter



Comparison of wear scar

9.2 HIWIN G02 Low Particle-emitting Grease

• Features

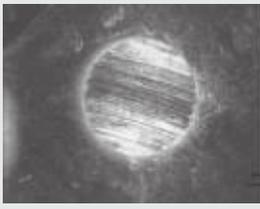
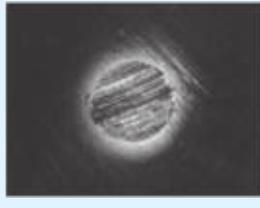
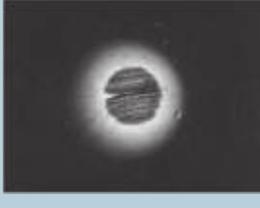
- 1.Low dust generation, suitable for clean room environment.
- 2.Wear resistant.
- 3.Long term grease, suitable for wide temperature range.
- 4.Consists of synthetic hydrocarbon oil and special calcium soap. resistant to oxidation and aging.
- 5.Can be used in plastic/steel and plastic/plastic components, compatible with elastomers and plastic materials.

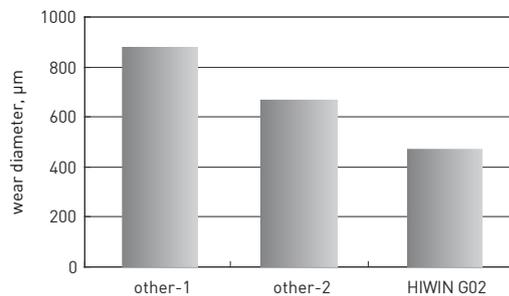
• Basic Properties

| | | HIWIN G02 |
|--------------------------|-------|---------------------------|
| Color | | Beige |
| Base Oil | | Synthetic hydrocarbon oil |
| Consistency Enhancer | | Special calcium soap |
| Service Temp. [°C] | | -30~140 |
| NLGI-grade (0.1mm) | | 265-295 |
| Viscosity (cst) | 40°C | 100 |
| | 100°C | 15 |
| Drop Point [°C] | | >180 |
| 4-ball test (ASTM D2266) | | 474μ |

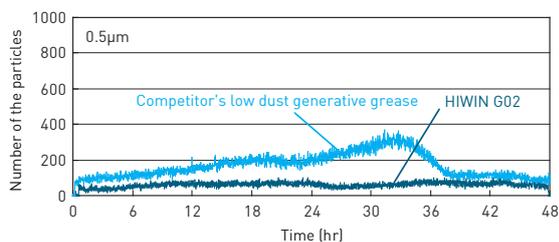
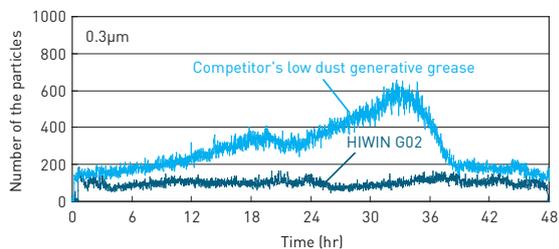
| | HIWIN G02 | other | Note |
|---------------------------|-----------|---------|-------------------------------------|
| Anti wear | ● | ▲ | 4-ball test (ASTM D2266) 46%more |
| Dust generation | ● | ▲ | Dust generation of KK in clean room |
| Anti-Corrosion | ● | ● | |
| Service Temperature Range | -30~140 | -30~120 | |

• 4-ball test(ASTM D2266)

| | Wear Scar | Diameter (μm) |
|-----------|---|---------------|
| other-1 |  | 879 |
| other-2 |  | 669 |
| HIWIN G02 |  | 474 |



• Dust generation



9.3 HIWIN G03 Low Particle-emitting (High Speed) Grease

• Features

1. Low dust generation characteristics and suitable for clean room environment.
2. Wear resistant under high speed conditions.
3. Long term grease, well wear resistance under high speed conditions.
4. Low starting and running torques particularly at low temperatures, to ensure high efficiency and conserve energy.
5. Compatible with plastic components.

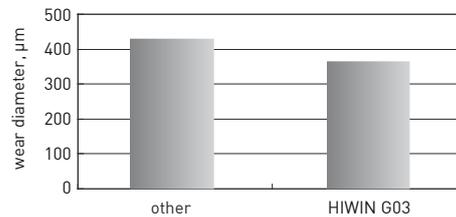
• Basic Properties

| | | HIWIN G03 |
|--------------------------|-------|---------------------------|
| Color | | Beige |
| Base Oil | | Synthetic hydrocarbon oil |
| Consistency Enhancer | | Special calcium soap |
| Service Temp. (°C) | | -45~125 |
| NLGI-grade (0.1mm) | | 265-295 |
| Viscosity (cst) | 40°C | 30 |
| | 100°C | 5.9 |
| Drop Point (°C) | | >210 |
| 4-ball test (ASTM D2266) | | 366µm |

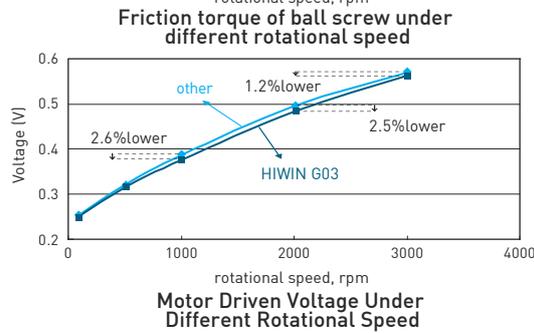
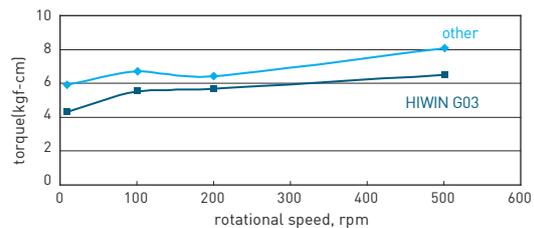
| | HIWIN G03 | other | Note |
|-----------------------------------|-----------|--------|------------------------------------|
| Anti wear | ● | ● | 4-ball test (ASTM D2266) 15% more |
| Dust generation | ● | ● | Dust generation of KKin clean room |
| Friction torque at low speed | ● | ▲ | 7~15 % lower less than 500rpm |
| Friction resistance at high speed | ● | ▲ | Motor voltage 1.2~2.6% lower |
| Service Temperature Range | -45~125 | -10~80 | |

• 4-ball test (ASTM D2266)

| | Wear Scar | Diameter (µm) |
|-----------|-----------|---------------|
| other | | 432 |
| HIWIN G03 | | 366 |

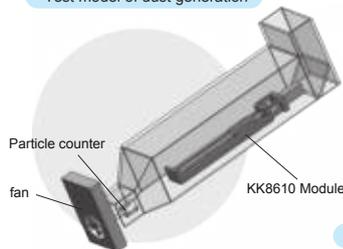


• Wear resistance

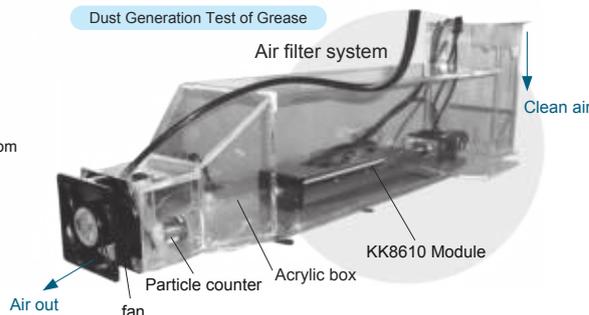


• Dust generation

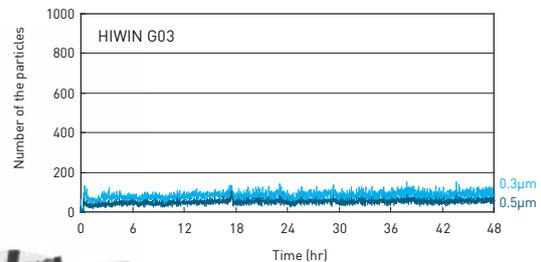
Test model of dust generation



Dust Generation Test of Grease



Test Condition : Air speed 2.5m/s
Rotational Speed of Screw : 1000rpm
Stroke : 210mm



9.4 HIWIN G04 High Speed Grease

- **Features**

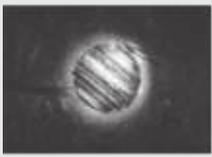
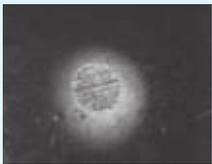
1. Wear resistant under high speed conditions
2. Low friction force under high speed conditions
3. Water resistant

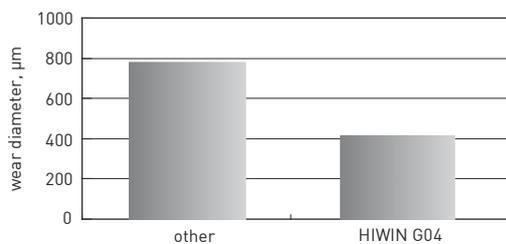
- **Basic Properties**

| | | |
|--------------------------|--------------|----|
| | HIWIN G04 | |
| Color | Beige | |
| Base Oil | ESTER/PAO | |
| Consistency enhancer | LITHIUM SOAP | |
| Service Temp. (°C) | -35-120 | |
| NLGI-grade (0.1mm) | 260-280 | |
| Viscosity (cst) | 40°C | 25 |
| | 100°C | 6 |
| Drop Point (°C) | >225 | |
| 4-ball test (ASTM D2266) | 418µm | |

| | HIWIN G04 | other | Note |
|---------------------------|-----------|--------|-------------------------------------|
| Anti-wear | ● | ▲ | 4-ball test (ASTM D2266) 46%more |
| Low Friction | ● | ▲ | motor voltage 4.6% lower at 3000rpm |
| Service Temperature Range | -45-125 | -10-80 | |

- **4-ball test (ASTM D2266)**

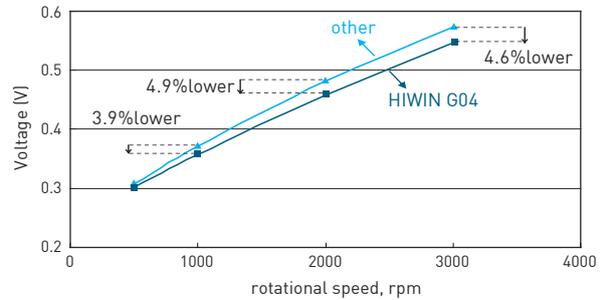
| | Wear Scar | Diameter (µm) |
|-----------|---|---------------|
| other |  | 781 |
| HIWIN G04 |  | 418 |



- **Wear resistance**

Screw Type : 40-10

Test Condition : motor driven voltage by different grease and rotational speed



9.5 HIWIN G05 General Type Grease

- **Features**

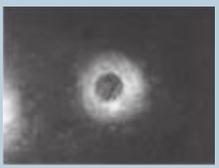
1. Wear resistant under high speed conditions
2. Low friction force under high speed conditions
3. Water resistant

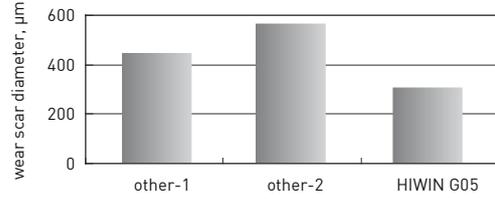
- **Basic Properties**

| | | |
|----------------------|--------------------------------------|--------------|
| | | HIWIN G05 |
| Color | | Brown |
| Base Oil | | MINERAL |
| Consistency enhancer | | LITHIUM SOAP |
| Service Temp. [°C] | | -15~120 |
| NLGI-grade (0.1mm) | | 2 |
| Viscosity (cst) | 40°C | 200 |
| Drop Point [°C] | | 190 |
| 4-ball test | Wear scar diameter(μm) [ASTM D-2266] | 291μm |
| | Welding load (N) [DIN 51350-4] | 2600/2800 |

| | HIWIN G05 | other | Note |
|---------------------------|-----------|-------|--|
| Anti-wear | ● | ▲ | 4-ball test [ASTM D2266] increases 38%~49% |
| Low Friction | ● | ▲ | increases 16%~19% |
| Service Temperature Range | ● | ● | |

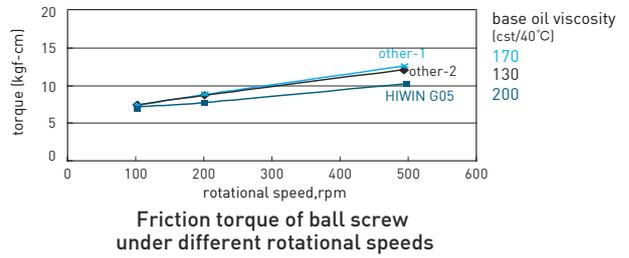
- **4-ball test (ASTM D2266)**

| | Wear Scar | Diameter (μm) |
|-----------|---|---------------|
| other-1 |  | 468 |
| other-2 |  | 567 |
| HIWIN G05 |  | 291 |



- **Wear resistance**

Screw diameter : 40mm
Lead : 10mm

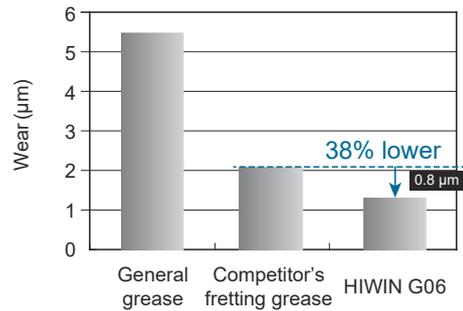


Friction torque of ball screw under different rotational speeds

9.6 HIWIN G06 High Frequency or Short-stroke Condition Grease

• Features

1. Well wear resistance under high frequency(1.5~3G) or short-stroke condition.
2. Long term grease, suitable for wide temperature range.
3. Can be used in plastic/steel and plastic/plastic components, compatible with elastomers and plastic materials.



• Basic Properties

| | | HIWIN G06 |
|----------------------|-------|----------------------|
| Color | | Beige |
| Base Oil | | PAO |
| Consistency enhancer | | Special Lithium Soap |
| Service Temp. (°C) | | -45~130 |
| NLGI-grade (0.1mm) | | 265-295 |
| Viscosity (cst) | 40°C | 32 |
| | 100°C | 6 |
| Drop Point (°C) | | 190 |

| | HIWIN G06 | Another general grease | Note | |
|---------------------------|-----------|------------------------|--|----------------|
| Anti wear | ● | ✘ | High frequency & short-stroke 3mm ∙ 600 cycles/min | increases 300% |
| Service temperature range | ● | ▲ | | |

• High frequency & short-stroke condition test (stroke 3mm ∙ 600 cycles/min)

| | Linear Guideway surface roughness | wear (µm) |
|----------------|-----------------------------------|-----------|
| General grease | | 5.5 |
| HIWIN G06 | | 1.3 |

9.7 HIWIN G07 Low Temperature Condition Grease

- **Features**

1. For low temperature condition: -50°C to 0°C.
2. Low starting and running torques particularly at low temperatures

- **Basic Properties**

| | | |
|----------------------|-------|-----------------------|
| | | HIWIN G07 |
| Color | | Beige |
| Base Oil | | Mineral |
| Consistency enhancer | | Lithium- calcium soap |
| Service Temp. (°C) | | -50~80 |
| NLGI-grade (0.1mm) | | 310-340 |
| Viscosity (cst) | 40°C | 14 |
| | 100°C | 3 |

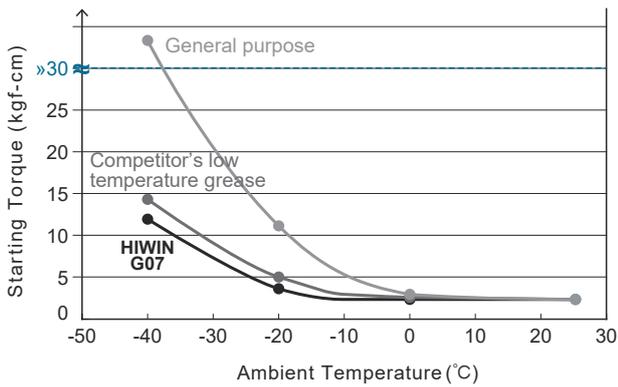
| | HIWIN G07 | Competitor's low temperature grease | Note |
|--|-----------|-------------------------------------|--|
| Low starting torque (at low temperature condition) | ● | ▲ | Ballscrew starting torque 20% lower at -40°C |
| Low Temperature Adaptability | ● | ● | |

- **Low temperature torque test**

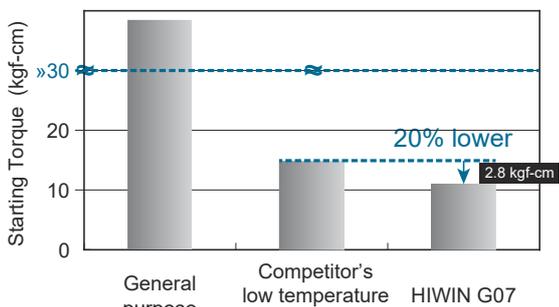
Sample : Ballscrew

Model : Diameter Ø25 mm \ Lead 5mm :

Test Conditions : -40°C~25°C



Comparison of different starting torque caused by grease at -40°C



A. Ballscrew Failure Analysis

A1 Preface

In recent years, more and more ballscrews are installed in various machines to meet the requirements of higher accuracy and better performance. Ballscrews have become one of the most widely used power transmission components. In CNC machines, ballscrews help improve positioning accuracy and elongate service life. Ballscrews are also increasingly used to replace ACME screws in manually operated machines.

A ballscrew is normally preloaded to minimize the backlash of machine movement. Even a high precision ballscrew will not provide good accuracy and long service life if it is not installed properly.

This article discusses primary ballscrew problems and their precautions. Some measuring procedures are also discussed to help users locate the cause of an abnormal backlash.

A2 Causes and Precautions for Ballscrew Problems

Three major categories of ballscrew problems and their precautions are discussed as follows.

A2-1 Too much play

1. No preload or insufficient preload :

The ball nut will rotate and move downward by its own weight when a non-preloaded ballscrew is held vertically with the screw spindle constrained. A significant backlash may exist in a non-preloaded ballscrew unit. Therefore non-preload ballscrews are only used in machinery, where low operation resistance but not positioning accuracy is the major concern.

HIWIN can determine the correct amount of preload based on different applications. We can also preset the amount of preload before shipment. Be sure to clearly specify the operation condition of your application when you order a ballscrew unit.

2. Too much torsional displacement :

(1) Incorrect heat treatment, hardened layer too thin, non-homogeneous hardness distribution, or material too soft: Standard hardness of steel balls, ball nuts, and screw spindles are HRC 62-66, 58-62, and 58-62, respectively.

(2) Incorrect design-L/D ratio too high, etc:

The lower the L/D (length/diameter) ratio, the more rigid the spindle is. L/D ratio should be limited to under 60. (The accuracy grade related to this L/D range is shown in Table 4.10) There will be a significant deflection (torsional displacement) if the L/D ratio is too high. The ballscrew installation shown in Fig A-1 is supported at one end only. This kind of "non-rigid" design should be avoided if possible.

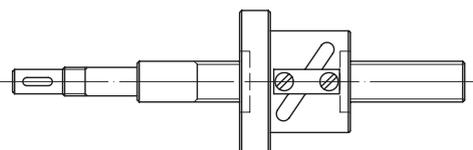


Fig. A-1 The installation of ballscrews.

3. Inappropriate bearing selection :

Angular ball bearings should be used in ballscrew installation. A ball bearing with high pressure angle specially designed for ballscrew installation is an even a better choice. A regular deep groove ball bearing will generate a significant amount of axial play when axially loaded. It should not be used in this application.

4. Inappropriate bearing installation :

(1) If the bearing is not attached to the screw spindle properly, it will cause axial play under load. This problem may be caused by the bearing journal of the screw spindle being too long or the non-threaded part of the screw spindle being too short.

(2) The perpendicularity between the bearing seating face and the thread axis of the bearing locknut on the ballscrew, or the parallelism between the opposite faces of the locknut is out of tolerance causing the bearing to tilt. The thread for bearing lock nut and the seating face of a bearing in the ballscrew journal should be machined in one setting to ensure the perpendicularity. It is even better if they can be ground.

(3) Two lock nuts and a spring washer should be used in the bearing installation to prevent them from getting loose in operation.

5. The ball nut housing or the bearing housing is not rigid enough :

The ball-nut-mounted housing or the bearing-mounted housing may deflect under components' weight or machining load if it is not rigid enough. The test illustrated in Fig A-4 (d) can be used to check the rigidity of the ball-nut-mounted housing. Similar tests can be used to check the rigidity of the bearing-mounted housing.

6. The ball nut housing or the bearing housing is not mounted properly :

- (1) Components may become loose due to vibration or lack of locating pin(s). Solid pins instead of spring pins should be used for locating purposes.
- (2) Ball-nut-seated screws are not seated firmly because the screws are too long or the thread holes on housing are too short.
- (3) Ball-nut-seated screws become loose due to vibration and lack of a spring washer.

7. Parallelism or flatness of the housing surface is out of tolerance :

In a machine assembly, a shim bar is frequently located between the housing location surface and the machine body for adjustment purpose. The clearance of table movement may vary at different locations if the parallelism or flatness of any matching component is out of tolerance no matter they are ground or scraped.

8. The motor and the ballscrew spindle are not assembled properly :

- (1) There will be a relative rotation between the motor shaft and the ballscrew spindle if the connecting coupling is not installed firmly or the coupling itself is not rigid enough.
- (2) Driving gears are not engaged properly or driving mechanism is not rigid. A timing belt should be used to prevent slipping if the ballscrew is to be driven by a belt.
- (3) Key is loose in the groove. Any inappropriate match among the hub, key, and key seat may cause these components to generate backlash.

A2-2 Unsmooth operation

1. Defects from ballscrew manufacturing :

- (1) The track surface of the ballscrew spindle or the ball nut is too rough.
- (2) The roundness of the bearing balls, the ball nut or the ballscrew spindle is out of tolerance.
- (3) The lead or the pitch circle diameter of the ball nut / the spindle is out of tolerance.
- (4) The return tube is not attached to the ball nut appropriately.
- (5) Uneven bearing ball size or hardness. The above problems should not be found in the manufacturers of top quality.

2. Foreign objects enter the ball path :

- (1) Packing material is trapped in the ball path. Various materials and anti-rust paper are normally used to pack ballscrew units for shipment. It is possible to have these foreign materials or other objects trapped in the ball path if proper procedures are not followed while installing or aligning the ballscrew unit. This may cause the bearing balls to slide instead of rolling or even cause the ball nut to freeze completely.
- (2) Machined chips get in the ball track. The chips or dust generated during machining processes may be trapped in the bearing ball track if wiper kits are not used to keep them away from the surface of the ballscrew unit. This may cause unsmooth operation, deteriorate accuracy and reduce service life.

3. Over-travel :

Over-travel can damage the return tube and cause it to collapse or even break. When this happens, the bearing balls will not circulate smoothly. They may break and damage the groove on the ball nut or the ballscrew spindle under severe circumstances. Over-travel may happen during set-up or as the result of a limit switch failure or a machine collision. To prevent further damage, an over-traveled ballscrew should be checked or repaired by the manufacturer before it goes back into service.

4. Damaged return tube:

The return tube may collapse and cause the same problems as mentioned above if it is hit heavily during installation.

5. Misalignment:

Radial load exists if the center line of the ball nut's housing and the screw spindle's bearing support housing are

not aligned properly. The ballscrew unit may bend if this misalignment is too large. An abnormal wear may still happen even if the misalignment is not significant enough to cause a noticeable bending. The accuracy of a ballscrew unit will deteriorate rapidly if it is misaligned. The higher the preload is set in the nut, the more demanding the alignment accuracy is required in the ballscrew.

6. The ball nut is not mounted properly on the nut housing:

Eccentric load exists when the mounted ball nut is tilted or misaligned. If this is the case, the motor current may fluctuate during rotation.

7. Ballscrew unit is damaged during transportation

A2-3 Fracture

1. Broken bearing ball :

Cr-Mo steel is the most commonly used material for bearing balls. It takes about 1,400kg (3,080LB) to 1,600kg (3,520LB) to break a steel ball of 3.175 mm (1/8 in) diameter. The temperature of an under-lubricated or non-lubricated ballscrew raises substantially during operation. This temperature rise could make the bearing balls brittle or break which causes damage to the grooves of the ball nut or the ballscrew spindle consequently.

Therefore, lubricant replenishment should be considered during the design process. If an automatic lubricating system is not available, a periodic grease replenishment should be scheduled as part of maintenance program.

2. Collapsed or broken return tube :

Over-travel of the ball nut or an impact on the return tube could cause the return tube to collapse or break. This may block the path of bearing balls and cause them to slide instead of rolling and eventually break.

3. Ballscrew spindle end breaks :

(1) Inappropriate design: Sharp corners on the ballscrew spindle should be avoided to reduce local stress concentration. (Fig. A2) shows some of the appropriate screw end designs.

(2) Bend of screw spindle journal: The seating surface of the bearing of the ballscrew and the thread axis of the bearing's lock nut are not perpendicular to each other or the opposite sides of the lock nut are not parallel to each other. This will cause the end of screw spindle to bend and eventually break. The amount of deflection at the end of the ballscrew spindle (Fig A-3) before and after the bearing's lock nut being tightened should not exceed 0.01 mm (0.0004 in).

(3) Radial force or fluctuating stress: Misalignment in the ballscrew installation creates abnormal fluctuating shear stress and causes the ballscrew to fail prematurely.

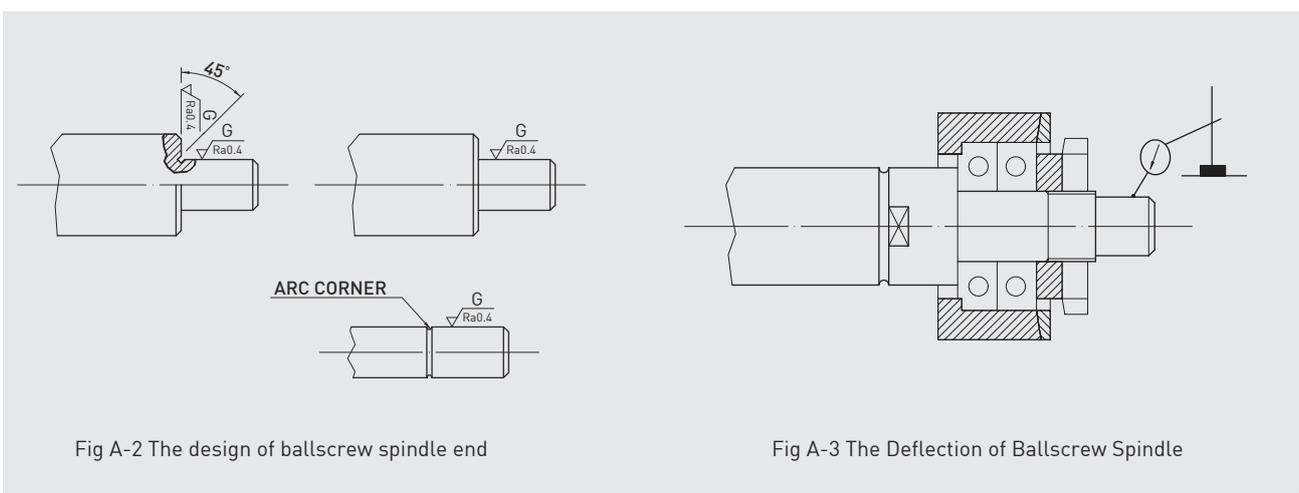


Fig A-2 The design of ballscrew spindle end

Fig A-3 The Deflection of Ballscrew Spindle

A3 Locating the Cause of an Abnormal Backlash

The following measurement procedures can be performed to locate the cause of an abnormal backlash in the ballscrew installation.

1. Glue a gauge ball in the center hole at one end of the screw spindle. Use the flat plate of a dial indicator to check the axial movement of this gauge ball in axial direction while rotating the screw spindle (Fig A-4(a)). The movement should not exceed 0.003mm (0.00012 in), if the bearing hub, the ball nut, and the ball nut housing are all installed properly.

2. Use a dial indicator to check the relative movement between the bearing housing and the bearing seat while rotating the ballscrew (Fig A-4(b)). Any dial indicator reading other than zero indicates that either the bearing hub is not rigid enough or it is not installed properly.

3. Check the relative movement between the machine table and the ball nut housing (Fig A-4(c)).

4. Check the relative movement between the ball nut housing and the ball nut flange (Fig A-4(d)).

Contact the ballscrew manufacturer if an unsatisfactory backlash still exits while all the above checks are ok. The preload or the rigidity of the ballscrew may have to be increased.

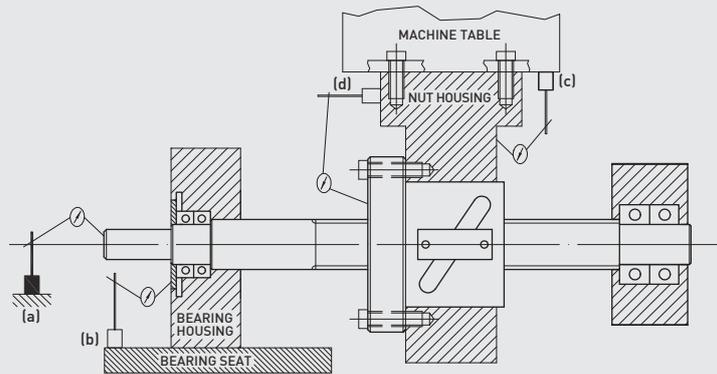


Fig. A-4 Locating the cause of an Abnormal Backlash

B. Standard Housing Dimension Tolerance

Unit: $\mu\text{m}=0.001\text{mm}$

| Dimensional range (mm) | E | | F | | | G | | H | | | | | | Js | | J | | K | | M | | N | | P | | R | | Dimensional range (mm) | | |
|------------------------|------|-------|------------|-------------|------------|------------|------------|-----------|-----------|---------|---------|----------|----------|----------|----------|------------|------------|------------|------------|-----------|------------|-----------|------------|------------|------------|------------|-------------|------------------------|-----|------|
| | Over | Incl. | E10 | E11 | F6 | F7 | F8 | G6 | G7 | H5 | H6 | H7 | H8 | H9 | H10 | Js6 | Js7 | J6 | J7 | K6 | K7 | M6 | M7 | N6 | N7 | P6 | P7 | R6 | R7 | Over |
| 3 | | 6 | +68 +20 | +95 +20 | +18 +10 | +22 +10 | +28 +10 | +12 +4 | +16 +4 | +5 0 | +8 0 | +12 0 | +18 0 | +30 0 | +48 0 | ± 4 | ± 6 | +5 -3 | +6 -6 | +2 -6 | +3 -9 | -1 -9 | 0 -12 | -4 -16 | -7 -17 | -8 -20 | -12 -20 | -11 -23 | 3 | 6 |
| 6 | | 10 | +83 +25 | +115 +25 | +22 +13 | +28 +13 | +35 +13 | +14 +5 | +20 +5 | +6 0 | +9 0 | +15 0 | +22 0 | +36 0 | +58 0 | ± 4.5 | ± 7.5 | +5 -4 | +8 -7 | +2 -7 | +5 -10 | -3 -12 | 0 -15 | -4 -19 | -12 -21 | -9 -24 | -16 -28 | -13 -28 | 6 | 10 |
| 10 | | 14 | +102 | +142 | +27 | +34 | +43 | +17 | +24 | +8 | +11 | +18 | +27 | +43 | +70 | ± 5.5 | ± 9 | +6 +10 | +10 +8 | +2 -9 | +6 -12 | -4 -15 | 0 -18 | -5 -23 | -15 -26 | -11 -29 | -20 -31 | -16 -24 | 10 | 14 |
| 14 | | 18 | +32 | +32 | +16 | +16 | +6 | +6 | +6 | 0 | 0 | 0 | 0 | 0 | 0 | ± 6.5 | ± 10.5 | +8 +12 | +12 +6 | +2 +6 | +6 -4 | 0 -4 | -11 -24 | -7 -28 | -18 -31 | -14 -35 | -20 -41 | -24 -30 | 18 | 24 |
| 18 | | 24 | +124 | +170 | +33 | +41 | +53 | +20 | +29 | +9 | +13 | +21 | +33 | +52 | +84 | ± 8 | ± 12.5 | +10 +14 | +14 +7 | +3 +7 | +7 -18 | -4 -20 | 0 -25 | -12 -33 | -8 -33 | -17 -42 | -29 -45 | -25 -50 | 30 | 40 |
| 24 | | 30 | +40 | +40 | +20 | +20 | +7 | +7 | +7 | 0 | 0 | 0 | 0 | 0 | 0 | ± 9.5 | ± 15 | +13 +18 | +18 +12 | +4 -15 | +9 -21 | -5 -24 | 0 -30 | -14 -33 | -9 -45 | -26 -51 | -60 -80 | -60 -80 | 50 | 65 |
| 30 | | 40 | +150 | +210 | +41 | +50 | +64 | +25 | +34 | +11 | +16 | +25 | +39 | +62 | +100 | ± 11 | ± 17.5 | +16 +22 | +22 +13 | +4 -18 | +10 -25 | -6 -28 | 0 -35 | -16 -45 | -30 -52 | -24 -59 | -44 -76 | -38 -80 | 80 | 100 |
| 40 | | 50 | +50 | +50 | +25 | +25 | +9 | +9 | +9 | 0 | 0 | 0 | 0 | 0 | 0 | ± 12.5 | ± 20 | +18 +26 | +26 +18 | +4 -21 | +12 -28 | -8 -33 | 0 -40 | -20 -45 | -36 -61 | -28 -68 | -56 -93 | -88 -120 | 120 | 140 |
| 50 | | 65 | +180 | +250 | +49 | +60 | +76 | +29 | +40 | +13 | +19 | +30 | +46 | +74 | +120 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 180 | 200 |
| 65 | | 80 | +60 | +60 | +30 | +30 | +10 | +10 | +10 | 0 | 0 | 0 | 0 | 0 | 0 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 200 | 225 |
| 80 | | 100 | +212 | +292 | +58 | +71 | +90 | +34 | +47 | +15 | +22 | +35 | +54 | +87 | +140 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |
| 100 | | 120 | +72 | +72 | +36 | +36 | +12 | +12 | +12 | 0 | 0 | 0 | 0 | 0 | 0 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |
| 120 | | 140 | | | | | | | | | | | | | | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |
| 140 | | 160 | +245 | +335 | +68 | +83 | +106 | +39 | +54 | +18 | +25 | +40 | +63 | +100 | +160 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |
| 160 | | 180 | +85 | +85 | +43 | +43 | +14 | +14 | +14 | 0 | 0 | 0 | 0 | 0 | 0 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |
| 180 | | 200 | | | | | | | | | | | | | | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |
| 200 | | 225 | +285 | +390 | +89 | +96 | +122 | +44 | +61 | +20 | +29 | +46 | +72 | +115 | +185 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |
| 225 | | 250 | +100 | +100 | +50 | +50 | +15 | +15 | +15 | 0 | 0 | 0 | 0 | 0 | 0 | ± 14.5 | ± 23 | +22 +30 | +30 +16 | +5 -24 | +13 -33 | -8 -37 | 0 -37 | -22 -51 | -41 -70 | -33 -79 | -60 -104 | -106 -113 | 225 | 250 |

C. Standard Spindle Dimension Tolerance

Unit: $\mu\text{m}=0.001\text{mm}$

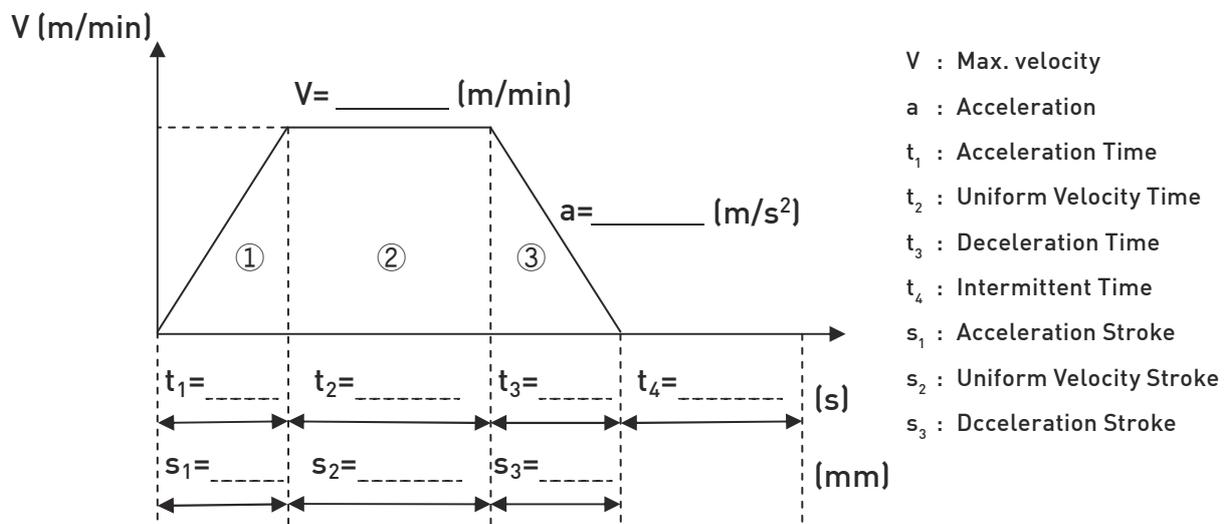
| Dimensional range (mm) | a | | c | | d | | e | | f | | g | | h | | | | | | js | | j | | k | | m | | n | | p | | r | | Dimensional range (mm) | |
|------------------------|------|-------|-------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-------|------------------------|--|
| | Over | Incl. | a13 | c12 | d6 | e6 | f5 | f6 | g5 | g6 | h5 | h6 | h7 | h8 | h9 | h10 | js5 | js6 | j5 | j6 | k5 | k6 | m5 | m6 | n5 | n6 | p5 | p6 | r6 | r7 | Over | Incl. | | |
| 3 | | | -270 | -70 | -30 | -20 | -10 | -10 | -4 | -4 | 0 | 0 | 0 | 0 | 0 | 0 | ± 2.5 | ± 4 | +3 | +6 | +6 | +9 | +9 | +12 | +13 | +16 | +17 | +20 | +23 | +27 | 3 | 6 | | |
| 6 | | | -450 | -190 | -38 | -28 | -15 | -18 | -9 | -12 | -5 | -8 | -12 | -18 | -30 | -48 | | | -2 | -2 | +1 | +1 | +4 | +4 | +8 | +8 | +12 | +12 | +15 | +15 | 6 | 10 | | |
| 10 | | | -280 | -80 | -40 | -25 | -13 | -13 | -5 | -5 | 0 | 0 | 0 | 0 | 0 | 0 | ± 3 | ± 4.5 | +4 | +7 | +7 | +10 | +12 | +15 | +16 | +19 | +21 | +24 | +28 | +34 | 10 | 14 | | |
| 14 | | | -500 | -230 | -49 | -34 | -19 | -22 | -11 | -14 | -6 | -9 | -15 | -22 | -36 | -58 | | | -2 | -2 | +1 | +1 | +6 | +6 | +10 | +10 | +15 | +15 | +19 | +19 | 14 | 18 | | |
| 18 | | | -290 | -95 | -50 | -32 | -16 | -16 | -6 | -6 | 0 | 0 | 0 | 0 | 0 | 0 | ± 4 | ± 5.5 | +5 | +8 | +9 | +12 | +15 | +18 | +20 | +23 | +26 | +29 | +34 | +41 | 18 | 24 | | |
| 24 | | | -300 | -110 | -65 | -40 | -20 | -20 | -7 | -7 | 0 | 0 | 0 | 0 | 0 | 0 | ± 4.5 | ± 6.5 | +5 | +9 | +11 | +15 | +17 | +21 | +24 | +28 | +31 | +35 | +41 | +49 | 24 | 30 | | |
| 30 | | | -630 | -320 | -78 | -53 | -29 | -33 | -16 | -20 | -9 | -13 | -21 | -33 | -52 | -84 | | | -4 | -4 | +2 | +2 | +8 | +8 | +15 | +15 | +22 | +22 | +28 | +28 | 30 | 40 | | |
| 40 | | | -310 | -120 | -80 | -50 | -25 | -25 | -9 | -9 | 0 | 0 | 0 | 0 | 0 | 0 | ± 5.5 | ± 8 | +6 | +11 | +13 | +18 | +20 | +25 | +28 | +33 | +37 | +42 | +50 | +59 | 40 | 50 | | |
| 50 | | | -700 | -370 | -96 | -66 | -36 | -41 | -20 | -25 | -11 | -16 | -25 | -39 | -62 | -100 | | | -5 | -5 | +2 | +2 | +9 | +9 | +17 | +17 | +26 | +26 | +34 | +34 | 50 | 65 | | |
| 65 | | | -320 | -130 | -119 | -79 | -43 | -49 | -23 | -29 | -13 | -19 | -30 | -46 | -74 | -120 | ± 6.5 | ± 9.5 | +6 | +12 | +15 | +21 | +24 | +30 | +33 | +39 | +45 | +51 | +60 | +60 | 65 | 80 | | |
| 80 | | | -800 | -440 | 100 | -60 | -30 | -30 | -10 | -10 | 0 | 0 | 0 | 0 | 0 | 0 | ± 7.5 | ± 11 | +6 | +13 | +18 | +25 | +28 | +35 | +38 | +45 | +52 | +59 | +73 | +73 | 80 | 100 | | |
| 100 | | | -360 | -170 | -120 | -72 | -36 | -36 | -12 | -12 | 0 | 0 | 0 | 0 | 0 | 0 | | | -9 | -9 | +3 | +3 | +13 | +13 | +23 | +23 | +37 | +37 | +54 | +54 | 100 | 120 | | |
| 120 | | | -820 | -450 | -142 | -94 | -51 | -58 | -27 | -34 | -15 | -22 | -35 | -54 | -87 | -140 | | | -9 | -9 | +3 | +3 | +13 | +13 | +23 | +23 | +37 | +37 | +54 | +54 | 120 | 140 | | |
| 140 | | | -380 | -170 | -120 | -72 | -36 | -36 | -12 | -12 | 0 | 0 | 0 | 0 | 0 | 0 | | | +6 | +13 | +18 | +25 | +28 | +35 | +38 | +45 | +52 | +59 | +73 | +73 | 140 | 160 | | |
| 160 | | | -920 | -520 | -142 | -94 | -51 | -58 | -27 | -34 | -15 | -22 | -35 | -54 | -87 | -140 | ± 9 | ± 12.5 | +7 | +14 | +21 | +28 | +33 | +40 | +45 | +52 | +61 | +68 | +88 | +88 | 160 | 180 | | |
| 180 | | | -410 | -180 | -142 | -85 | -43 | -45 | -14 | -14 | 0 | 0 | 0 | 0 | 0 | 0 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +65 | +65 | 180 | 200 | | |
| 200 | | | -950 | -530 | -170 | -110 | -61 | -68 | -32 | -39 | -18 | -25 | -40 | -63 | -100 | -160 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +68 | +68 | 200 | 240 | | |
| 240 | | | -460 | -200 | -145 | -85 | -43 | -45 | -14 | -14 | 0 | 0 | 0 | 0 | 0 | 0 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +68 | +68 | 240 | 280 | | |
| 280 | | | -1090 | -600 | -170 | -110 | -61 | -68 | -32 | -39 | -18 | -25 | -40 | -63 | -100 | -160 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +68 | +68 | 280 | 320 | | |
| 320 | | | -520 | -210 | -145 | -85 | -43 | -45 | -14 | -14 | 0 | 0 | 0 | 0 | 0 | 0 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +68 | +68 | 320 | 360 | | |
| 360 | | | -1150 | -610 | -170 | -110 | -61 | -68 | -32 | -39 | -18 | -25 | -40 | -63 | -100 | -160 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +68 | +68 | 360 | 400 | | |
| 400 | | | -580 | -230 | -170 | -110 | -61 | -68 | -32 | -39 | -18 | -25 | -40 | -63 | -100 | -160 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +68 | +68 | 400 | 440 | | |
| 440 | | | -1210 | -630 | -170 | -110 | -61 | -68 | -32 | -39 | -18 | -25 | -40 | -63 | -100 | -160 | | | -11 | -11 | +3 | +3 | +15 | +15 | +27 | +27 | +43 | +43 | +68 | +68 | 440 | 480 | | |

D. HIWIN Ballscrew Inquiry (1/2)

Company _____ Date ____ Day ____ Month ____ Year
 Address _____
 Telephone _____ Fax _____
 Machine Type _____ Application X axis Y axis Z axis
 Guide way Rolling Sliding Hardened slideway
 Attached Yes (Drawing No. _____) No

1. Operation conditions:

| | | | |
|-----------------|--|-----------------|---|
| Life Expectancy | hr | Shock/Vibration | <input type="checkbox"/> Smooth |
| Lubricant | <input type="checkbox"/> Oil <input type="checkbox"/> Grease <input type="checkbox"/> Other _____ | | <input type="checkbox"/> Normal <input type="checkbox"/> Vibration |
| Environment | <input type="checkbox"/> General environment <input type="checkbox"/> High dust <input type="checkbox"/> Clean room <input type="checkbox"/> Other _____ | | |
| | <input type="checkbox"/> In vacuum (Value of Pressure _____ Torr/mmHg) | | |
| | <input type="checkbox"/> High Temperature (Temperature _____ °C _____ °F) | | |



Operation conditions diagram

2. Specification factors of the ballscrew:

| | | | | | |
|----------------------|---|--------------------------|---------------------------------|-----------------|---------------------------------------|
| Operation Conditions | <input type="checkbox"/> Rotation Shaft | Ballscrew Classification | <input type="checkbox"/> Rolled | Preload | kgf |
| | <input type="checkbox"/> Rotation nut | | <input type="checkbox"/> Ground | Drag Torque | kgf-cm |
| Turning Direction | <input type="checkbox"/> Right | Accuracy Grade | | Support Bearing | <input type="checkbox"/> Ball _____ |
| | <input type="checkbox"/> Left | | | | <input type="checkbox"/> Roller _____ |
| Seal | <input type="checkbox"/> Yes <input type="checkbox"/> No | Supplemental explanation | | | |

E. HIWIN Ballscrew Inquiry (2/2)

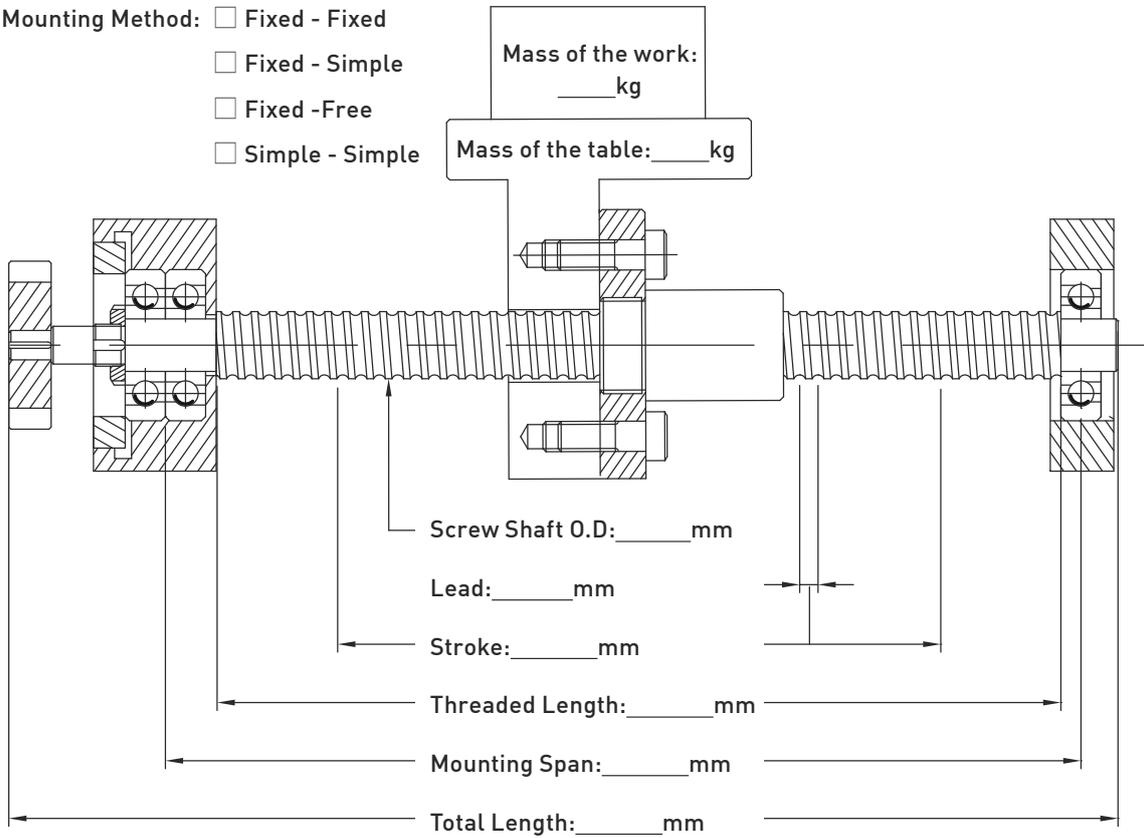
3. Horizontal Type:

Mounting Method: Fixed - Fixed

Fixed - Simple

Fixed -Free

Simple - Simple



4. Vertical Type:

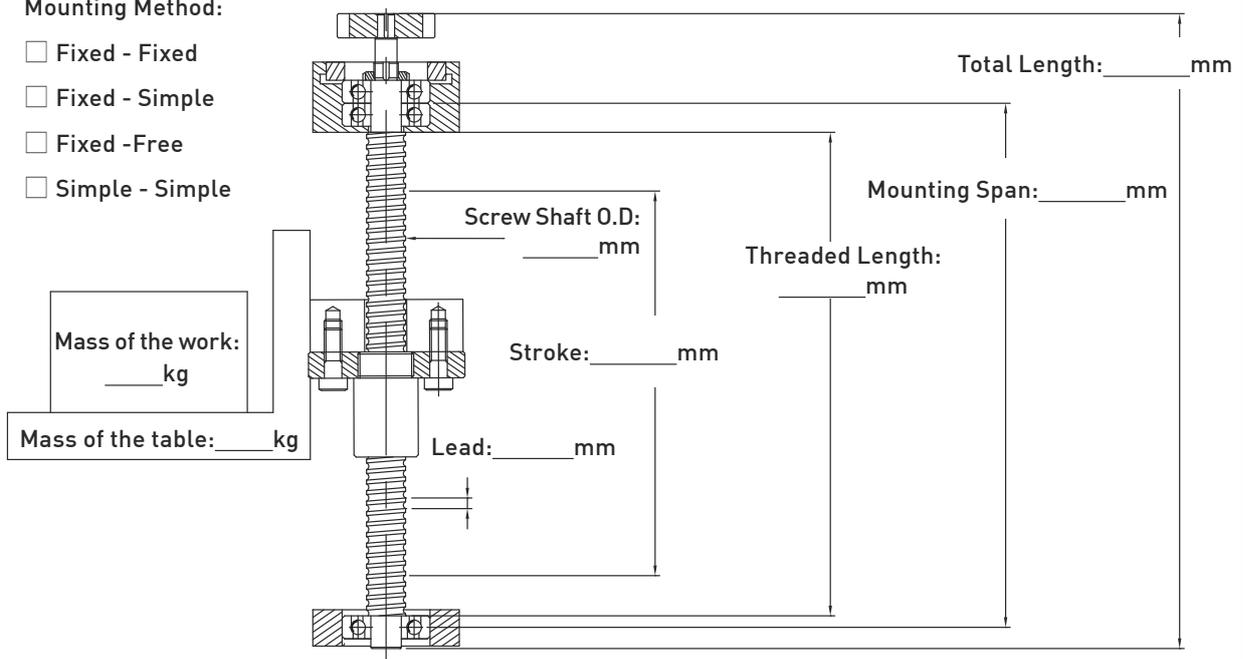
Mounting Method:

Fixed - Fixed

Fixed - Simple

Fixed -Free

Simple - Simple

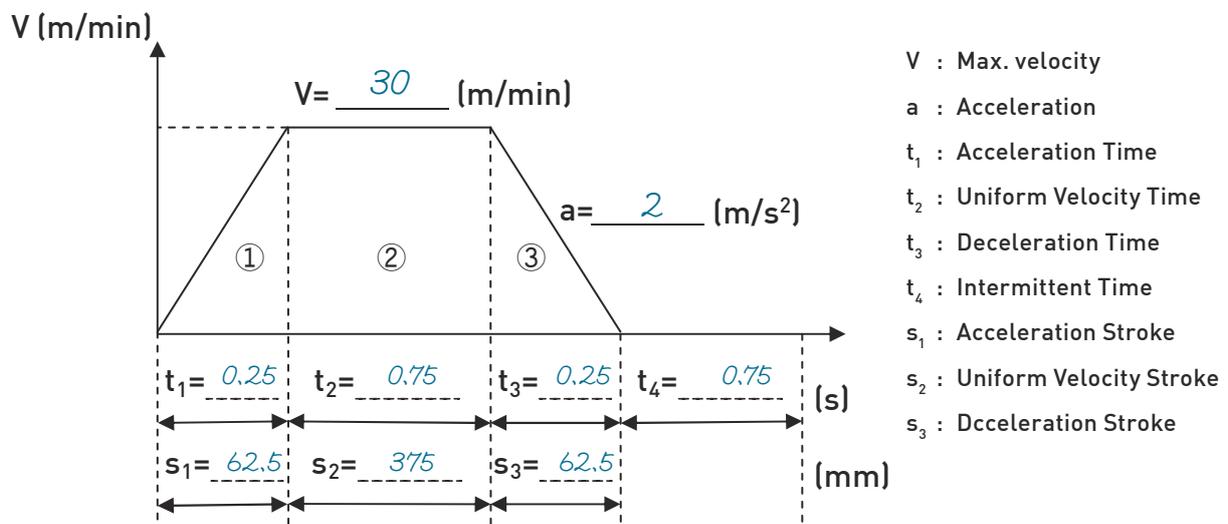


F. HIWIN Ballscrew Inquiry Sample (1/2)

Company _____ Date ____ Day ____ Month ____ Year
 Address _____
 Telephone _____ Fax _____
 Machine Type Three axis machine Application X axis Y axis Z axis
 Guide way Rolling Sliding Hardened slideway
 Attached Yes (Drawing No. _____) No

1. Operation conditions:

| | | | |
|-----------------|--|-----------------|--|
| Life Expectancy | <u>20,000</u> hr | Shock/Vibration | <input type="checkbox"/> Smooth |
| Lubricant | <input checked="" type="checkbox"/> Oil <input type="checkbox"/> Grease <input type="checkbox"/> Other _____ | | <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Vibration |
| Environment | <input checked="" type="checkbox"/> General environment <input type="checkbox"/> High dust <input type="checkbox"/> Clean room <input type="checkbox"/> Other _____ <input type="checkbox"/> In vacuum (Value of Pressure _____ Torr/mmHg) <input type="checkbox"/> High Temperature (Temperature _____ °C _____ °F) | | |



Operation conditions diagram

2. Specification factors of the ballscrew:

| | | | | | |
|----------------------|---|--------------------------|---|---|----------------|
| Operation Conditions | <input checked="" type="checkbox"/> Rotation Shaft <input type="checkbox"/> Rotation nut | Ballscrew Classification | <input type="checkbox"/> Rolled <input checked="" type="checkbox"/> Ground | Preload | <u>146</u> kgf |
| Turning Direction | <input checked="" type="checkbox"/> Right <input type="checkbox"/> Left | Accuracy Grade | <u>C3</u> | Drag Torque | _____ kgf-cm |
| Seal | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Support Bearing | Supplemental explanation | <input checked="" type="checkbox"/> Ball _____ <input type="checkbox"/> Roller _____ | |

G. HIWIN Ballscrew Inquiry Sample (2/2)

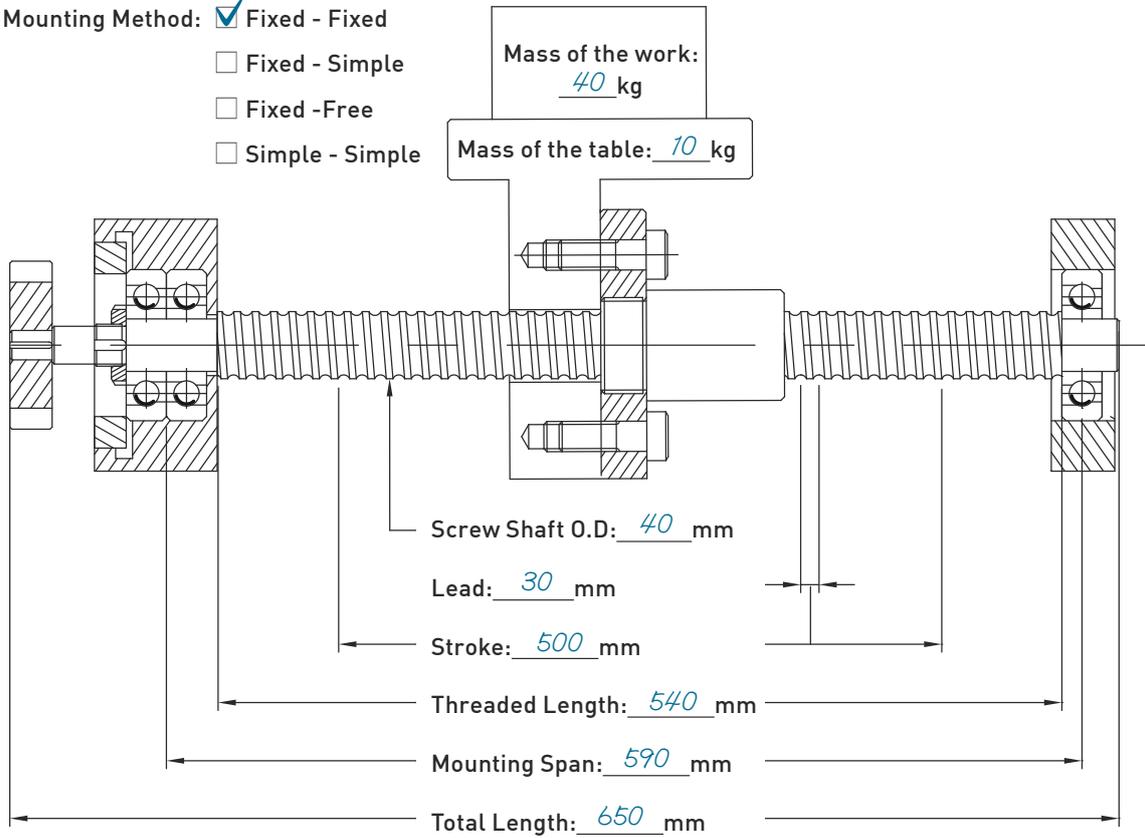
3. Horizontal Type:

Mounting Method: Fixed - Fixed

Fixed - Simple

Fixed -Free

Simple - Simple



4. Vertical Type:

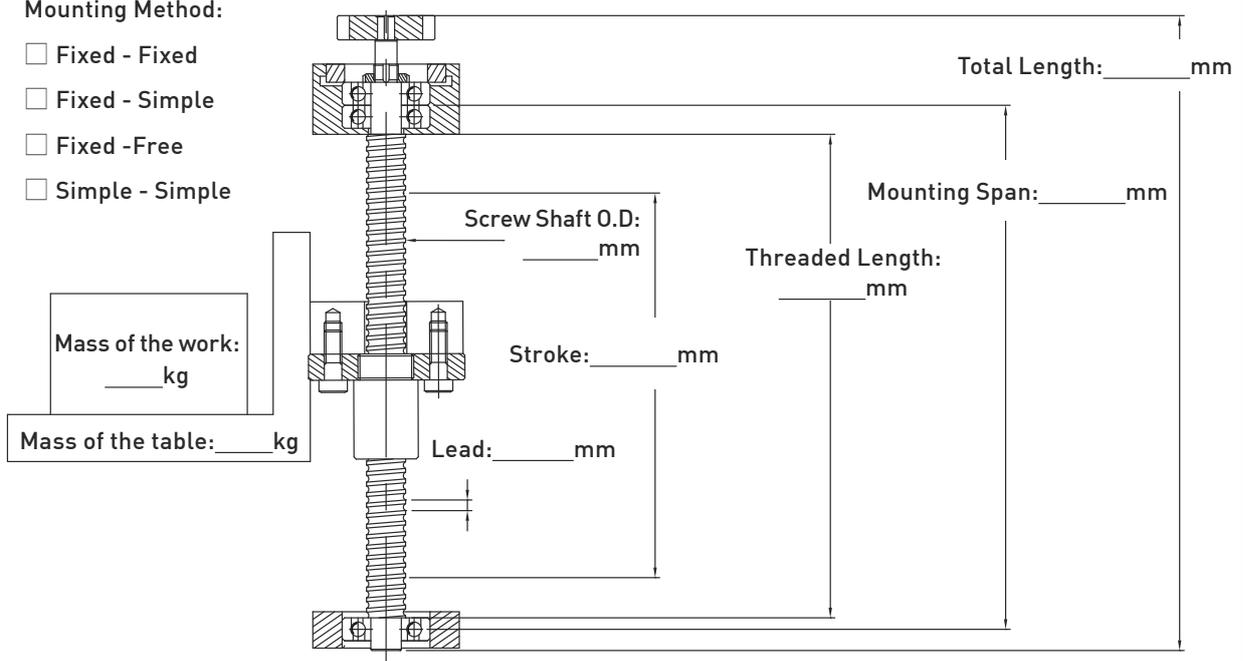
Mounting Method:

Fixed - Fixed

Fixed - Simple

Fixed -Free

Simple - Simple



H. HIWIN Heavy Load Ballscrew Data Inquiry (1/2)

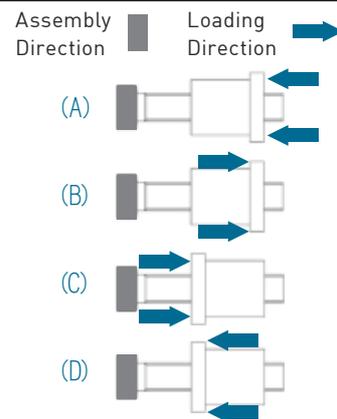
Company _____ Date ____ Day ____ Month ____ Year
 Address _____
 Telephone _____ Fax _____
 Machine Type* _____ Axis* _____
 Attached Yes No

※ For Injection or pressing machine, please provide the "ton" of machine.

※ For Injection machine, please provide the ballscrew is being used on injection, clamp or ejector.

1. Application Condition:

Movement Type: Rotating shaft Rotating nut
 Mounting Method: fix-fix fix -support fix -free
 Installation: Horizontal Vertical
 Loading Direction: (A) (B) (C) (D) (see the drawing)
 Lubrication: Grease Oil
 ※ Grease name: _____ Supplier: _____
 Lubrication hole position: HIWIN decide special position
 Spacer[Q1]: Yes No
 Environment temperature: _____ °C



2. Ballscrew Specification:

Shaft diameter: _____ mm Turning direction: Right Left
 Lead: _____ mm Start: Single Double
 Nut type: _____ Circulation: _____ Axial backlash: 0.02MAX 0.05MAX Other: _____
 Thread Length: _____ mm Shaft Length: _____ mm

3. Loading Condition: (If there are more than one ballscrew used in the machine, please provide single ballscrew loading condition.)

Max. Dynamic Load: _____ kgf Max. Static Load: _____ kgf
 Normal use stroke: _____ mm Max. stroke: _____ mm
 Cycle time: _____ s Life requirement: _____ hours or cycles

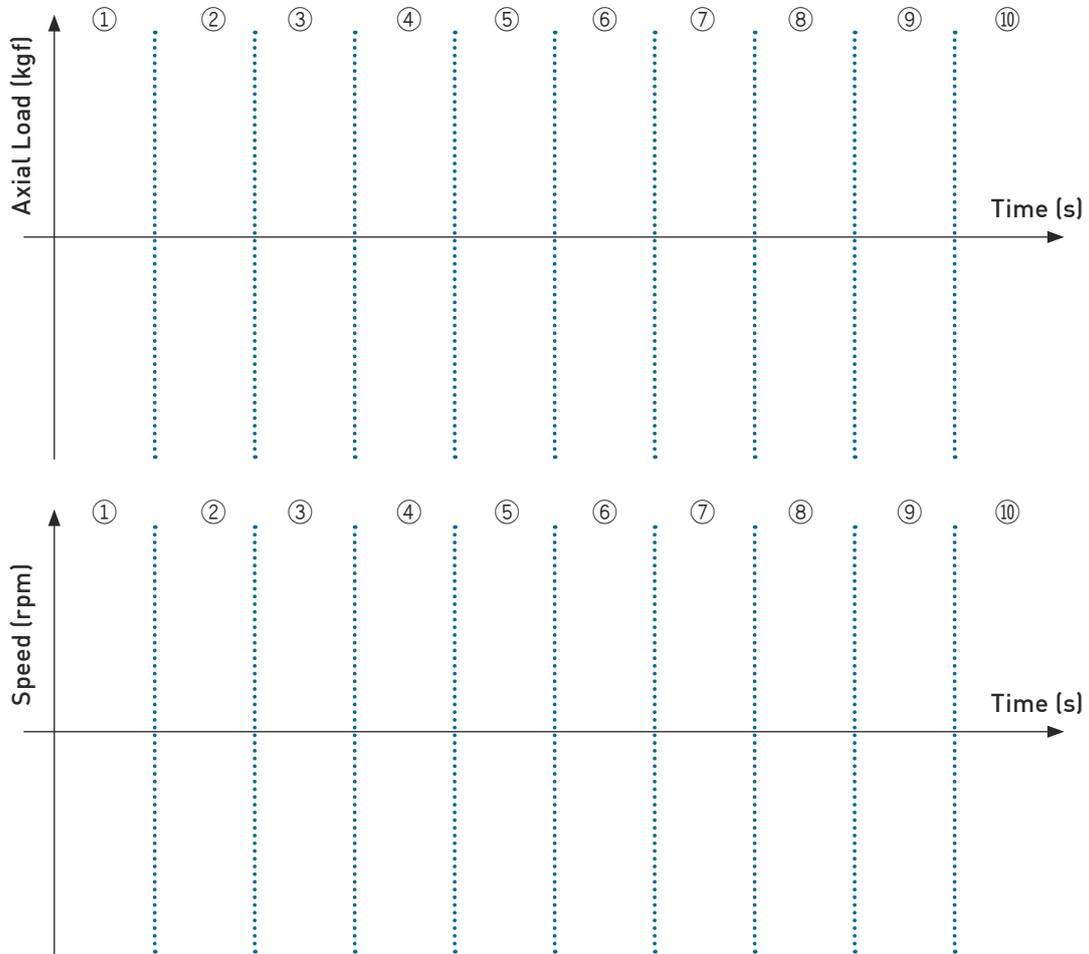
※ In order to make sure the ballscrew is suitable for your machine, please provide load conditions.

4. Other Remark:

I. HIWIN Heavy Load Ballscrew Data Inquiry (2/2)

5. Loading curve drawing:

(If there is more than one ballscrew used in the machine, please provide single ballscrew loading conditions.)



| | Axial Load (kgf) | Speed (rpm) | Time (s) | Distance (mm) | Remark |
|---|------------------|-------------|----------|---------------|--------|
| ① | | | | | |
| ② | | | | | |
| ③ | | | | | |
| ④ | | | | | |
| ⑤ | | | | | |
| ⑥ | | | | | |
| ⑦ | | | | | |
| ⑧ | | | | | |
| ⑨ | | | | | |
| ⑩ | | | | | |

Remark

- ※ Ballscrew's actual life will be affected by assembly condition, lubrication and use condition.
- ※ Under high temperature the grease may not perform as it should.

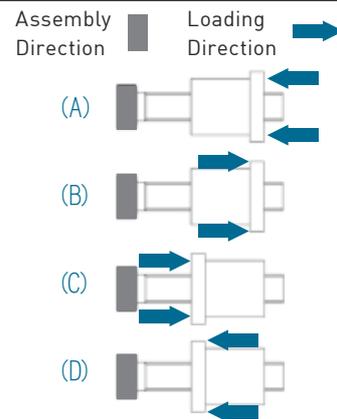
J. HIWIN Heavy Load Ballscrew Data Inquiry Sample (1/2)

Company _____ Date ____ Day ____ Month ____ Year
 Address _____
 Telephone _____ Fax _____
 Machine Type* All electric injection molding machine [50ton] Axis* clamping
 Attached Yes No

※ For Injection or pressing machine, please notify the "ton" of machine.
 ※ For Injection machine, please notify the ballscrew is being used on injection, clamp or ejector.

1. Application Condition:

Movement Type: Rotating shaft Rotating nut
 Mounting Method: fix-fix fix-support fix-free
 Installation: Horizontal Vertical
 Loading Direction: (A) (B) (C) (D) (see the drawing)
 Lubrication: Grease Oil
 ※ Grease name: HIWIN G01 Supplier: _____
 Lubrication hole position: HIWIN decide special position
 Spacer[Q1]: Yes No
 Environment temperature: 50 °C



2. Ballscrew Specification:

Shaft diameter: 63 mm Turning direction: Right Left
 Lead: 20 mm Start: Single Double
 Nut type: FSS Circulation: 3.8x2 Axial backlash: 0.02MAX 0.05MAX Other: _____
 Thread Length: 1,000 mm Shaft Length: 1,500 mm

3. Loading Condition: (If there are more than one ballscrew used in the machine, please provide single ballscrew loading condition.)

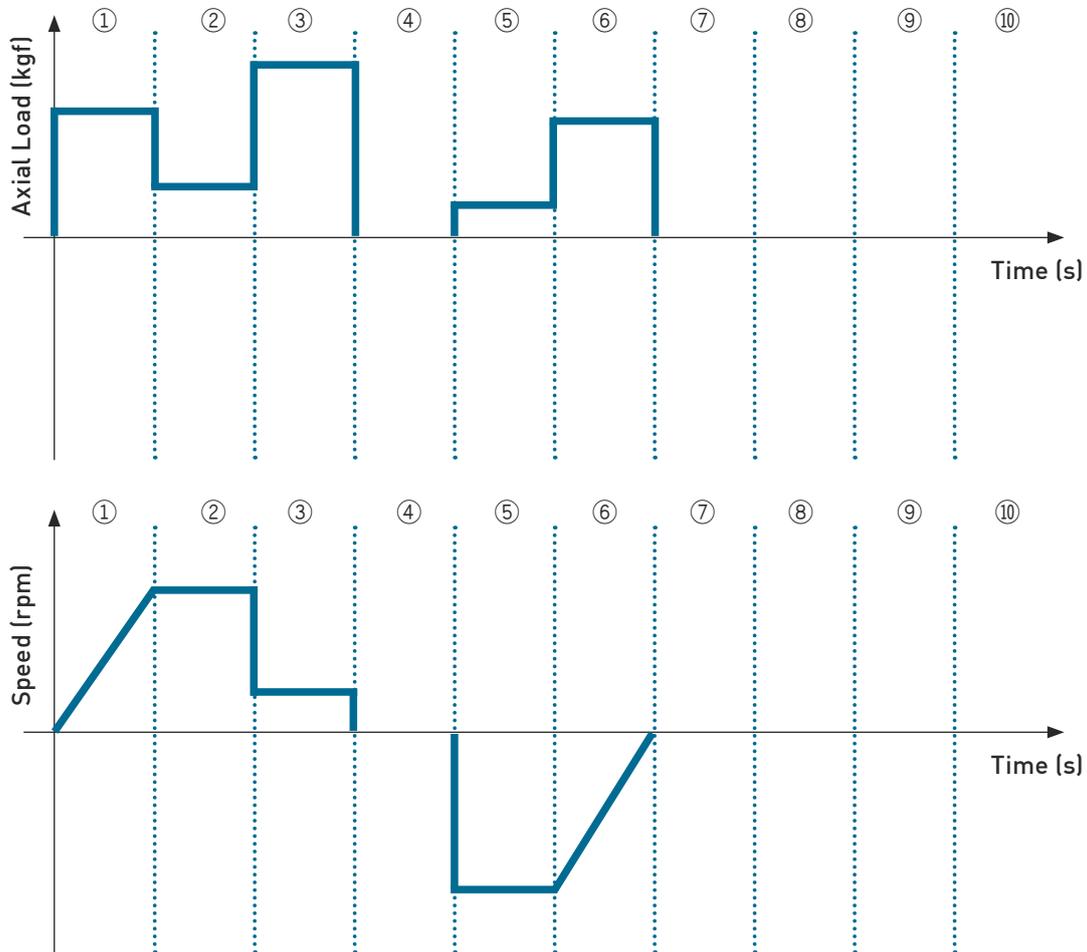
Max. Dynamic Load: 8,000 kgf Max. Static Load: 2,500 kgf
 Normal use stroke: 300 mm Max. stroke: 500 mm
 Cycle time: 13 s Life requirement: 6,000,000 hours or cycles
 ※ In order to make sure the ballscrew is suitable for your machine, please provide loading condition.

4. Other Remark:

K. HIWIN Heavy Load Ballscrew Data Inquiry Sample (2/2)

5. Loading curve drawing:

(If there is more than one ballscrew used in the machine, please provide single ballscrew loading condition.)



| | Axial Load (kgf) | Speed (rpm) | Time (s) | Distance (mm) | Remark |
|---|------------------|-------------|----------|---------------|-------------------|
| ① | 2500 | 600 | 1 | 60 | |
| ② | 400 | 1200 | 2 | 100 | |
| ③ | 8000 | 300 | 3 | 70 | Instant peak load |
| ④ | 0 | 0 | 4 | 0 | |
| ⑤ | 400 | 1200 | 2 | 100 | |
| ⑥ | 2500 | 600 | 1 | 60 | |
| ⑦ | | | | | |
| ⑧ | | | | | |
| ⑨ | | | | | |
| ⑩ | | | | | |

Remark

- ※ Ballscrew's actual life will be affected by assembly condition, lubrication and use condition.
- ※ Under high temperature the grease may not perform as it should.

Ballscrews Technical Information

Publication Date : June 1998, first edition

Print Date : October 2018, 21th edition

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