WOIDTOP

Lead Screw Product Catalogue

Company Profile

Shenzhen Tianyi Intelligent Technology Co., Ltd. was established in December 2013. It mainly engages in the research and development, production, sales and service o FA (Factory Automation) precision parts (such as pneumatic components, rolling functional components, high-precision adjustment platforms, four-axis robots, aluminum profiles, industrial robots, industrial control modules, transmitters and sensors), fixtures and automated equipment (lines) for tooling and inspection. By integrating technological innovation, the company's FA (Factory Automation) precision standard parts business helps customers achieve value through its products, making industries more automated and production sites more pleasant. Based on application scenarios, the company's current focus in the tooling and inspection fixtures and automated equipment business is on two major application fields: consumer electronics such as smart phones and wearable devices, and automotive electronics. The company plans to gradually expand its capabilities and serve more application fields in FA factory automation. With a strategic focus on FA precision standard parts and intelligent equipment, it aims to achieve scale through speed and become a leading brand in the industry, contributing to the upgrading of China's industry and the realization of the "Made in China 2025" and "Industry 4.0" blueprints.

Development Process

Climbing period

2018-2020

Self-established Suizhou Industrial Park, Strategically positioned FA standard parts, Initially forming a nationwide service network layout.

Startup Stage

2013-2018

Based in the two major parks of Longhua and Guangming in Shenzhen, complete process research, standard setting, and supply chain verification!

Growth Phase

2020-2022

Establish the Huizhou park, improve the business capability layout in South China, actively seek capital market empowerment, and strengthen the dual advantages of the company's FA precision components & intelligent equipment.

period of rapid development

2023- · · ·

Strategically focus on FA precision standard components & intelligent equipment, use speed to impact scale, become an industry-leading brand, and contribute to the realization of Made in China 2025 and the Industry 4.0 blueprint.

Ball screw indexing

Grinding-grade ball screw

P27

Slider type	Guide rail size mm	Load type	Slider Fixing method	Guide rail Fixing method
Flange type Square type Square type (low)	15	Heavy load Overload	Lockable type Bottom -lockable type Top and bottom lockable type	Lockable type Bottom -lock type
	20			
	25			
	30			
	35			
	45			
	55			
	65			

Reconditioned grade ball screw

P50

Slider type	Guide rail size mm	Load type	Slider Fixing method	Guide rail Fixing method
Flange type Square type	15	Heavy load Overload	Lockable type Bottom -lockable type Top and bottom lockable type	Lockable type Bottom -lock type
	20			
	25			
	30			
	35			

MEMO

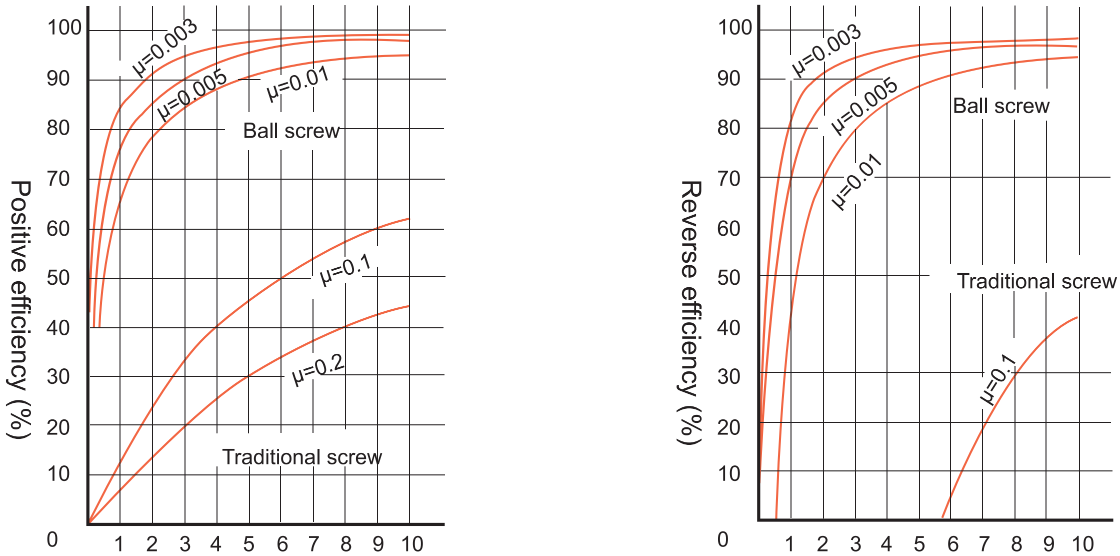
1-1The advantages of ball screws

(1)High dependency

Ball screws are based on the accumulated product technology over the years. From materials, heat treatment, manufacturing, inspection to shipment, they are all managed under the most rigorous quality assurance system, thus ensuring high reliability.

(2)Smoothness of movement

The ball screw, as shown in Figure 1.1.1, has a higher efficiency than the traditional screw, requiring only 30% or less torque, and can easily convert linear motion into rotary motion. Even when preloaded, the ball screw can maintain smooth motion characteristics.



Lead angle (degree)
Positive efficiency (rotation to linear)
The formula of input-output relationship

Lead angle (degree)
Reverse efficiency (linear to rotary)
The formula of input-output relationship

□: Coefficient of friction

$$P=\frac{2\pi\eta_1 xT}{\ell}$$

T=Input torque kgf•cm
P=Output thrust kgf
=lead screw pitch cm
η_1=Positive efficiency

$$T=\frac{\ell x\eta_2 xP}{2\pi}$$

T=Input torque kgf•cm
P=Output thrust kgf
=lead screw pitch cm
η_2=Positive efficiency

Figure 1.1.1 Mechanical Efficiency of Ball Screws

(3)Zero backlash and high rigidity

The ball screw, as shown in Figure 1.1.2, adopts a Gothic arch full groove shape, and the axial clearance can be adjusted to a minimum, allowing for easy rotation. Moreover, preload adjustment is made between one or two nuts to eliminate axial clearance, thereby achieving appropriate rigidity that meets the usage conditions.

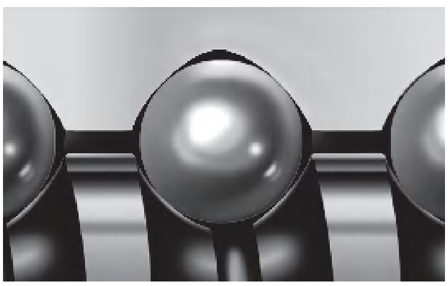


Figure 1.1.2 Gothic Full Groove

(4) Circulation mode

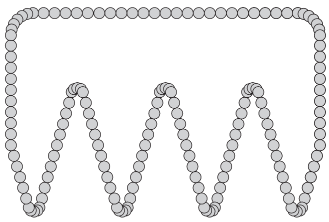


Figure 1.1.3 External Circulation

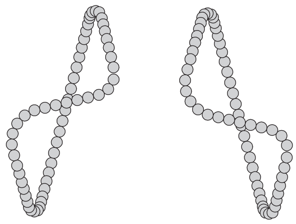


Figure 1.1.4 Inner Loop

(5)Excellent durability

Based on the accumulated production technology of ball screws over many years, and by using strict materials and advanced heat treatment and processing techniques, we can supply durable products, as shown in Table 1.1.1 and Figure 1.1.5.

Table 1.1.1 Materials and Heat Treatment

Product Name	Materials	Hardness
Screw rod	SCM450/S55C	HRC58°~62°
Nut	SCM415H	HRC58°~62°
Steel ball	SUJ2	HRC62°UP

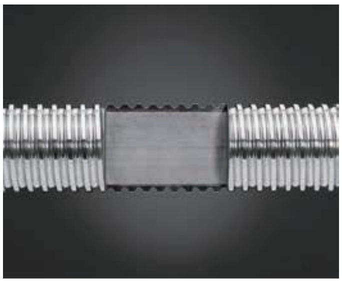
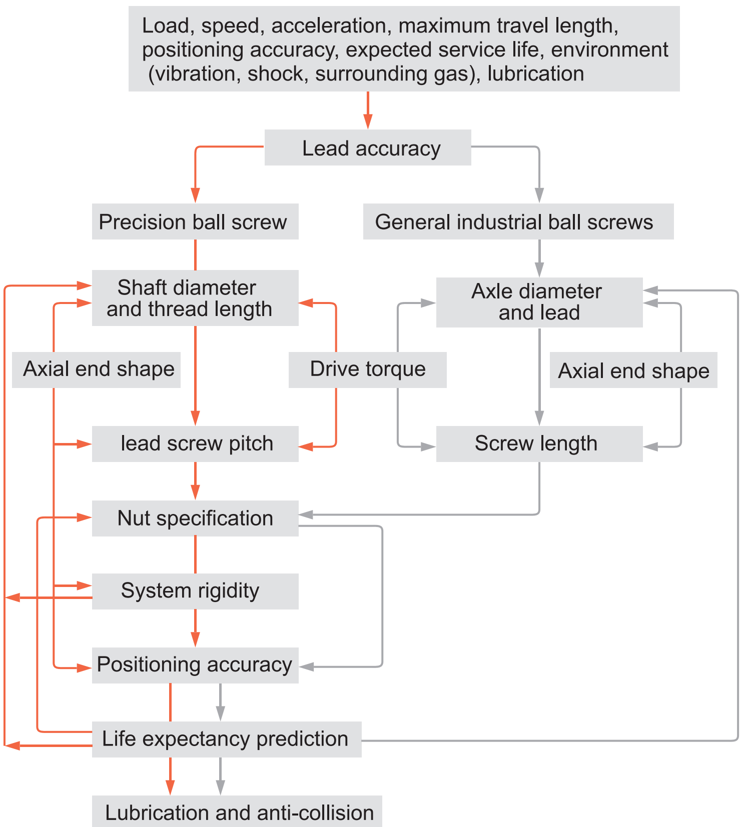


Figure 1.1.5 Heat Treatment Diagram

1-2Selection steps for ball screws



1-3Precision design

1-3-1 Lead accuracy

The lead accuracy of precision ball screws (C0 grade to C5 grade) is defined based on the JIS standard and specified by four characteristic items (E, e, e300, e2π). The definitions and allowable values of each characteristic are shown in Figure 1.3.1 and Tables 1.3.1 to 1.3.3. For general-purpose ball screws of C7 and C10 grades, the cumulative lead error is specified by the maximum allowable error width within any 300mm range within the effective thread length and the e300 value in Table 1.3.3, which are 0.05mm and 0.21mm respectively.

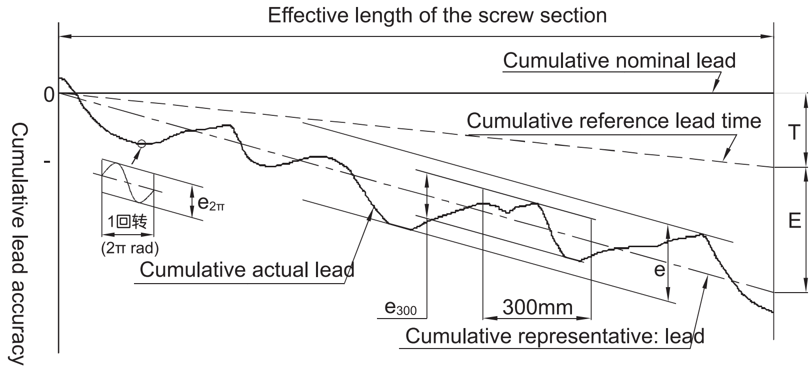


Figure 1.3.1 Specification of Lead Precision

Terminology	Mark	Explanation	Allowable value
Cumulative lead target value	T	Within the effective thread range, the difference between the cumulative reference lead and the cumulative nominal lead is called the lead compensation, which takes into account factors such as thermal expansion and elastic deformation during operation. The cumulative nominal lead is corrected in advance, and the screw is manufactured based on this. Its value is determined by experiments or experience.	
Cumulative actual lead		The actual measured cumulative lead.	
Cumulative lead distance		The straight line representing the cumulative actual lead tendency is the one obtained from the cumulative actual lead curve by the least squares method or a similar approach.	
Cumulative lead distance The error of it	E	The cumulative value represents the difference between the lead and the cumulative reference lead.	Table1.3.2
Change	e e_{300} $e_{2\pi}$	The maximum width of the cumulative actual lead between two straight lines cut parallel to the cumulative representative lead is defined by the following three items: the maximum width within the effective thread length; the maximum width within any 300mm range within the effective thread length; and the maximum width of the difference between the measured value and the reference value of the axial displacement of the nut corresponding to any rotation angle within one rotation of the screw shaft.	Table1.3.2 Table1.3.3 Table1.3.3

1-3-1 Lead accuracy

Table 1.3.2 Permissible Values of Cumulative Lead Error (±E) and Variation (e) (JIS B 1192)

accuracy level			C0		C1		C2		C3		C5		C7	C10
Effective thread length (mm)	The above	The following	±E	e	±E	e	±E	e	±E	e	±E	e	e	e
		100	3	3	3.5	5	5	7	8	8	18	18		
	100	200	3.5	3	4.5	5	7	7	10	8	20	18		
	200	315	4	3.5	6	5	8	7	12	8	23	18		
	135	400	5	3.5	7	5	9	7	13	10	25	20		
	400	500	6	4	8	5	10	7	15	10	27	20		
	500	630	6	4	9	6	11	8	16	12	30	23		
	630	800	7	5	10	7	13	9	18	13	35	25		
	800	1200	8	6	11	8	15	10	21	15	40	27		
	1000	1250	9	6	13	9	18	11	24	16	46	30	±50/300mm	±210/300mm
	1250	1600	11	7	15	10	21	13	29	18	54	35		
	1600	2000			18	11	25	15	35	21	65	40		
	2000	2500			22	13	30	18	41	24	77	46		
	2500	3150			26	15	36	21	50	29	93	54		
	3150	4000			30	18	44	25	60	35	115	65		
	4000	5000					52	30	72	41	140	77		
	5000	6300					65	36	90	50	170	93		
	6300	8000							110	60	210	115		
	8000	10000									260	140		
	10000	12500									320	170		

Table 1.3.3 Permissible values of variation (e300) and swing (e2π) for thread section length 300mm (JIS B 1192) Unit: μm

accuracy level	C0	C1	C2	C3	C5	C7	C10
e_{300}	3.5	5	7	8	18	50	210
$e_{2\pi}$	2.5	4	5	6	5		

1-3-2 Axial clearance

The preload grades for the axial clearance of precision ball screws are shown in Table 1.3.4.

Table 1.3.4 Preload Grades for Axial Direction Clearance

accuracy level	P0	P1	P2	P3	P4
gap	There is	None	None	None	None
Preloading	None	None	Light	Middle	Heavy

Excessive preload will cause a significant increase in friction torque and temperature rise, thereby reducing the expected service life. However,too low a preload will result in insufficient rigidity of the ball screw and increase the possibility of lost motion. We suggest that for CNC machine tools, the maximum preload should not exceed 8% of the dynamic load; for automated X-Y platform mechanisms, the maximum preload should not exceed 5% of the dynamic load.

Table 1.3.5 Reference Values for Preloading (P2)

Specification	Single nut spring force (kg)	Double nut spring force (kg)
1605	0.1~0.3	0.3~0.6
2005	0.1~0.3	0.3~0.6
2505	0.2~0.5	0.3~0.6
3205	0.2~0.5	0.5~0.8
4005	0.2~0.5	0.5~0.8
2510	0.2~0.5	0.5~0.8
3210	0.3~0.6	0.5~0.8
4010	0.3~0.6	0.5~0.8
5010	0.3~0.6	0.8~1.2
6310	0.6~1.0	0.8~1.2
8010	0.6~1.0	0.8~1.2

Table 1.3.6 Maximum Axial Play of Recycled and Ground Grade Ball Screws (P0)

The outer diameter size of the screw	Maximum rotational clearance of recirculating ball screw	Maximum rotational clearance of precision ground ball screw
ϕ04~ϕ14Micro-miniature ball screw	0.05	0.015
ϕ15~ϕ40Medium-sized ball screw	0.08	0.025
ϕ50~ϕ100Large-sized ball screw	0.12	0.05

1-3-3 The installation position accuracy of ball screws

The necessary items for the accuracy of the installation position of the ball screw are as follows:

(1)Measure the circumferential wobble value in the radial direction of the screw support part relative to the axis A of the threaded surface.

(2)Measure the coaxiality of the part installation position relative to the axis F of the screw support position.

(3)Measure the perpendicularity of the end face of the support part relative to the axis line E of the screw shaft support part.

(4)Determine the perpendicularity of the reference surface of the nut or the installation surface of the flange relative to the axis G of the screw.

(5)Determine the coaxiality of the outer edge of the nut (cylindrical) relative to the screw axis A.

(6)Measure the parallelism of the outer edge of the nut (the installation surface of the flat head type) relative to the screw axis C.

(7)The total wobble value in the radial direction of the screw axis.

The precision items described herein are based on JISB1191 and 1192.

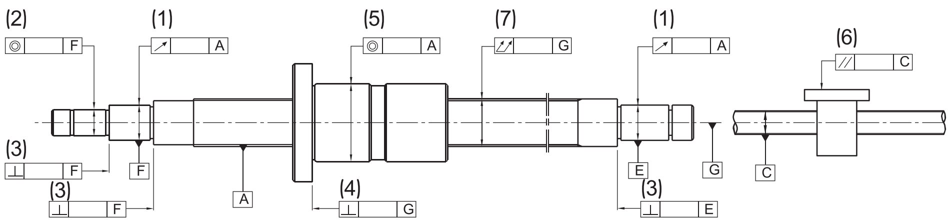


Figure 1.3.2 Precision of the Installation Position of the Ball Screw

1-3-4 Pre-tightening torque

When rotating the ball screw with preload, the preload torque generated is expressed as shown in Figure 1.3.3. The allowable range of the preload torque variation rate is roughly based on the JIS standard, as shown in Table 1.3.8.

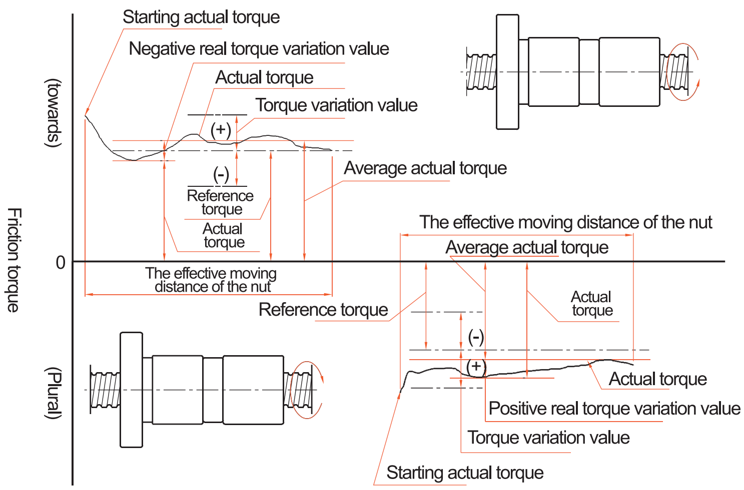


Figure 1.3.3 Illustration of Rolling Preload Torque

1-3-4 Pre-tightening torque

The meaning of words and expressions：
(1)Preloading
To eliminate the clearance of the screw and increase its rigidity, a group of larger-sized steel balls (about 2) are filled into the nut, or two nuts that are displaced from each other in the screw axis direction are used to generate an internal force in the screw.
(2)Preload dynamic torque
The dynamic torque required to continuously rotate the screw shaft or nut of a ball screw under no external load after applying the pre-load as specified is called the preload torque.
(3)Reference torque
As the pre-tightening torque diagram 1.3.3 (1) set by the target.
(4)Torque variation value
The variation value of the pre-tightening torque set as the target. Take the positive or negative value relative to the reference torque.
(5)Torque variation rate
The ratio of the variation value relative to the reference torque.
(6)Actual torque
The measured preload torque of the ball screw.
(7)The measured preload torque of the ball screw.
The arithmetic mean of the maximum and minimum values of the actual torque measured by making the nut move back and forth within the effective length of the threaded part.
(8)Actual torque variation value
The maximum variation value and the minimum value, taken as positive or negative values relative to the actual torque, measured by making the nut move back and forth within the effective length of the threaded section.
(9)Actual torque variation rate
The ratio of the variation value to the average actual torque.

Table 1.3.7 Permissible Range of Torque Variation Rate

Reference torque kgf•cm		Effective screw length mm										
		4000The following								4000~10000The following		
		Aspect ratio less than 1:40				Aspect ratio: 40 to 1 : 60					-	
		Grade				Grade				Grade		
more than	The following	C0	C1	C2,C3	C5	C0	C1	C2,C3	C5	C1	C2,C3	C5
2	4	±35%	±40%	±45%	±55%	±45%	±45%	±55%	±65%	-	-	-
4	6	±25%	±30%	±35%	±45%	±38%	±38%	±45%	±50%	-	-	-
6	10	±20%	±25%	±30%	±35%	±30%	±30%	±35%	±40%	-	±40%	±45%
10	25	±15%	±20%	±25%	±30%	±25%	±25%	±30%	±35%	-	±35%	±40%
25	63	±10%	±15%	±20%	±25%	±20%	±20%	±25%	±30%	-	±30%	±35%
63	100	-	-	±15%	±20%	-	-	±20%	±25%	-	±25%	±30%

Note 1: The aspect ratio is defined as the value obtained by dividing the length of the threaded portion of the screw shaft (in mm) by the outer diameter of the screw shaft.
Note 2: Torque below 2 kgf x cm is managed separately according to specifications.

The calculation of the reference torque T_P

The calculation formula for the reference torque T_P (kgf x cm) of the preloaded ball screw is as follows.

$$T_P=0.05(\tan\beta)^{-0.05}\cdot\frac{Fao\cdot\ell}{2_r}$$

Here，Fao=Preload force(kgf)
β=Lead angle
ℓ=lead distance(cm)

Determination conditions
The pre-tightening torque (T_P) is determined under the following conditions as shown in Figure 1.3.4. After rotating the screw shaft, the force (F) required to prevent the nut from rotating along is measured. Then, the measured value of (F) is multiplied by the length of the lever arm (L), and the product is the T_P.

$$T_P=F\cdot L$$

Determination conditions
(1)The test is carried out in a state without the attached scraper.
(2)The rotational speed was measured at 100 rpm.
(3)The viscosity of the lubricating oil used is in accordance with the provisions of JSK2001 (Classification of Viscosity for Industrial Lubricating Oils), with ISO VG 68 as the reference.

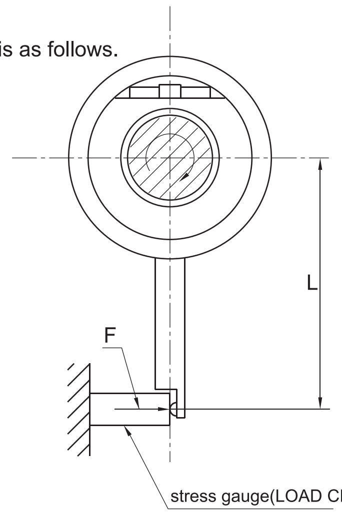


Figure 1.3.4 Preload Dynamic Torque Measurement Method

1-4Screw shaft design

1-4-1 Installation method

The installation method and the selection of the appropriate ball screw specification are important items. Figures 1.4.1 to 1.4.8 show installation exar

(Installation methods of screw shaft and nut)

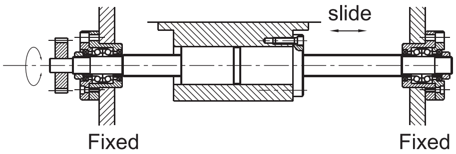


Figure 1.4.1

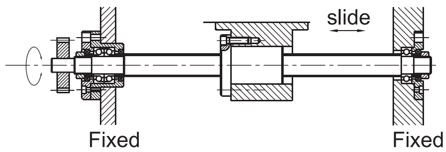


Figure 1.4.5

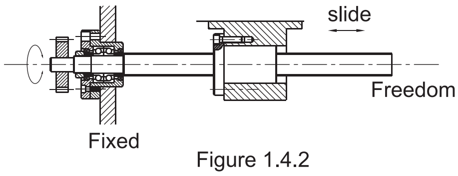


Figure 1.4.2

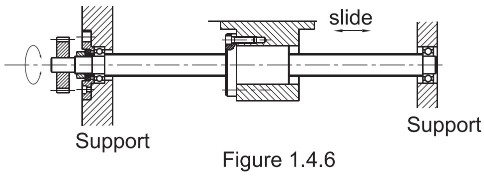


Figure 1.4.6

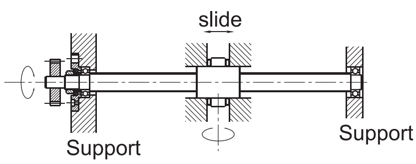


Figure 1.4.3

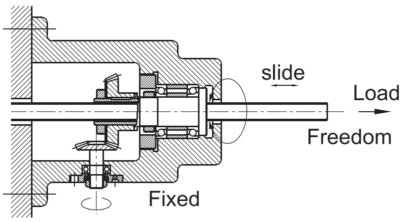


Figure 1.4.7

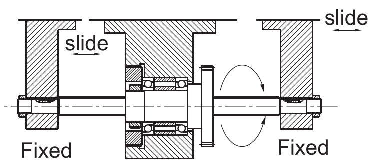


Figure 1.4.4

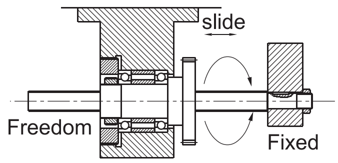


Figure 1.4.8

Installation methods for screw shafts used in various working machines

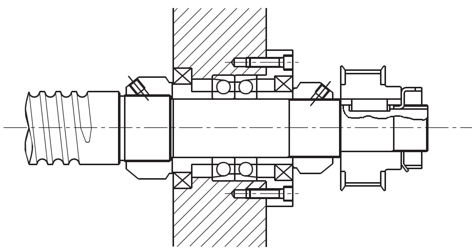


Figure 1.4.9

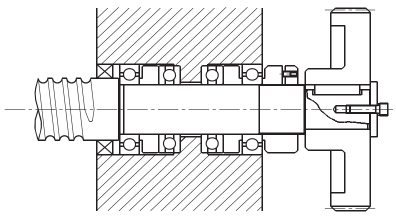


Figure 1.4.1

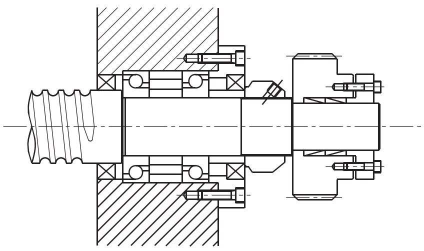


Figure1.4.10

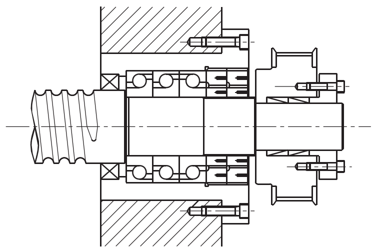


Figure1.4.12

mples.

1-4-1 Installation method

(Bearing Installation Method with Preload)

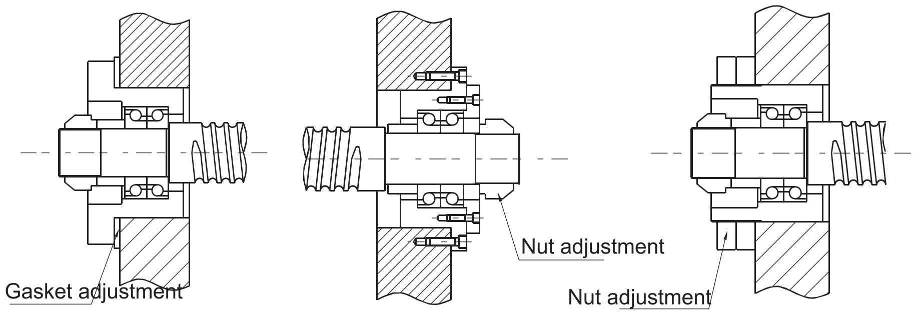


Figure 1.4.13 Figure 1.4.14 Figure 1.4.15

1-4-2 Allowable axial load

(1)Bending load
Due to the effect of compressive load, it is necessary to verify the safety of buckling of the screw shaft. Figure 1.4.16 is a chart compiled by organizing the allowable compressive load for buckling according to the outer diameter of the screw. (When the outer diameter of the screw shaft is 125mm or more, please calculate it according to the following formula.)

The scale allowing axial load is selected according to the support method of the ball screw.。

$$P=\alpha \cdot \frac{I \cdot N \cdot \pi^2 \cdot E}{L^2}=m\frac{dr^4}{L^2} \cdot 10^3$$

Here，α=safety factor(α=0.5)

E：Coefficient of longitudinal elasticity($E=2.1 \cdot 10^4$kgf/mm²)

I：The minimum second moment of force of the screw shaft cross-section

$I=\frac{\pi}{64}dr^4(mm^4)$

dr：The bottom diameter of the screw thread(mm)

L：Installation room distance(mm)

M•N：Coefficient depending on the installation method of the ball screw

Support——Support m=5.1(N=1)

Fixed——Support m=10.2(N=2)

Fixed——Fixed m=20.3(N=4)

Fixed——Freedom m=1.3(N=1/4)

(2)Allowable tensile and compressive load

When the installation distance is short, please verify the following two items that are not related to the installation method.

Allowable tensile and compressive load equivalent to the stress amplitude of the screw shaft (the following formula).

Allowable load of the ball-filled groove section.

$$P=\sigma A=11.8dr^2(kfg)$$

Here，P=Bending load(kfg)

σ：Allowable tensile and compressive stress(kgf/mm²)

A：The end area of the bottom diameter of the screw thread shaft(mm²)

dr：The bottom diameter of the screw thread(mm)

1-4-2 Allowable axial load

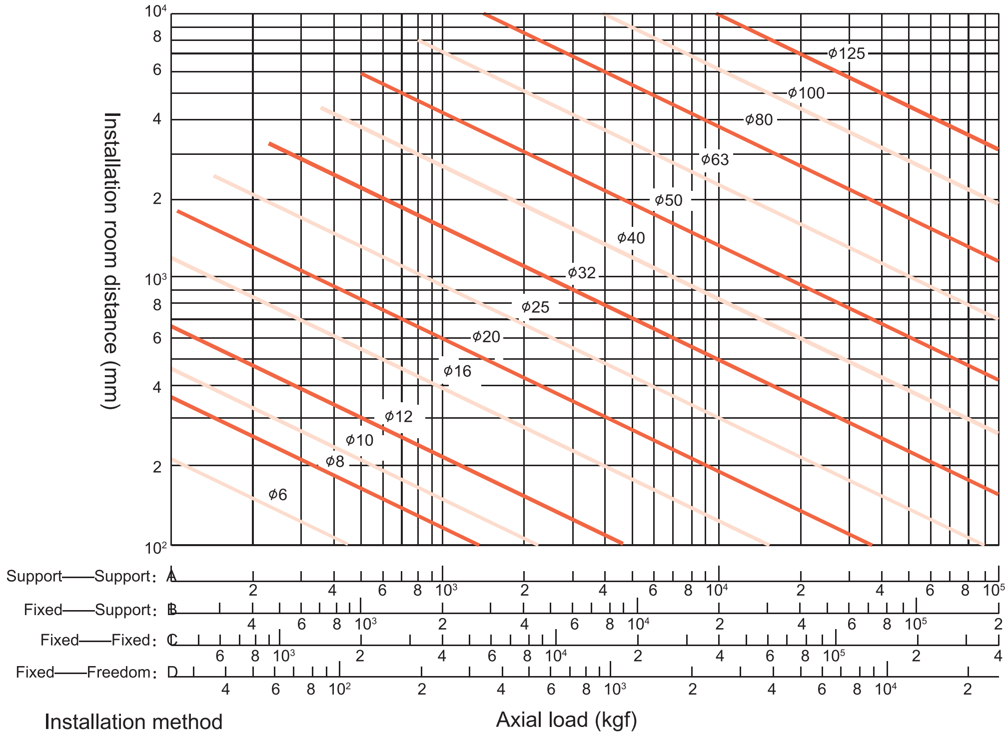


Figure 1.4.16 Allowable Compressive Load for Buckling

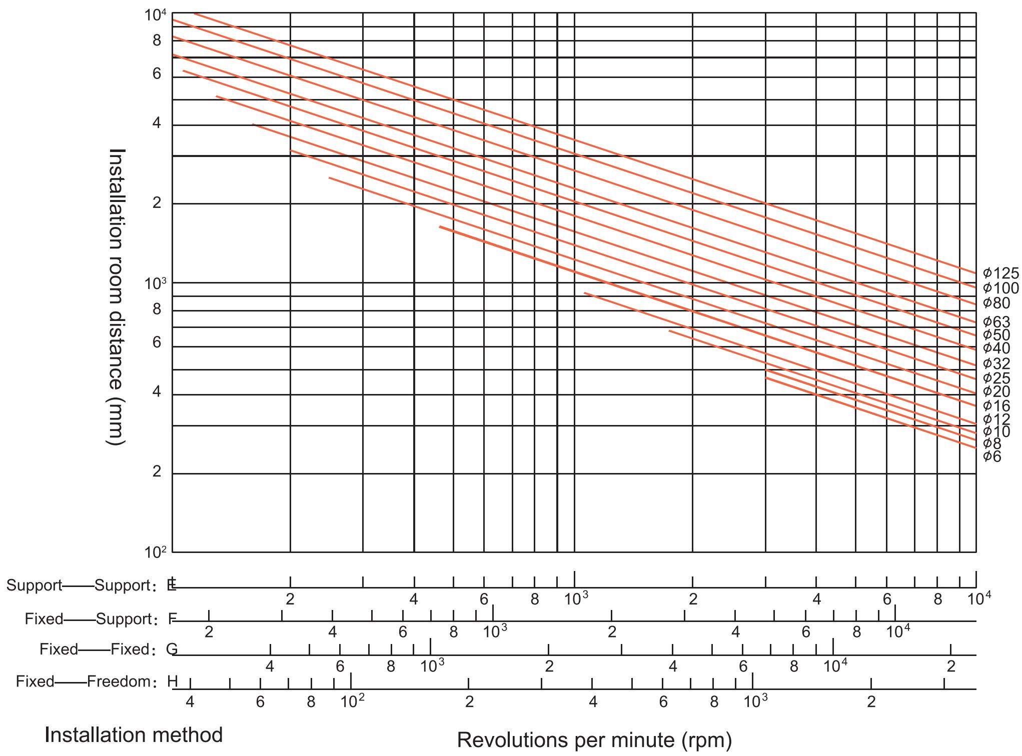


Figure 1.4.17 Permissible Rotational Speed of the Shaft for Dangerous Speeds

1-4-3 Permissible number of rotations

(1)Dangerous speed
It is necessary to review the rotation speed of the ball screw to prevent resonance with the inherent vibration frequency of the screw (the speed at which resonance occurs is called the dangerous speed). The allowable rotation speed should be set at 80% or less of the dangerous speed. Figure 1.4.17 shows the allowable rotation speed relative to the dangerous speed plotted against the outer diameter of the screw. (When the outer diameter of the screw shaft is 125mm or more, please calculate it according to the following formula). The scale of the allowable rotation speed should be selected according to the support method of the ball screw. If there is a problem with the rotation speed at the dangerous speed, an intermediate support should be added to increase the inherent vibration frequency of the screw. This method is also effective.

(2)Dm•n value
The allowable number of rotations is also subject to the limit of the value of Dm x N representing the number of turns (Dm: the center diameter of the steel ball in mm, N: the number of rotations per minute).

Precision grade (C7 and above)	General industrial use(C10)
Dm x N ≤ 70,000	Dm x N ≤ 50,000

$$n=\alpha \cdot \frac{60\lambda^2}{2\pi L^2}\sqrt{\frac{EIg}{\gamma A}} = f\frac{dr}{L^2} \cdot 10^7 \text{ (rpm)}$$

Here, α=safety factor(α=0.8)

E: Coefficient of longitudinal elasticity($E=2.1\cdot10^4$kgf/mm²)

I: The minimum second moment of force of the screw shaft cross-section

$I=\frac{\pi}{64}dr^4$(mm⁴)

dr: The bottom diameter of the screw thread(mm)

g: acceleration due to gravity($g=9.8\cdot10^3$mm/s²)

γ: The density of the material($\gamma=7.8\cdot10^{-6}$kgf/mm³)

A: The cross-sectional area of the screw shaft($A=\pi dr^2/4$mm²)

L: Installation room distance(mm)

f,λ: The rated coefficient according to the installation method of the ball screw

Support——Support f=9.7(λ=π)

Fixed——Support f=15.1(λ=3.927)

Fixed——Fixed f=21.9(λ=4.730)

Fixed——freedom f=3.4(λ=1.875)

1-5Drive torque

1-5-1 The driving torque T_S of the transmission shaft

$T_S=T_P+T_D+T_F$(At constant speed)

$T_S=T_G+T_P+T_D+T_F$(At constant speed)

T_G: Accelerating torque(1) T_P: Accelerating torque(2) T_D: Accelerating torque(3) T_F: Accelerating torque(4)

(1)Accelerating torqueT_G

$T_G=J\alpha$(kgf•cm)

$\alpha=\frac{2\pi n}{60\triangle t}$(rad/s²)

J: Inertial torque converted from the motor shaft(kgf•cm•s²)

α: Angular acceleration(rad/s²)

n: Revolutions per minute (RPM)(min⁻¹)

△t: Startup time(sec)

(4)Accelerating torqueT_G

$T_F=T_B+T_O+T_J$(kgf•cm)

T_B: Friction torque of the support shaft

T_O: Friction torque of the free shaft

T_J: The friction torque of the motor shaft

(2)Load torqueT_P

$T_P=\frac{P\cdot\ell}{2\pi\eta_1}$ (kgf•cm)

$P=F+\mu_{Mg}$

P: Axial load(kgf)

ℓ: lead distance(cm)

η1: Positive efficiency (efficiency when rotary motion is transformed into linear motion)

F: Cutting force(kgf)

μ: Coefficient of friction

M: Mass of moving objects(kg)

g: acceleration due to gravity(9.8m/s²)

$T_P=\frac{P\cdot\ell\cdot\eta_2}{2\pi}$ (kgf•cm)

η_2: Reverse efficiency (efficiency when linear motion is transformed into rotary motion)

(3)Load torqueT_D

$T_D=\frac{K\cdot P_{PL}\cdot\ell}{\sqrt{\tan\alpha}\cdot 2\pi}$ (kgf•cm)

K: Internal coefficient (usually set at 0.05)

P_{PL}: Preload amount(kgf)

ℓ: lead distance(cm)

α: Lead angle

1-5-1 The driving torque T_S of the transmission shaft

The frictional torque of the support shaft is affected by the amount of lubricating oil. Unexpected excessive frictional torque or temperature rise may occur when the oil seal is too tight. This point must be paid special attention to.

Reference load inertia torque (Table 1.5.1)

$J=J_{BS}+J_{CU}+J_W+J_M$

J_{BS}: Inertial torque of ball screw shaft
J_{CU}: Connector inertial torque
J_W: Linear motion section inertial torque
J_M: Inertial torque of the motor shaft rolling part

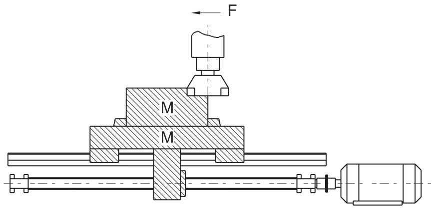


Figure 1.5.1 Load Inertial Torque

Table 1.5.1 Conversion Formula for Load Inertial Torque

Inertial torque conversion of motor shaft \ Formula	J
Cylinder load	$\frac{\pi\rho L D^4}{32}$
A body in linear motion	$\frac{M}{4}\left(\frac{V\ell}{\pi \cdot N_M}\right)^2=\frac{M}{4}\left(\frac{P}{\pi}\right)^2$
unit	$kg\cdot m^2$
Inertial torque during deceleration	$J_M=\left(\frac{J\ell}{N_M}\right)^2 J\ell$

ρ: Density(kg/m^3) $\rho=7.8\cdot10^3$
L: Length of the cylinder(m)
D: Cylinder diameterr(m)
M: The mass of the linear motion unit(kg)
V: The velocity of a linearly moving object(m/min)
N_M: Motor shaft revolution number(min^{-1})
P: The linear movement distance of the object per revolution of the motor(m)
$N\ell$: Rotations in the direction of linear motion(min^{-1})
$J\ell$: Load-direction inertial torque
J_M: Motor direction inertial torque

1-6Nut design

1-6-1 Selection of nuts

(1)Series
When selecting a series, factors such as required precision, required delivery date, dimensions (outer diameter of the screw shaft, lead/outer diameter ratio of the screw shaft), and preload should be taken into consideration.
(2)Circulation mode
Select the circulation mode: Please take the space economy of the nut installation part into consideration. The characteristics of the circulation mode are shown in Table 1.6.1.
(3)Number of circuits
The number of selected circuits should take into account the required performance, lifespan, etc.
(4)Flange Shape
Please select in accordance with the space for the installation of the nut.
(5)Oil filling hole
Precision ball screws are equipped with oil holes for use during machine assembly and regular oiling.

Table 1.6.1 Reference Forms of Nut Cycles

Circulation mode	Specification		Characteristics
	Single nut	Double nuts	
Internal circulation	WSFM WSFNI WSFK WSFNU WBSH	WDFM	The outer diameter of the nut is compact (does not take up much space). It is suitable for those with a relatively small lead/screw shaft outer diameter.
External circulation	WSFV WXSV WBSH	WDFV	Economical. It can be used for those with a relatively large lead/screw shaft outer diameter. Suitable for high-load applications.
End cover type circulation	WSFY WSFH WSFA	WDFS	Suitable for high-speed feed applications.

1-6-2 Nut type

U, I, M type nuts
This type of form is characterized by steel balls traveling along the full groove of the recirculator, crossing over the peaks of the screw threads and returning to the starting point. Generally, one cycle involves one coil of steel balls. (As shown in Figure 1.6.1) For this type of screw, at least one end must be fully threaded, and it is suitable for screws with a smaller outer diameter.

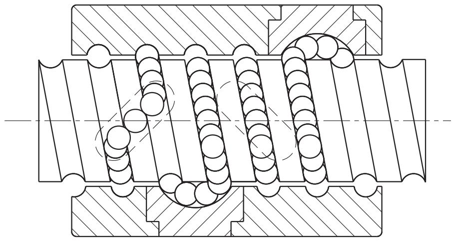


Figure 1.6.1 U, I, M type nuts

K-type nut
The principle of the cycle is the same as Type I, but in different cycles, the cycle positions are all located on the keyways at the same angle. (As shown in Figure 1.6.2)

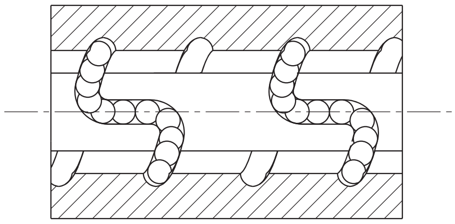


Figure 1.6.2 K-type Nut

V-shaped nut
The circulation mode of this type of nut is external circulation. (As shown in Figure 1.6.3) The special circulation device design enables the steel balls to run along the direction of the thread, which can reduce the collision between the steel balls and improve the smoothness of the circulation. It is particularly suitable for high-speed and heavy-load designs.

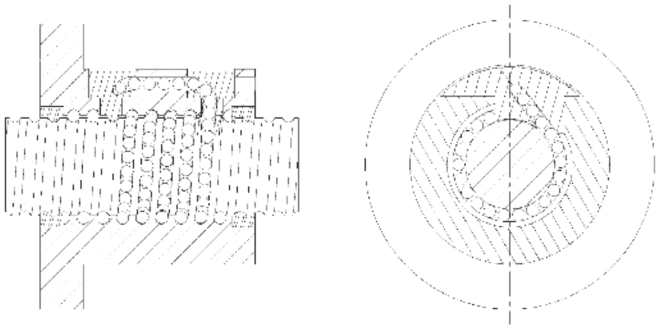


Figure 1.6.3 V-type Nut

Y, H, A type nuts
The dust-proof plates at both ends are made of thin and elastic materials, which further enhance the scraping effect. The reinforced circulation reflux structure increases the high rigidity and high-speed performance. (As shown in Figure 1.6.4)

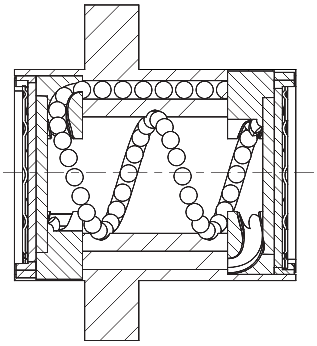


Figure 1.6.4 Y, H, A type nuts

1-7Rigorous review

Insufficient rigidity of the peripheral structure of the screw is one of the main causes of lost motion. Therefore, in precision machinery such as NC machine tools, to achieve good positioning accuracy, it is necessary to consider the balance of axial rigidity and torsional rigidity of the parts of the transmission screw during the design.

Static rigidity K

The axial elastic deformation and rigidity of the lead screw system can be obtained by the following formula.

$$K=\frac{P}{e}\ \text{(kgf/mm)}$$

P: Axial load (kgf) carried by the drive screw system

e: Elastic displacement in the axial direction of the drive screw system (mm)

$$\frac{1}{K}=\frac{1}{K_S}+\frac{1}{K_N}+\frac{1}{K_B}+\frac{1}{K_H}\ \text{(mm/kgf)}$$

K_S: The direction rigidity of the screw shaftC (1)

K_N: Axial rigidity of the nut (2)

K_B: Axial rigidity of the support shaft (3)

K_H: Axial rigidity of the nut and bearing installation section (4)

(1)The direction stiffness Ks and displacement δS of the screw shaft

$$K_S=\frac{P}{\delta_S}\ \text{(kgf/mm)}$$

Fixed - Fixed installation scenarios

$$\delta_{SF}=\frac{PL}{4AE}\ \text{(mm)}$$

Fixed - Other than fixed installation scenarios

$$\delta_{SS}=\frac{PL_0}{AE}\ \text{(mm)}$$

$\delta_{SF}=4\delta_{SF}$

δ_{SF}: Fixed - Directional displacement in fixed installation situations

δ_{SS}: Directional displacement in situations other than fixed installation - Fixed

A: The cross-sectional area of the bottom diameter of the screw thread (mm²)

E: Longitudinal elastic coefficient (2.1×10^4 kgf/mm²)

L: Installation room distance (mm)

L_0: Distance between load application points (mm)

(2)Axial stiffness of the nut KN and displacement δ_N

$$K_N=\frac{P}{\delta_N}\ \text{(kgf/mm)}$$

(a)When using a single nut

$$\delta_{NS}=\frac{K}{\sin\beta}\left[\frac{Q^2}{d}\right]^{\frac{1}{3}}\cdot\frac{1}{\xi}\ \text{(mm)}$$

$$Q=\frac{P}{n\cdot\sin\beta}\ \text{(kgf)}$$

$$n=\frac{D_0\pi m}{d}\ \text{(个)}$$

Q: The load of a steel ball(kgf)

n: Number of steel balls

K: According to material, shape and size

The determined constantK≒$5.7\cdot10^{-4}$

β: Contact angle(45°)

P: Axial load(kgf)

d: Steel ball diameter(mm)

ξ: Precision, internal structure coefficient

m: Effective number

D_0: Steel ball center diameter (mm))

$$D_0=\frac{\ell}{\tan\alpha\cdot\pi}\ \text{(kgf/mm)}$$

ℓ=lead screw pitch(mm)

α=Lead angle

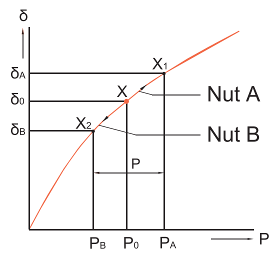


Figure 1.7.1

(b) When using double nuts

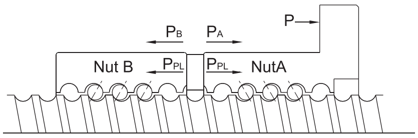


Figure 1.7.2 Double Nut Preload Load

When the preload force PPL is approximately three times the axial load P, to eliminate the preload PPL of the nut B, the preload force PPL should be set within 1/3 of the maximum axial load. The maximum preload force is set at 0.25Ca as a standard. When the displacement is at three times the preload force in the axial load direction, it is half the displacement of a single nut.

$$K_N = \frac{P}{\delta_{NW}} = \frac{3P_{PL}}{\delta_{NS/2}} = \frac{6P_{PL}}{\delta_{NS}} \quad \text{(kgf/mm)}$$

δ_{NS}: The displacement of a single nut(mm)

δ_{NW}: The displacement of the double nuts(mm)

(Explanation of the Rigidity of Double Nuts)

As shown in Figures 1.7.1 and 1.7.2, when a preload PPL is applied to the two nuts A and B, both nuts A and B will undergo elastic deformation reaching point X. If an external force P is then applied here, nut A will move from point X to point X1 and nut B will move from point X to point X2. Subsequently, based on the calculation formula for the displacement δNS of a single nut, we can obtain:

$\delta_0 = aP_{PL}^{\frac{2}{3}}$

The displacement of nuts A and B is $\delta_A = aP_{PL}^{\frac{2}{3}}$

The displacements of nuts A and B subjected to external force P are equal, so $\delta_A - \delta_0 = \delta_0 - \delta_B$

Or if the only external force applied to the nuts A and B is P, then when PA increases, $P_A - P_B = P$, $\delta_B = 0$

To prevent the external force applied to nut B from being absorbed and reduced by nut A. Therefore, $\delta_B = 0$时

$$aP_A^{\frac{2}{3}} - aP_{PL}^{\frac{2}{3}} = aP_{PL}^{\frac{2}{3}}$$

$$P_A^{\frac{2}{3}} = 2P_{PL}^{\frac{2}{3}}$$

$$P_A = \sqrt{8}\, P_{PL} \fallingdotseq 3P_{PL}$$

Therefore, it can also be judged from Figure 1.7.3 that when the preload is three times the axial load weight, the single nut has a displacement of 1/2 and the rigidity is twice as much.

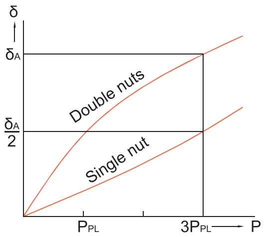


Figure 1.7.3

(3) The axial-directional rigidity K_B and displacement δ_B of the support shaft

$$K_B = \frac{P}{\delta_B} \quad \text{(kgf/mm)}$$

The rigidity of the angular contact ball bearing used as the support bearing of the ball screw and widely applied in precision machinery can be calculated by the following formula:

$$\delta_B = \frac{2}{\sin\beta}\left[\frac{Q^2}{d}\right]^{\frac{1}{3}} \text{(mm)} \qquad Q = \frac{2}{n \cdot \sin\beta} \text{(kgf)}$$

Q: The load of a steel ball (kgf)
n: Number of steel balls
β: Contact angle (45°)
P: Axial load (kgf)
d: Steel ball diameter(mm)
a: The effective length of the scroll

(4) At the beginning of the machine development, it is particularly important to pay attention to the high rigidity of the installation part of the nut and the bearing in the axial direction, as well as the displacement δ_H.

$$K_H = \frac{P}{\delta_H} \quad \text{(kgf/mm)}$$

Ball screw

Among the factors contributing to feed accuracy errors, lead accuracy and the rigidity of the feed system are key points for review. Additionally, factors such as thermal deformation caused by temperature rise and the assembly accuracy of the guiding surfaces also need to be taken into account.

1-8-1 Selection of lead accuracy

Table 1.8.1 shows the recommended application range of ball screw accuracy grades for different uses.

Table 1.8.1 Precision grades of ball screws by application type

Purpose			Purpose						
			C0	C1	C2	C3	C5	C7	C10
NC machine tools	lathe	X	○	○	○	○	○	○	
		Y				○	○	○	
	Milling machine / boring machine	XY		○	○	○	○	○	
		Z			○	○	○	○	
	Machining center	XY		○	○	○	○		
		Z			○	○	○		
	Jig grinding machine	Y	○	○					
		Z	○	○					
	Key bed	XY				○	○	○	
		Z					○	○	
	Grinding machine	X	○	○	○	○	○	○	
		Z		○	○	○	○	○	
	Electrical discharge machining machine	XY		○	○	○	○	○	
		(Z)			○	○	○	○	
	Wire cutting machine / Electrical discharge machining (EDM) machine	Y		○	○	○			
		UV		○	○	○	○	○	
	High-speed punch press	XY				○	○	○	
	Laser processing machine	XY				○	○		
		Z				○	○		
	Woodworking machine					○	○	○	○
General-purpose machine, special-purpose machine					○	○	○	○	○
Semiconductor-related devices	Exposure device		○	○					
	Chemical treatment device					○	○	○	○
	Welding wire machine			○	○	○			
	Probe testing machine		○	○	○	○			
	Electronic component insertion machine				○	○	○	○	
	PCB drilling machine			○	○	○	○	○	
Industrial robots	Orthogonal coordinate type	Assembly		○	○	○	○	○	
		Others					○	○	○
	Vertical multi-joint type	Assembly			○	○	○		
		Others				○	○	○	
	Cylindrical coordinate type				○	○	○	○	
Steel equipment machinery							○	○	○
Injection molding machine							○	○	○
Three-dimensional measuring machine			○	○	○				
Transaction machine							○	○	○
Image processing device			○	○					
Nuclear power generation	control rod					○	○	○	
	Shock absorption device							○	○
aircraft						○	○		

1-8-2 Thermal variable countermeasure

The screw shaft elongates and shifts due to heat, which can lead to a deterioration in positioning accuracy. The thermal change can be calculated by the following formula.

$\triangle \ell = \alpha \cdot \triangle t \cdot L$

$\triangle \ell$: The elongation in the direction of the screw shaft

α: Coefficient of thermal expansion

$\triangle t$: Screw temperature variation (deg)

L: Effective length of thread

That is to say, for every 1℃ increase in temperature, there will be an elongation of 12μm on a 1-meter-long screw shaft. Therefore, even if the lead of the ball screw is processed with high precision, the displacement caused by the temperature rise will still make it impossible to meet the high-precision positioning requirements. When the operating conditions of the ball screw require high speed, the heat generation will increase relatively, and the influence of the temperature rise will also become greater.

The countermeasures for the temperature rise of ball screws are as follows:：
(1)Control the heat output
The heat generation of the ball and the preload of the supporting bearing should be correct and appropriate.
The correct selection and proper supply of lubricants.
Increase the lead of the ball screw and reduce the number of rotations.
(2)Forced cooling is applied.
The screw shaft is hollowed out and cooled liquid is passed through it.
The outer edge of the screw shaft is cooled by lubricating oil or air.
(3)Avoid the influence of temperature rise.
First, warm up the machine at high speed to the required temperature.：
Use it again when it is in a stable state.
A preload force is applied to the screw shaft during installation.
The target value of the cumulative lead is taken as a negative value in advance.
Locate using the closed-loop method.

1-9Life expectancy design

1-9-1 The service life of ball screws

Even when used under reasonable conditions, ball screws will eventually become unusable after a period of time. The time it takes for a ball screw to deteriorate to the point of being unusable is known as its service life, which is generally divided into fatigue life when spalling occurs and life due to wear-induced precision degradation, etc.

1-9-2 Basic static rated load C_{oa}

The so-called basic static rated load refers to the axial load at which the sum of the permanent deformation of the contact area between the balls and the raceway in the screw shaft and nut, which are subjected to the maximum stress, reaches 0.01% of the ball diameter.

1-9-3 Basic dynamic rated loadC_a

The so-called dynamic rated load refers to the axial load that a batch of identical ball screws can withstand when rotating 10^6 times under the same conditions, with 90% of the screws not experiencing flaking due to rolling fatigue.

The relationship between load and lifespan $L_\alpha = [\frac{1}{P}]^3$ L: lifespan P: Load

1-9-4 fatigue life

average loadP_e

(1)When the axial load is subject to variations, calculate the equivalent fatigue load for each varying load condition and determine the average load. (See Table 1.9.1)

$$P_e = \left(\frac{P_1^3 n_1 t_1 + P_2^3 n_2 t_2 + \ldots + P_n^3 n_n t_n}{n_1 t_1 + n_2 t_2 + \ldots + n_n t_n}\right)^{\frac{1}{3}} \text{ (kgf)}$$

Axial load(kgf)	Number of revolutions(min^{-1})	time(%)
P_1	n_1	t_1
P_2	n_2	t_2
…	…	…
P_n	n_n	t_n

But$t_1+t_2+t_3+\ldots+t_4=100$

1-9-4 Basic dynamic rated loadC_a

Table 1.9.1 Lifespan for Various Purposes

Purpose	Life span(h)
Industrial machinery	20000
General industrial machinery	10000
Automatic control machinery	15000
Measuring device	15000

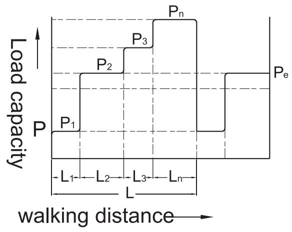


Figure 1.9.1

$$P_e = \frac{2P_{max}+P_{min}}{3} \text{ (kgf)}$$

P_{max}: Maximum axial load(kgf)

P_{min}: Minimum axial load(kgf)

(2)When the load varies according to a sine curve (as shown in Figure 1.9.2 on the right)

$P_e \fallingdotseq 0.65P_{max}$......(Figure 1)

$P_e \fallingdotseq 0.75P_{max}$......(Figure 2)

Figure 1　　Figure 2

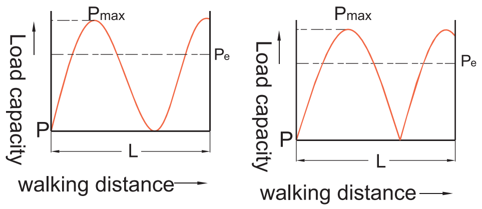


Figure1.9.2

1-9-5 Life expectancy calculation

Although fatigue life is generally difficult to express in terms of total revolutions, it can also be represented by total revolution time or total travel distance. The following formula can be used to calculate it:

$$L = \left[\frac{C_a}{P_a \cdot f_w}\right]^3 \qquad L_t = \frac{L}{60_n} \qquad L_s = \frac{L \cdot \ell}{10^6}$$

Here

L: Rated fatigue life(rev)

f_w: Load factor (operating condition factor)

n: Revolutions per minute (RPM)(rpm)

L_s: Walking distance and lifespan(km)

L_t: Life span(h)

ℓ: lead screw pitch(mm)

P_a: Axial load(kgf)

C_a: Basic dynamic rated load(kgf)

Table 1.9.2 Load Coefficient(f_w)

Vibration/shock during repeated movement	speed(V)	f_w
tiny	At low speedV≦0.25m/s	1~1.2
Little	At low speeds0.25＜V≦1m/s	1.2~1.5
At medium speed	At medium speed1＜V≦2m/s	1.5~2
Great	At high speedV＞2m/s	2~3.5

Table 1.9.3 Load Coefficient(f_s)

Use machinery	Load condition	f_s
Working machinery	During normal operation	1.0~1.3
	When there are impacts and vibrations	2.0~3.0
General industrial machinery	During normal operation	1.0~1.5
	When there are impacts and vibrations	2.5~7.0

The rated load to be movedC_a

$C_a = P_e \cdot f_s$

The rated load of the static exciterC_{oa}

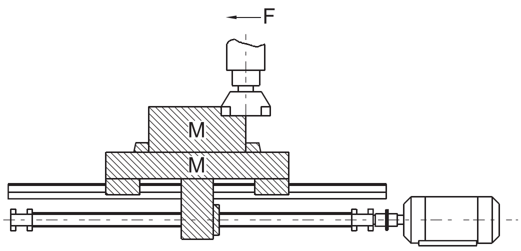
$C_{oa} = P_{max} \cdot f_s$

1-9-5 Life expectancy calculation

Key Points for Selecting Ball Screws

When selecting a ball screw, the most fundamental principle is to thoroughly investigate the operating conditions before making a design decision.
The selection factors include load weight, stroke, torque, positioning accuracy, repeatability, rigidity, lead, and nut hole diameter. These factors are interrelated, and a change in one factor will cause changes in others. It is essential to pay attention to the balance among these factors.

Selection and calculation of ball screws



Design conditions

1. Workbench weight	300Kg
2. Weight of the workpiece	400Kg
3. Maximum stroke	700mm
4. Feed rate	10m/min
5. Minimum resolution capability	10μm/stroke
6. Drive motor DC motor	(MAX100min)
7. Coefficient of friction of the guide surface	(μ=0.05~0.1)
8. Rotation rate	60%
9. Matters concerning precision review	
10. The inertial force during acceleration and deceleration can be disregarded as the time it occupies is relatively short.	

---

1. Setting of operating conditions

(a) Estimation of mechanical life time H (hr)

H= [ ] • [ ] • [ ] • [ ]

Rotate the time/day · Rotational day/year · Years of lifespan · Rotation rate

(b) Mechanical conditions

Calculate the parameters / Operation differences	Speed / Revolutions per minute	Cutting Resistance	Slide Resistance	Usage time
Express delivery	$m/min/min^{-1}$	kgf	kgf	%
Light cutting	/			
Middle cutting	/			
Heavy cutting	/			

(c) Positioning accuracy

Among the factors contributing to feed accuracy errors, lead accuracy and the rigidity of the feed system are key points for review. Additionally, factors such as thermal deformation caused by temperature rise and the assembly accuracy of the guiding surfaces also need to be taken into account.

1. Setting of operating conditions

(a) Estimation of mechanical life time H (hr)

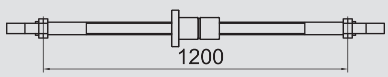
H=12hr x 250daily x 10Year x 0.6Rotation rate = 18000hr

(b) Mechanical conditions

Calculate the parameters. / Operation differences	Speed / Revolutions per minute	Cutting Resistance	Slide Resistance	Usage time
Express delivery	$10m/min/1000min^{-1}$	0kgf	70kgf	10%
Light cutting	6/600	100	70	50
Middle cutting	2/200	200	70	30
Heavy cutting	1/100	300	70	10

Sliding resistance=(300 + 400)•0.1=70kgf

1-9-5 Life expectancy calculation

Key Points for Selecting Ball Screws	Selection and calculation of ball screws
2. Lead of ball screwℓ(mm) $\ell=\frac{\text{Feed rate(m/min)}\cdot 1000}{\text{Maximum rotational speed of the motor(min}^{-1}\text{)}}$ (mm)	2. Lead of ball screwℓ(mm) $\ell=\frac{10000}{10000}=10$ (mm) Minimum resolution capability=$\frac{\text{10mm}}{\text{1000Itinerary}}$ =0.01mm/Itinerary
3. Calculation of average load P_e (kgf $P_e=\left(\frac{P_1^3n_1t_1+P_2^3n_2t_2+\dots+P_n^3n_nt_n}{n_1t_1+n_2t_2+\dots+n_nt_n}\right)^{\frac{1}{3}}$ $P_e=\frac{2P_{max}+P_{min}}{3}$ $P_e≒0.65P_{max}$ $P_e≒0.75P_{max}$	3. Calculation of average load P_e (kgf) $P_e=\left(\frac{70^3\cdot1000\cdot10+170^3\cdot600\cdot50+270^3\cdot200\cdot30+370^3\cdot100\cdot10}{1000\cdot10+600\cdot50+200\cdot30+100\cdot10}\right)^{\frac{1}{3}}$ $=\left(\frac{3.17\cdot10^{10}}{4.7\cdot10^4}\right)^{\frac{1}{3}}$ ≒189kgf
4. Average revolutions per minuten_m $n_m=\left(\frac{n_1t_1+n_2t_2+\dots+n_nt_n}{100}\right)$	4. Average revolutions per minuten_m $n_m=\left(\frac{1000\cdot10+600\cdot50+200\cdot30+100\cdot10}{100}\right)$ $=\frac{4.7\cdot10^4}{100}=470\text{min}^{-1}$
5. Calculation of the rated load C_a (kgf) for all moving parts $C_a=P_e\cdot f_s$	5. Calculation of the rated load C_a (kgf) for all moving parts $C_a=189\cdot5=945$(kgf)
6. All calculations of the static rated load C_{oa} (kgf) $C_{oa}=P_{max}\cdot f_s$	6.All calculations of the static rated load C_{oa} (kgf) $C_{oa}=369\cdot5=1845$(kgf)
7. Selection of nut type $C_a>945$ $C_{oa}>1845$ Select the type of nut with the basic dynamic rated load and the basic static rated load exceeding the values calculated by the above formula.	7. Selection of nut type Select according to the catalogue.WSFNI2510 $C_a=2954$(kgf) $C_{oa}=7295$(kgf)
8. Calculation of the lifespan time Lt (h) $Lt=\frac{L}{60n}=\left(\frac{C_a}{P_e\cdot f_w}\right)^3\cdot10^6\cdot\frac{1}{60n}$	8. Calculation of the lifespan time Lt (h) $Lt=\left(\frac{2954}{189\cdot2}\right)^3\cdot10^6\cdot\frac{1}{60\cdot470}=42544$(h)
9. The determination of the distance between supporting bearings	9. The determination of the distance between supporting bearings  (Fixed)(BK17) (Fixed)(BK17)
10. The determination of screw length The minimum screw length = the maximum stroke + the length of the nut + the reserved length at both ends of the shaft.	10. The determination of screw length Screw length=700+85+76+76=937mm 937mm＜1200mm
11. Review of Axial Load Allowance	11. Review of Axial Load Allowance Since it is a fixed-fixed, supported type, it is omitted.

1-9-5 Life expectancy calculation

Key Points for Selecting Ball Screws	Selection and calculation of ball screws
12. Review of allowable rotation number N and DN value $N=\alpha\cdot\frac{60\lambda^2}{2\pi L^2}\sqrt{\frac{Elg}{\gamma A}}=f\frac{dr}{L^2}\cdot 10^7$ (rpm) DN=Shaft outer diameter x maximum rotational speed	12. Review of allowable rotation number N and DN value $N=\frac{21.9\cdot 21.86\cdot 10^7}{1200^2}=3324\text{min}^{-1}<n_{max}$ $DN=25\cdot 1000=25000<50000$
13. Hot variable countermeasures $\triangle\ell=\alpha\cdot\triangle t\cdot L$ $\triangle\ell$: The elongation in the direction of the screw shaft α: Coefficient of thermal expansion $\triangle t$: The variation in screw temperature(deg) L: Effective length of thread	13. Hot variable countermeasures Hot variable countermeasures For general machinery, it is estimated that the temperature of the ball screw rises by approximately 2 to 5 degrees Celsius. Taking a 2-degree Celsius increase as an example, calculate the elongation of the ball screw. $\triangle\ell=\alpha\cdot\triangle t\cdot L=11.7\cdot 10\cdot 2\cdot 700\text{mm}$ $\fallingdotseq 0.016\text{mm}$ $Fp=\frac{EA\triangle\ell}{L}$ $=\frac{2.06\cdot 10^4\,\frac{\pi\cdot 21.86^2}{4}\cdot 0.016}{700}$ $\fallingdotseq 177$(kgf)
14. Rigorous review (1)The direction stiffness K_S and displacement δ_S of the screw shaft $K_S=\frac{P}{\delta_S}$ (Kgf/mm) P: Axial load(kgf) $\delta_{SF}=\frac{PL}{4AE}$ (mm) ……(Refer to C21) (2)Axial loadδ_S $\delta_{SN}=\frac{K}{\sin\beta}\left[\frac{Q^2}{d}\right]^{\frac{1}{3}}\cdot\frac{1}{\xi}$ (mm) $Q=\frac{P}{n\cdot\sin\beta}$ (kgf) $n=\frac{D_0\pi m}{d}$ (↑) ……(Refer toC22) (3)The axial-directional rigidity K_B and displacement δ_B of the support shaft $K_B=\frac{P}{\delta_B}$ (Kgf/mm) ……(Refer toC23)	14. Rigorous review When the temperature rises by an estimated elongation of 0.016mm, applying a preload of 177kgf can correct the deviation. (1)Directional rigidity $\delta_{SF}=\frac{PL}{4AE}=\frac{27\cdot 1200}{4\cdot\frac{\pi\cdot 21.86^2}{4}\cdot 2.06\cdot 10^4}$ $=0.00105$(mm) $K_S=\frac{370}{0.00105}=3.5\cdot 10^5$Kgf/mm (2)The steel balls and nuts are fully rigid. $n=\frac{26.62\cdot\pi\cdot 4}{4.762}=70$ $Q=\frac{370}{70\sin 45°}=10$ $\delta_{NS}=\frac{0.00057}{\sin 45°}\left[\frac{10^2}{4.762}\right]^{\frac{1}{3}}\cdot\frac{1}{0.7}$ $=3.2\cdot 10^{-3}$mm $K_N=\frac{370}{3.2\cdot 10^{-3}}=1.27\cdot 10^5$Kgf/mm (3)The rigidity of the supporting bearing Calculate based on a nut rigidity of 50 kgf/μm. $\delta_B=\frac{370}{51\cdot 2}=3.6\mu m$ $K_B=\frac{370}{0.0036}=1\cdot 10^5$Kgf/mm $\delta_{TOTAL}=1.05+3.2+3.6=7.85\mu m$
15. Confirmation of the service life of ball screws	15. Confirmation of the service life of ball screws L=42544(h)＞18000(h)

1-10Precautions for the Use of Ball Screws

Ball screws are precision components. Please be particularly careful not to let sharp objects or tools strike the thread surface. Also, when assembling ball screws, avoid knocking or colliding to prevent scratches. At the same time, do not separate the nut from the screw or exceed the travel. If the nut travel is out of the screw, the balls may fall out. If this happens accidentally, do not force them back in, as this may cause the ball screw to jam. Please contact our specialist. (As shown in Figure 1.10.1)

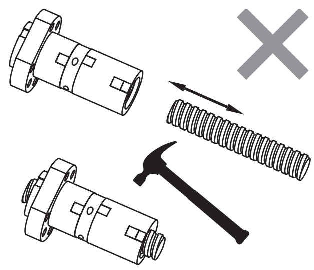


Figure 1.10.1 Incorrect Usage Method

If you need to remove and reinstall the nut, you must use a tube with an outer diameter smaller than the bottom diameter of the screw. Please turn the nut into the adapter tube to ensure that the steel balls do not fall out. (Refer to C34)

1-10-1 Lubrication

When using ball screws, it is essential to ensure adequate lubrication. Insufficient lubrication can lead to metal-to-metal contact, increasing friction and wear, which may result in malfunctions or shortened service life.
The lubricants used for ball screws can be classified into two types: oil and grease. Generally, in terms of maintenance, the frictional torque of grease increases linearly with the increase of the rotational speed. When the speed exceeds 3-5 m/min, oil lubrication is more suitable. However, it should not be forgotten that there are instances where grease has been used at speeds up to 10 m/min; as for equipment, there are also those that are suitable for the less expensive grease. Generally speaking, to fully utilize the performance of ball screws, oil lubrication at around 5 m/min is the most appropriate choice. Table 1.10.1 shows the general guidelines for the inspection and replenishment intervals of lubricants. When replenishing, the old grease adhering to the screw shaft should be wiped off before reple

Table1.10.1Inspection and replenishment intervals for lubricants

Lubrication methods	Inspection time interval	Inspection items	Supply or replacement interval
Automatic interval oiling	Every week	Oil contamination and dirt, etc.	Refuel each time during inspection, but the amount of fuel added should be appropriate according to the capacity of the fuel tank.
grease	The initial two to three months of work	Contamination with dirt, dust and powder	Supplementation is usually carried out once a year, but it should be appropriately increased based on the inspection results。
Oil bath	Before starting work every day	Oil surface management	Regulate appropriately based on the consumption status.

1-10-2 Dust-proof / Protective

Like rolling bearings, ball screws will wear out more quickly when foreign substances or moisture get mixed in, and in some cases, this may lead to damage. For instance, in work machinery, due to the working environment, chips or cutting oil may get mixed in. Therefore, when there is a possibility of foreign substances getting mixed in from the outside, as shown in Figure 1.10.2, the screw shaft should be completely covered with a folded cloth (accordion type) or a telescopic sleeve.

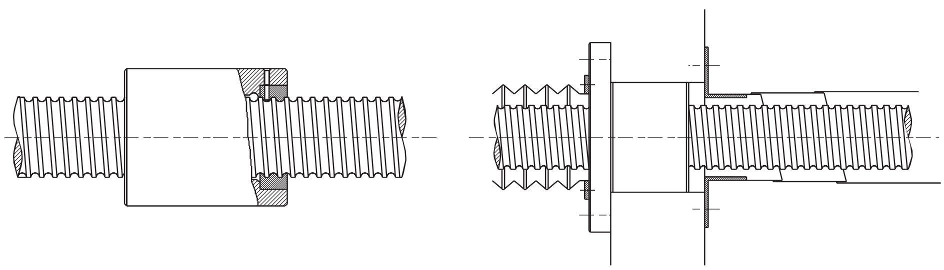


Figure 1.10.2 Protective Mechanism

1-10-3 Partial load

When the phenomenon of uneven load occurs, it will directly affect the service life and noise of the screw, and is often accompanied by an uncomfortable feeling of unsmooth operation. If the smoothness of the screw when it is unloaded is different from that after assembly, in addition to paying attention to the precision of the screw itself, it is mostly due to poor assembly accuracy causing the uneven load phenomenon, as shown in Figure 1.10.3.

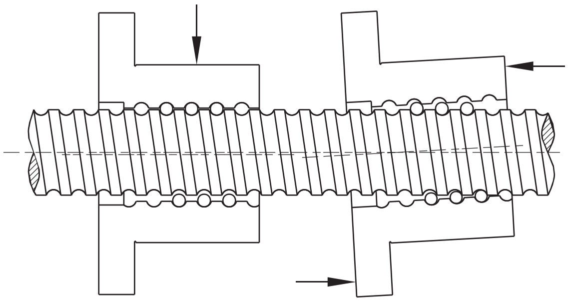


Figure 1.10.3 Partial Load

1-10-4 Single nut assembly instructions

If the product you ordered is a re-manufactured single-end nut, please follow the steps below for assembly:

Table 1.10.2 Operating Steps for Nut Assembly

 (1) Cut the fixing wire on the nut.	 (2) Align the conversion tube with the front end of the screw of the correct size.
 (3) Turn the nut along the thread of the screw.	 (4) Turn the nut fully into the screw. Note! Make sure the nut is fully engaged with the screw before removing the adapter tube.

1-10-5 Processing Specifications

(1)If you choose a recirculating ball screw with internal circulation or end cap circulation, the thread at one end of the screw must be exposed and the maximum size of the shoulder must be smaller than the bottom diameter. If the shoulder size is required to be larger than the bottom diameter, it is also acceptable, but there must be thread lines left on the shoulder to facilitate the installation of the nut. As shown in Figure 1.10.4.

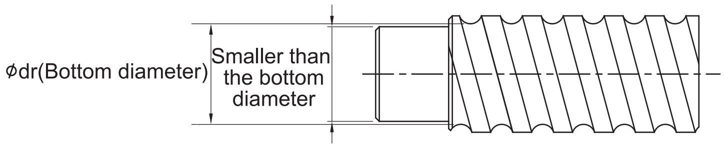


Figure 1.10.4 Toothed - Inner Circulation Shaft End Necessary Conditions

(2)When the screw is heat-treated, the thread section near the shoulder that has been machined must remain in a soft state for a length of 10 to 20 mm to facilitate the machining of the shoulder. This area will be marked on the drawing, as shown in Figure 1.10.5. If you have any special requirements, please consult the salesperson when placing your order.

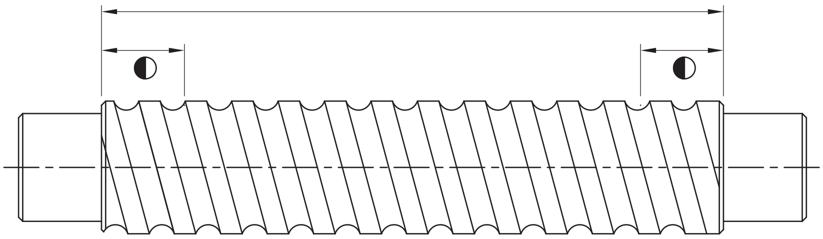


Figure 1.10.5 Effective Heat Treatment Range of the Screw

Axial direction clearance preload grade

2-1Nominal designation of ball screw

WT	-	SFU	R	025	05	T4	D	G	C5	-	600	-	P1	-	B2	+	N3	N3
		①	②	③	④	⑤	⑥	⑦	⑧		⑨		⑩		⑪		⑫	⑬

①

Nominal model	
S	S: Single nut
	D: Double nuts
	O: One-piece nut
F	F: With flange
	C: Flangeless
U	NI: NI type nut
	NU: NU-type nut
	H: H-type nut
	A: Type A nut
	NH: NH type nut (special for linear guide)
	Y: Y-type nut
	V: V-shaped nut
	U: DIN type nut
	M: M-type nut
	K: K-type nut

②

Thread direction
R: right
L: Left

③

Outer diameter of the screw shaft
Unit: mm

④

lead screw pitch
Unit: mm

⑤

Number of rolls (number of rolls × number of columns)
Volume number: T: 1
A: 1.5(or1.7/1.8)
B: 2.5/2.8
C: 3.5
D: 4.8
For example: (2.5x2=B2)

⑥

Flange type
B: No trimming
S: Single edge trimming
D: Double edge trimming

⑦

Process code
G: Grinding
F: Reconstruction

⑧

Lead accuracy grade
C0,C1,C2,C3,C5,C7,C10

⑨

Screw shaft length
Unit: mm

⑩

Axial direction clearance preload grade
P0,P1,P2,P3,P4

⑪

Nut
One shaft with two nuts: B2

⑫

Surface treatment of nuts
S: Standard
B1: Dye black
N1: Chromium plating
P: Phosphate
N3: Nickel plating
N4: Cold electroplating
N5: Black chrome plating

⑬

Surface treatment of screw shaft
S: Standard
B1: Dye black
N1: Chromium plating
P: Phosphate
N3: Nickel plating
N4: Cold electroplating
N5: Black chrome plating

注1: When neither the nut nor the screw has surface treatment, the indication can be omitted.
注2: Grinding grade C5 or above screws will be delivered with a test sheet attached.

2-1Nominal designation of ball screw

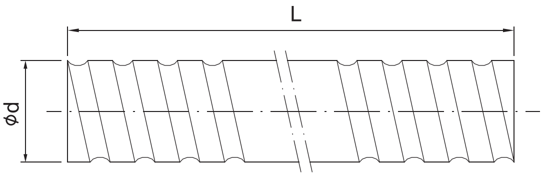


Figure 2.1.1 Schematic Diagram of the Screw

Table 2.1.1 Standard Dimension Specifications Comparison Table for Precision Grinding Grade Screws ☒4~32 Unit: mm

Model number			Lead accuracy grade	Thread direction	Number of teeth	Standard type screw code	Applicable nut type
Outer diameter d	Lead-in l	Jewel Path Da		R: Right L: Left			
4	1	0.8	C7,C5,C3	R	1	WSCR00401	K
6	1	0.8	C7,C5,C3	R	1	WSCR00601	K
8	1	0.8	C7,C5,C3	R/L	1	WSCR00801	K
	2	1.2	C7,C5,C3	R/L	1	WSCR00802	K
	2.5	1.2	C7,C5,C3	R	1	WSCR0082.5	K,BSH
10	2	1.2	C7,C5,C3	R/L	1	WSCR01002	K,BSH
	4	2	C7,C5,C3	R	1	WSCR01004	K,BSH
12	2	1.2	C7,C5,C3	R/L	1	WSCR01202	K
	4	2.5	C7,C5,C3	R	1	WSCR01204	U,BSH
	5	2.5	C7,C5,C3	R	1	WSCR01205-A	V,U,BSH,H,A
	10	2.5	C7,C5,C3	R	2	WSCR01210-B	V
14	2	1.2	C7,C5,C3	R/L	1	WSCR01402	K
	4	2.5	C7,C5,C3	R	1	WSCR01404	BSH
16	2	1.2	C7,C5,C3	R/L	1	WSCR01602	K
	4	2.381	C7,C5,C3	R	1	WSCR01604(N)	V,I,U,BSH
	5	3.175	C7,C5,C3	R/L	1	WSCR01605	V,NI,NU,BSH
	10	3.175	C7,C5,C3	R/L	2	WSCR01610	V,NI,NU,BSH
	16	2.778	C7,C5,C3	R	2	WSCR01616	Y
20	2	1.2	C7,C5,C3	R	1	WSCR02002	K
	4	2.381	C7,C5,C3	R	1	WSCR02004(N)	V,I,U
	5	3.175	C7,C5,C3	R/L	1	WSCR02005	V,NI,NU,BSH,H,A
	10	3.969	C7,C5,C3	R	1	WSCR02010	V
	20	3.175	C7,C5,C3	R	2	WSCR02020	V,Y,H,A
25	2	1.2	C7,C5,C3	R	1	WSCR02502	K
	4	2.381	C7,C5,C3	R	1	WSCR02504(N)	I,U
	5	3.175	C7,C5,C3	R/L	1	WSCR02505	V,NI,NU,BSH,H,A
	6	3.969	C7,C5,C3	R	1	WSCR02506	V,U
	8	4.762	C7,C5,C3	R	1	WSCR02508	V,U
	10	4.762	C7,C5,C3	R/L	1	WSCR02510-A	NI,NU,BSH
	10	6.35	C7,C5,C3	R	1	WSCR02510-B	V
	25	3.969	C7,C5,C3	R	2	WSCR02525	Y
32	4	2.381	C7,C5,C3	R	1	WSCR03204(N)	V,I,U
	5	3.175	C7,C5,C3	R/L	1	WSCR03205	V,NI,NU,M,H,A
	6	3.969	C7,C5,C3	R	1	WSCR03206	V,U
	8	4.762	C7,C5,C3	R	1	WSCR03208	V,U
	10	6.35	C7,C5,C3	R/L	1	WSCR03210	V,NI,NU
	20	6.35	C7,C5,C3	R	1	WSCR03220	V
	32	4.762	C7,C5,C3	R	2	WSCR03232	Y

2-1Nominal designation of ball screw

Table 2.1.2 Standard Dimension Specifications Comparison Table ☒40~80

Unit: mm

Model number			Lead accuracy grade	Thread direction	Number of teeth	Standard type screw code	Applicable nut type
Outer diameter d	Lead-in l	Jewel Path Da		R: Right L: Left			
40	5	3.175	C7,C5,C3	R/L	1	WSCR04005	V,NI,NU,H,A
	6	3.969	C7,C5,C3	R	1	WSCR04006	V,NU
	8	4.762	C7,C5,C3	R	1	WSCR04008	V,NU
	10	6.35	C7,C5,C3	R/L	1	WSCR04010	V,NI,NU
	20	6.35	C7,C5,C3	R	2	WSCR04020	V
50	5	3.175	C7,C5,C3	R	1	WSCR05005	V,H,A
	10	6.35	C7,C5,C3	R/L	1	WSCR05010	V,NI,NU
	20	9.525	C7,C5,C3	R	1	WSCR05020	V
63	10	6.35	C7,C5,C3	R	1	WSCR06310	V,NI,NU
80	10	6.35	C7,C5,C3	R	1	WSCR08010	V,NI,NU

Table 2.1.3 H/A Type Dimension Specifications Comparison Table ☒16~50

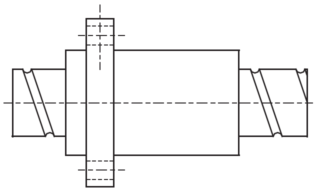
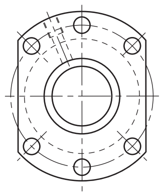
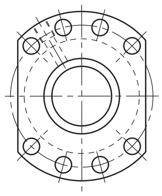
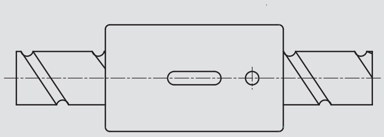
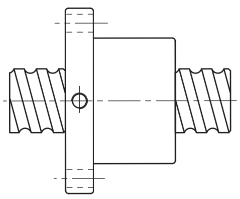
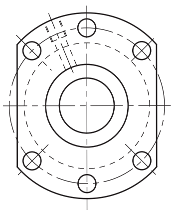
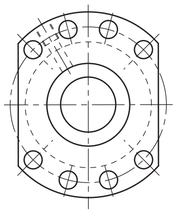
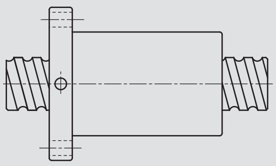
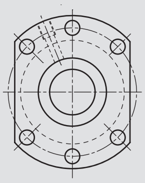
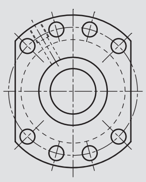
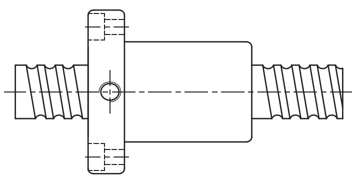
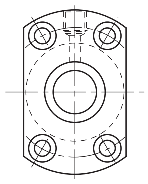
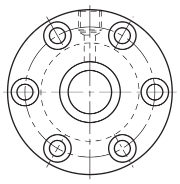
Unit: mm

Model number			Lead accuracy grade	Thread direction	Number of teeth	Standard type screw code	Applicable nut type
Outer diameter d	Lead-in l	Jewel Path Da		R: Right L: Left			
12	10	2.5	C7,C5,C3	R	1	WSCR01210	H,A
16	5	2.778	C7,C5,C3	R	1	WSCR01605	H,A
	10	2.778	C7,C5,C3	R	1	WSCR01610	H,A
	16	2.778	C7,C5,C3	R	1	WSCR01616	H,A
	20	2.778	C7,C5,C3	R	1	WSCR01620	H,A
20	10	3.175	C7,C5,C3	R	1	WSCR02010	H,A
25	10	3.175	C7,C5,C3	R	1	WSCR02510	H,A
	25	3.175	C7,C5,C3	R	1	WSCR02525	H,A
32	10	3.969	C7,C5,C3	R	1	WSCR03210	H,A
	20	3.969	C7,C5,C3	R	1	WSCR03220	H,A
	32	6.35	C7,C5,C3	R	1	WSCR03232	H,A
40	10	6.35	C7,C5,C3	R	1	WSCR04010	H,A
	20	6.35	C7,C5,C3	R	1	WSCR04020	H,A
50	10	6.35	C7,C5,C3	R	1	WSCR05010	H,A
	20	6.35	C7,C5,C3	R	1	WSCR05020	H,A

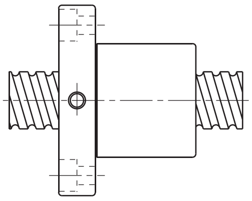
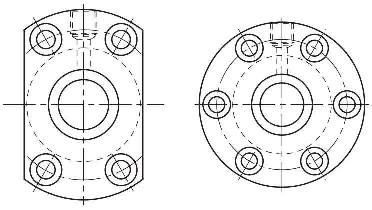
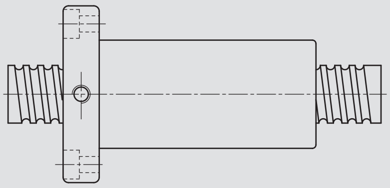
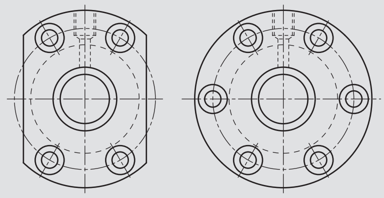
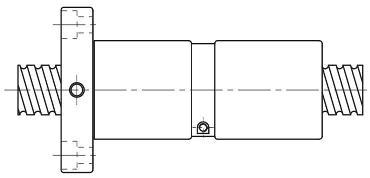
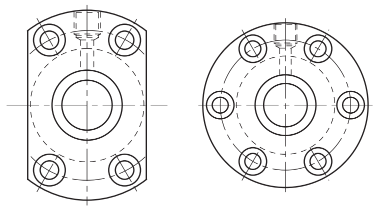
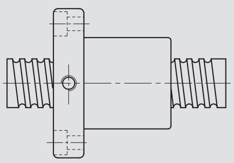
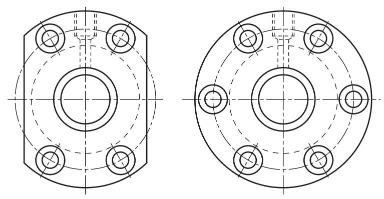
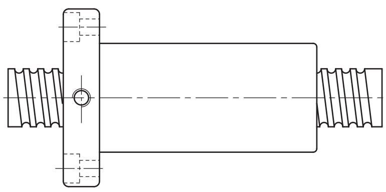
Note: The above is the standard specification. For any other requirements, please consult the business personnel.。

2-2Precision ground grade ball screw series

2-2-1 Precision ground grade nut type

	Grinding grade nut type	Flange type
NH/H/A(Special type for slide table / High-speed reinforced anti-collision type)	WSFNH/WSFH/WSFA(DIN)  C44	 d≤32  d≥40
CNH (Specialized for Sliding Tables)	WSCNH  C45	Flangeless
NU/U (Reinforced anti-collision type)	WSFNU/WSFU(DIN)  C46	 d≤32  d≥40
OFU/U (One-piece lightweight double nut)	WOFU/WDFU(DIN)  C47	 
NI/I (Reinforced Protective Type)	WSFNI/WSFI  C48	 

2-2-1 Precision ground grade nut type

<table>
<tr><th colspan="2">Grinding grade nut type</th><th>Flange type</th></tr>
<tr><td>M (Special for milling machines)</td><td>WSFM

C48</td><td></td></tr>
<tr><td>OFI/I (One-piece lightweight double nut)</td><td>WOFI/WDFI

C49</td><td></td></tr>
<tr><td>M (Special for milling machines)</td><td>WDFM

C49</td><td></td></tr>
<tr><td>V(Heavy-duty external circulation type)</td><td>WSFV

C50</td><td rowspan="2"></td></tr>
<tr><td>OFV (One-piece lightweight double nut)</td><td>WOFV

C51</td></tr>
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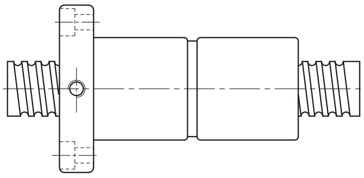
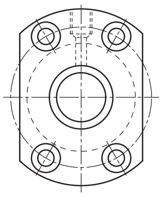
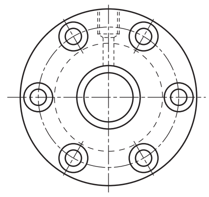
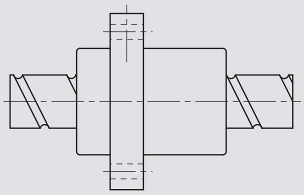
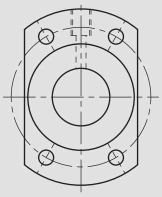
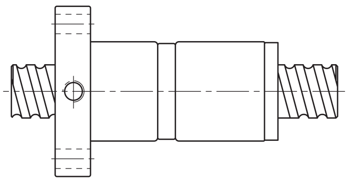
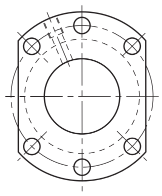
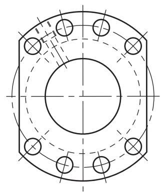
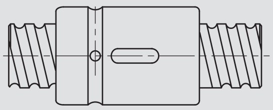
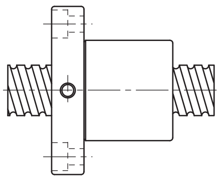
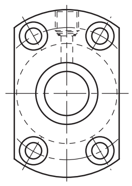
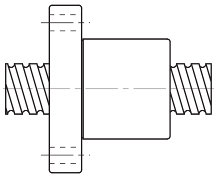
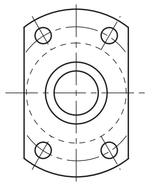
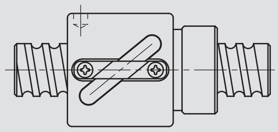
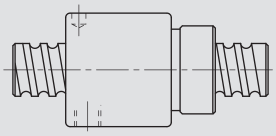
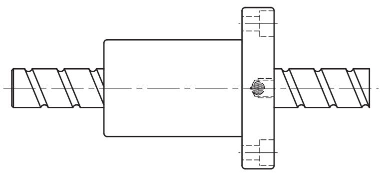
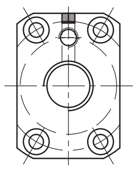
2-2-1 Precision ground grade nut type

Grinding grade nut type		Flange type
V (Heavy-duty external circulation type)	WDFV  C51	 
Y High D_m-N value)	WSFY  C52	
S (High-speed and low-noise type)	WDFS(DIN)  C53	 Model No.≤3232  Model No.≥4005
CNI/I (Standard Type)	WSCNI/WSCI  C54	Flangeless
K (Micro-miniature)	WSFK  C55	 (WSFK 01004) (WSFK 02002) (WSFK 02502)

2-2-1 Precision ground grade nut type

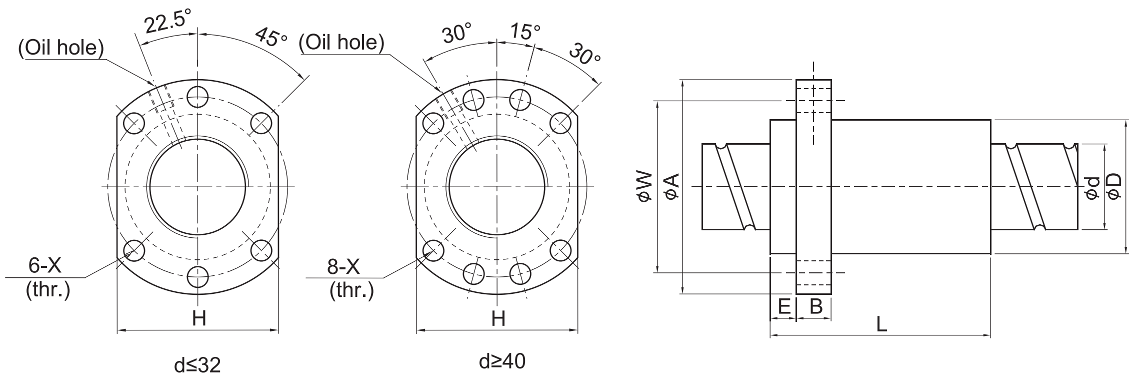
Grinding grade nut type		Flange type
K(Micro-miniature)	WSFK  C55	
BSH	WBSH  d≤12  d≥14 C56	Flangeless
XSV(Specialized for Automation Equipment)	WXSV  C57~61	

Note: The above is the standard specification. If you have any other requirements, please consult our business personnel.

Table 2.2.1 Grinding Grade - Pre-press Specifications Table

Preloading	I,U,MType	H,A Type	Y Type	V Type	BSH Type	K Type
P0						
P1	√	√	√	√	√	√
P2	√	√	√	√	√	
P3	√	√	√	√	√	
P4				√		

WSFNH/WSFH(DIN 69051 FORM B) Precision Grinding Grade Series Specifications and Dimensions Table

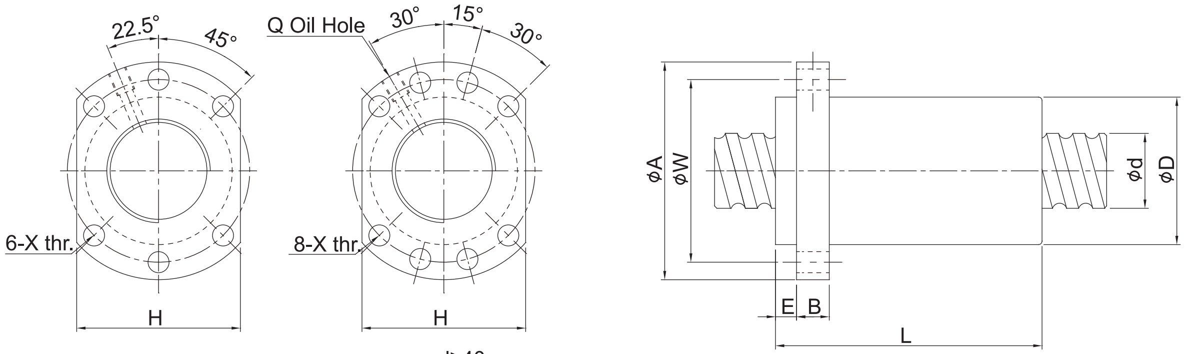


Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size D	A	E	B	L	W	H	X	Q	n	Rated load of ball nut Ca(kgf)	Coa(kgf)	rigidity kgf/μm
WSFH01205-2.8★	12	5	2.5	24	40	5	10	30	32	30	4.5		2.8x1	661	1316	19
WSFH01210-2.8★		10	2.5	24	40	5	10	45	32	30	4.5		2.8x1	642	1287	19
WSFH01605-3.8★	15	5	2.778	28	48	5	10	37	38	40	5.5	M6	3.8x1	1112	2507	30
WSFH01610-2.8★		10	2.778	28	48	5	10	45	38	40	5.5	M6	2.8x1	839	1821	23
WSFH01616-1.8★		16	2.778	28	48	5	10	45	38	40	5.5	M6	1.8x1	552	1137	14
WSFH01616-2.8★		16	2.778	28	48	5	10	61	38	40	5.5	M6	2.8x1	808	1769	22
WSFH01620-1.8★		20	2.778	28	48	7	10	58	38	40	5.5	M6	1.8x1	554	1170	14
WSFH02005-3.8★	20	5	3.175	36	58	7	10	37	47	44	6.6	M6	3.8x1	1484	3681	37
WSFH02010-3.8★		10	3.175	36	58	7	10	55	47	44	6.6	M6	3.8x1	1516	3833	40
WSFH02020-1.8★		20	3.175	36	58	7	10	54	47	44	6.6	M6	1.8x1	764	1758	19
WSFH02020-2.8★		20	3.175	36	58	7	10	74	47	44	6.6	M6	2.8x1	1118	2734	29
WSFH02505-3.8★	25	5	3.175	40	62	7	10	37	51	48	6.6	M6	3.8x1	1650	4658	43
WSFH02510-3.8★		10	3.175	40	62	7	12	55	51	48	6.6	M6	3.8x1	1638	4633	45
WSFH02525-1.8★		25	3.175	40	62	7	12	64	51	48	6.6	M6	1.8x1	843	2199	22
WSFH02525-2.8★		25	3.175	40	62	7	12	89	51	48	6.6	M6	2.8x1	1232	3421	34
WSFH03205-3.8	32	5	3.175	50	80	9	12	37	65	62	9	M6	3.8x1	1839	6026	51
WSFH03210-3.8	31	10	3.969	50	80	9	12	57	65	62	9	M6	3.8x1	2460	7255	55
WSFH03220-2.8		20	3.969	50	80	9	12	76	65	62	9	M6	2.8x1	1907	5482	43
WSFH03232-1.8		32	3.969	50	80	9	12	80	65	62	9	M6	1.8x1	1257	3426	27
WSFH03232-2.8		32	3.969	50	80	9	12	112	65	62	9	M6	2.8x1	1838	5329	42
WSFH04005-3.8	40	5	3.175	63	93	9	15	42	78	70	9	M8	3.8x1	2018	7589	60
WSFH04010-3.8	38	10	6.35	63	93	9	14	60	78	70	9	M8	3.8x1	5035	13943	67
WSFH04020-2.8		20	6.35	63	93	9	14	80	78	70	9	M8	2.8x1	3959	10715	54
WSFH05005-3.8	50	5	3.175	75	110	10.5	15	42	93	85	11	M8	3.8x1	2207	9542	68
WSFH05010-3.8	48	10	6.35	75	110	10.5	18	60	93	85	11	M8	3.8x1	5638	17852	79
WSFH05020-3.8		20	6.35	75	110	10.5	18	100	93	85	11	M8	3.8x1	5749	18485	87

Note: Those marked with ★ can be made into special specifications for WSFNH linear guides.

WSFA Precision Grinding Grade Series Specifications and Dimensions Table

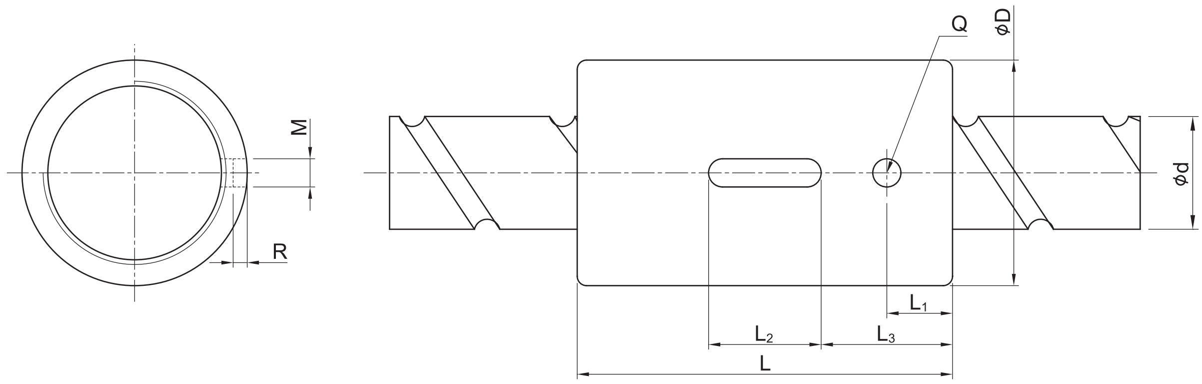


d≤32 d≥40

Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size										Rated load of ball nut		rigidity kgf/μm
				D	A	E	B	L	W	H	X	Q	n	Ca(kgf)	Coa(kgf)	
WSFA1205-2.8	12	5	2.5	24	40	5	10	30	32	30	4.5		2.8x1	661	1316	19
WSFA1210-2.8		10	2.5	24	40	5	10	42	32	30	4.5		2.8x1	642	1287	19
WSFA1605-3.8	15	5	2.778	28	48	5	10	31	38	40	5.5	M6	3.8x1	1112	2507	30
WSFA1610-2.8		10	2.778	28	48	5	10	42	38	40	5.5	M6	2.8x1	839	1821	23
WSFA1616-1.8		16	2.778	28	48	5	10	43	38	40	5.5	M6	1.8x1	552	1137	14
WSFA1616-2.8		16	2.778	28	48	5	10	59	38	40	5.5	M6	2.8x1	808	1769	22
WSFA1620-1.8		20	2.778	28	48	5	10	50	38	40	5.5	M6	1.8x1	554	1170	14
WSFA1630-1.8		30	2.778	28	48	7	10	70	38	40	5.5	M6	1.8x1	534	1195	14
WSFA2005-3.8	20	5	3.175	36	58	7	10	33	47	44	6.6	M6	3.8x1	1484	3681	37
WSFA2010-1.8		10	3.175	36	58	7	10	52	47	44	6.6	M6	3.8x1	1516	3833	40
WSFA2020-3.8		20	3.175	36	58	7	10	52	47	44	6.6	M6	1.8x1	764	1758	19
WSFA2020-2.8		20	3.175	36	58	7	10	72	47	44	6.6	M6	2.8x1	1118	2734	29
WSFA2505-3.8	25	5	3.175	40	62	7	10	33	51	48	6.6	M6	3.8x1	1650	4658	43
WSFA2510-3.8		10	3.175	40	62	7	12	52	51	48	6.6	M6	3.8x1	1638	4633	45
WSFA2525-1.8		25	3.175	40	62	7	12	60	51	48	6.6	M6	1.8x1	843	2199	22
WSFA2525-2.8		25	3.175	40	62	7	12	85	51	48	6.6	M6	2.8x1	1232	3421	34
WSFA3205-3.8	32	5	3.175	50	80	9	12	35	65	62	9	M6	3.8x1	1839	6026	51
WSFA3210-3.8	31	10	3.969	50	80	9	12	53	65	62	9	M6	3.8x1	2460	7255	55
WSFA3220-2.8		20	3.969	50	80	9	12	72	65	62	9	M6	2.8x1	1907	5482	43
WSFA3232-1.8		32	3.969	50	80	9	12	78	65	62	9	M6	1.8x1	1257	3426	27
WSFA3232-2.8		32	3.969	50	80	9	12	110	65	62	9	M6	2.8x1	1838	5329	42
WSFA4005-3.8	40	5	3.175	63	93	9	14	39	78	70	9	M8	3.8x1	2018	7589	60
WSFA4010-3.8	38	10	6.35	63	93	9	14	57	78	70	9	M8	3.8x1	5035	13943	67
WSFA4020-2.8		20	6.35	63	93	9	14	78	78	70	9	M8	2.8x1	3959	10715	54
WSFA5005-3.8	50	5	3.175	75	110	10.5	15	42	93	85	11	M8	3.8x1	2207	9542	68
WSFA5010-3.8	48	10	6.35	75	110	10.5	18	57	93	85	11	M8	3.8x1	5638	17852	79
WSFA5020-3.8		20	6.35	75	110	10.5	18	98	93	85	11	M8	3.8x1	5749	18485	87

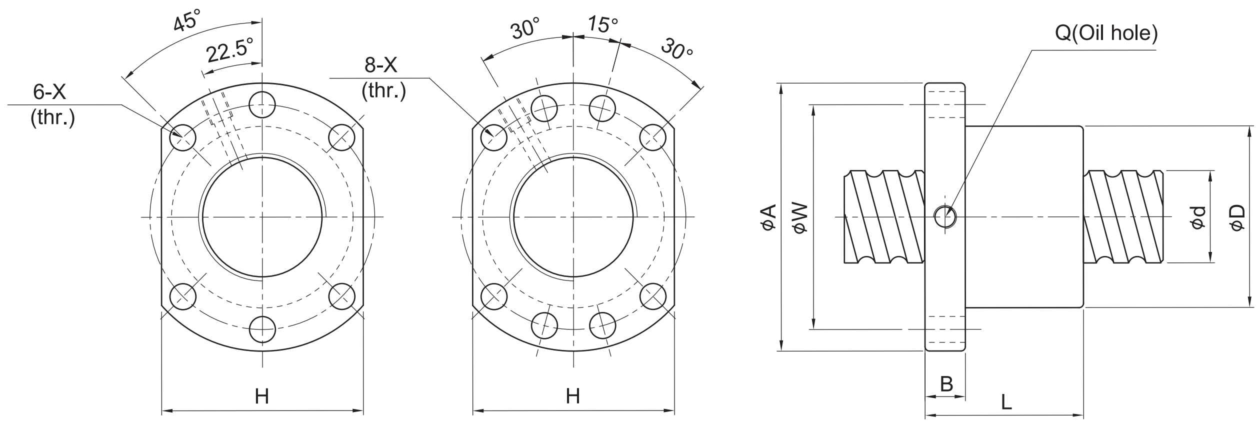
WSCNH Precision Grinding Grade Series Specifications and Dimensions Table



Unit: mm

Model number	shaft diameter d	lead screw pitch I	Pearl Path Da	Nut size									Rated load of ball nut		rigidity kgf/μm
				D	L	L_1	L_2	L_3	M	R	Q	n	C_a(kgf)	C_{oa}(kgf)	
WSCNH01205-4.8	12	5	2.5	24	40	7	12	14	3	1.5	3	4.8x1	1011	2105	34
WSCNH01210-2.8		10	2.5	24	45	8	15	15	3	1.5	3	2.8x1	642	1287	19
WSCNH01210-1.8		10	2.5	24	40	10.5	12	14	3	1.5	3	1.8x1	439	827	33
WSCNH01605-5.8	15	5	2.778	28	45	7	20	12.5	5	3	3	5.8x1	1599	3827	49
WSCNH01610-2.8		10	2.778	28	45	7	20	12.5	5	3	3	2.8x1	839	1821	23
WSCNH01616-1.8		16	2.778	28	45	7	20	12.5	5	3	3	1.8x1	552	1137	18
WSCNH01620-1.8		20	2.778	28	58	10	20	19	5	3	3	1.8x1	554	1170	14
WSCNH02005-5.8	20	5	3.175	36	47	8	20	13.5	5	3	3	5.8x1	2134	5619	60
WSCNH02010-3.8		10	3.175	36	55	8	20	17.5	5	3	3	3.8x1	1516	3833	40
WSCNH02020-1.8		20	3.175	36	55	8	20	17.5	5	3	3	1.8x1	764	1758	19

WSFNU/WSFU (DIN 69051 FORM B)
Precision Grinding Grade Series Specifications and Dimensions Table



d≤32

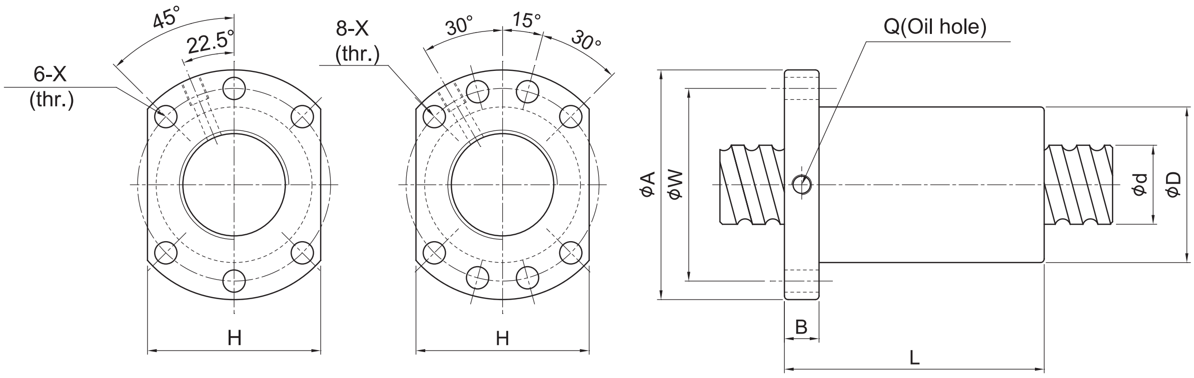
d≥40

Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size									Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Q	n			
WSFNU01605-4*	16	5	3.175	28	48	10	45	38	40	5.5	M6	1x4	1380	3052	32
WSFNU01610-3*		10	3.175	28	48	10	57	38	40	5.5	M6	1x3	1103	2401	26
WSFNU02005-4*	20	5	3.175	36	58	10	51	47	44	6.6	M6	1x4	1551	3875	39
WSFNU02505-4*	25	5	3.175	40	62	10	51	51	48	6.6	M6	1x4	1724	4904	45
WSFNU02510-4*		10	4.762	40	62	12	80	51	48	6.6	M6	1x4	2954	7295	50
WSFNU03205-4*	32	5	3.175	50	80	12	52	65	62	9	M6	1x4	1922	6343	54
WSFNU03210-4*		10	6.35	50	80	12	85	65	62	9	M6	1x4	4805	12208	61
WSFNU04005-4*	40	5	3.175	63	93	14	55	78	70	9	M8	1x4	2110	7988	63
WSFNU04010-4*		10	6.35	63	93	14	88	78	70	9	M8	1x4	5399	15500	73
WSFNU05010-4*	50	10	6.35	75	110	16	88	93	85	11	M8	1x4	6004	19614	85
WSFNU06310-4	63	10	6.35	90	125	18	93	108	95	11	M8	1x4	6719	25358	99
WSFNU08010-4	80	10	6.35	105	145	20	93	125	110	13.5	M8	1x4	7346	31953	109
WSFU01204-4	12	4	2.5	24	40	10	40	32	30	4.5		1x4	902	1884	26
WSFU01604-4	16	4	2.381	28	48	10	40	38	40	5.5	M6	1x4	973	2406	32
WSFU02004-4	20	4	2.381	36	58	10	42	47	44	6.6	M6	1x4	1066	2987	38
WSFU02504-4	25	4	2.381	40	62	10	42	51	48	6.6	M6	1x4	1180	3795	43
WSFU02506-4		6	3.969	40	62	10	54	51	48	6.6	M6	1x4	2318	6057	47
WSFU02508-4		8	4.762	40	62	10	63	51	48	6.6	M6	1x4	2963	7313	49
WSFU03204-4	32	4	2.381	50	80	12	44	65	62	9	M6	1x4	1296	4838	51
WSFU03206-4		6	3.969	50	80	12	57	65	62	9	M6	1x4	2632	7979	57
WSFU03208-4		8	4.762	50	80	12	65	65	62	9	M6	1x4	3387	9622	60
WSFU04006-4	40	6	3.969	63	93	14	60	78	70	9	M6	1x4	2873	9913	66
WSFU04008-4		8	4.762	63	93	14	67	78	70	9	M6	1x4	3712	11947	70
WSFU05020-4	50	20	7.144	75	110	16	138	93	85	11	M8	1x4	7142	22588	94

Note: Those marked with * can be made with left-hand threads.

WOFU/WDFU (DIN 69051 FORM B)
Precision Grinding Grade Series Specifications and Dimensions Table

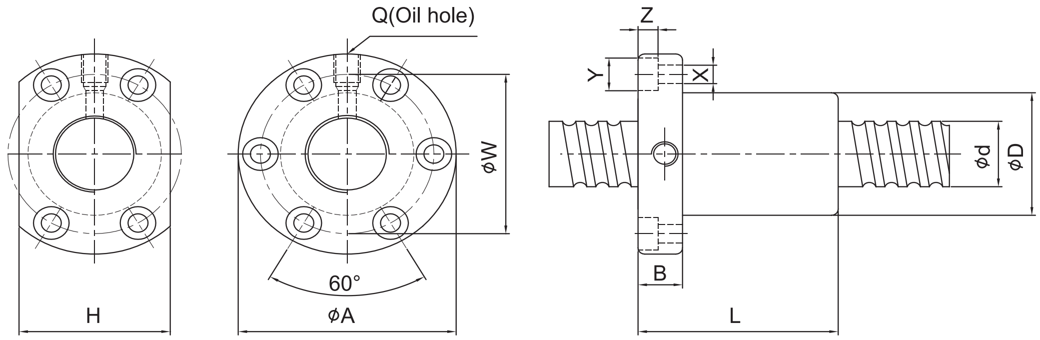


d≤32 d≥40

Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size									Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Q	n			
WOFU01605-4	16	5	3.175	28	48	10	75	38	40	5.5	M6	1x8	1380	3052	44
WOFU02005-4	20	5	3.175	36	58	10	85	47	44	6.6	M6	1x8	1551	3875	53
WOFU02505-4	25	5	3.175	40	62	10	86	51	48	6.6	M6	1x8	1724	4904	62
WOFU02510-4		10	4.762	40	62	12	130	51	48	6.6	M6	1x8	2954	7295	67
WOFU03205-4	32	5	3.175	50	80	12	87	65	62	9	M6	1x8	1922	6343	74
WOFU03210-4		10	6.35	50	80	12	145	65	62	9	M6	1x8	4805	12208	82
WOFU04005-4	40	5	3.175	63	93	14	90	78	70	9	M8	1x8	2110	7988	87
WOFU04010-4		10	6.35	63	93	14	148	78	70	9	M8	1x8	5399	15500	99
WOFU05010-4	50	10	6.35	75	110	16	148	93	85	11	M8	1x8	6004	19614	117
WOFU06310-4	63	10	6.35	90	125	18	153	108	95	11	M8	1x8	6719	25358	139
WOFU08010-4	80	10	6.35	105	145	20	153	125	110	13.5	M8	1x8	7346	31953	156
WDFU01604-4	16	4	2.381	28	48	10	80	38	40	5.5	M6	1x4	973	2406	43
WDFU02004-4	20	4	2.381	36	58	10	80	47	44	6.6	M6	1x4	1066	2987	51
WDFU02504-4	25	4	2.381	40	62	10	80	51	48	6.6	M6	1x4	1180	3795	60
WDFU02506-4		6	3.696	40	62	10	105	51	48	6.6	M6	1x4	2318	6057	64
WDFU02508-4		8	4.762	40	62	10	120	51	48	6.6	M6	1x4	2963	7313	67
WDFU03204-4	32	4	2.381	50	80	12	80	65	62	9	M6	1x4	1296	4838	71
WDFU03206-4		6	3.969	50	80	12	105	65	62	9	M6	1x4	2632	7979	78
WDFU03208-4		8	4.762	50	80	12	122	65	62	9	M6	1x4	3387	9622	82
WDFU04006-4	40	6	3.969	63	93	14	108	78	70	9	M6	1x4	2873	9913	91
WDFU04008-4		8	4.762	63	93	14	132	78	70	9	M6	1x4	3721	11947	96
WDFU05020-4	50	20	7.144	75	110	16	280	93	85	11	M8	1x4	7142	22588	126

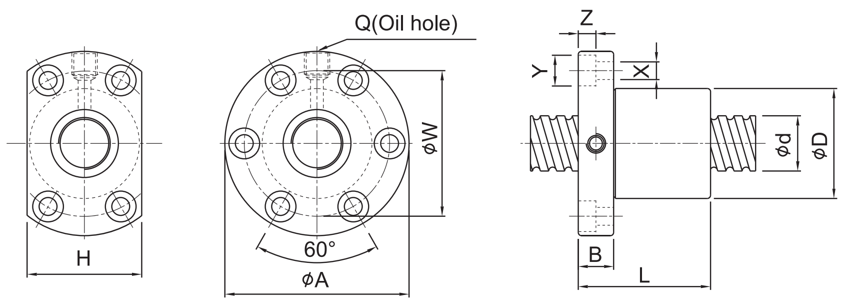
WSFNI/WSFI Precision Grinding Grade Series Specifications and Dimensions Table



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFNI01605-4*	16	5	3.175	30	49	10	45	39	34	4.5	8	4.5	M6	1x4	1380	3052	33
WSFNI01610-3*		10	3.175	34	58	10	57	45	34	5.5	9.5	5.5	M6	1x3	1103	2401	27
WSFNI02005-4*	20	5	3.175	34	57	11	51	45	40	5.5	9.5	5.5	M6	1x4	1551	3875	39
WSFNI02505-4*	25	5	3.175	40	63	11	51	51	46	5.5	9.5	5.5	M8	1x4	1724	4904	45
WSFNI2510-4*		10	4.762	46	72	12	80	58	52	6.5	11	6.5	M6	1x4	2954	7295	51
WSFNI03205-4*	32	5	3.175	46	72	12	52	58	52	6.5	11	6.5	M8	1x4	1922	6343	52
WSFNI03210-4*		10	6.35	54	88	15	85	70	62	9	14	8.5	M8	1x4	4805	12208	62
WSFNI04005-4*	40	5	3.175	56	90	15	55	72	64	9	14	8.5	M8	1x4	2110	7988	59
WSFNI04010-4*		10	6.35	62	104	18	88	82	70	11	17.5	11	M8	1x4	5399	15500	72
WSFNI05010-4*	50	10	6.35	72	114	18	88	92	82	11	17.5	11	M8	1x4	6004	19614	83
WSFNI06310-4	63	10	6.35	85	131	22	93	107	95	14	20	13	M8	1x4	6719	25358	95
WSFNI08010-4	80	10	6.35	105	150	22	93	127	115	14	20	13	M8	1x4	7346	31953	109
WSFI01604-4	16	4	2.381	30	49	10	45	39	34	4.5	8	4.5	M6	1x4	973	2406	32
WSFI02004-4	20	4	2.381	34	57	11	46	45	40	5.5	9.5	5.5	M6	1x4	1066	2987	37
WSFI02504-4*	25	4	2.381	40	63	11	46	51	46	5.5	9.5	5.5	M6	1x4	1180	3795	43
WSFI03204-4	32	4	2.381	46	72	12	47	58	52	6.5	11	6.5	M6	1x4	1296	4838	49

WSFM Precision Grinding Grade Series Specifications and Dimensions Table

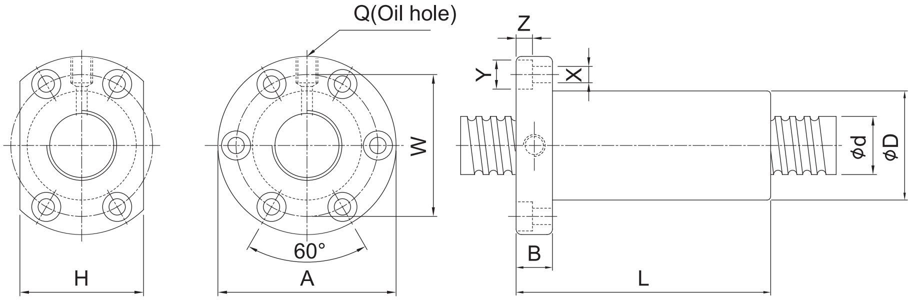


Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFM03205-4*	32	5	3.175	48	74	12	52	60	60	6.5	11	6.5	M8	1x4	1922	6343	53

Note: Those marked with * can be made with left-hand threads.

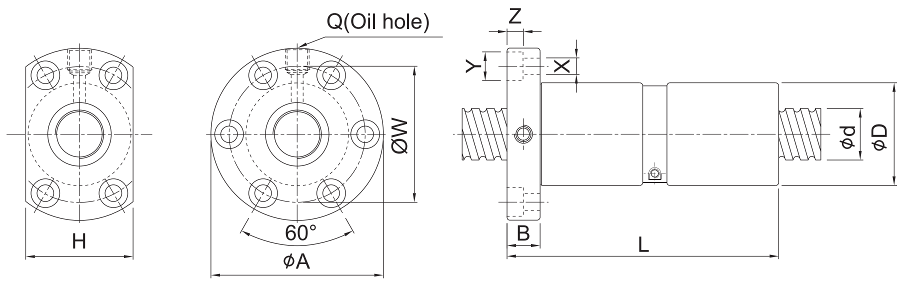
WOFI/WDFI Precision Grinding Grade Series Specifications and Dimensions Table



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WOFI01605-4	16	5	3.175	30	49	10	75	39	34	4.5	8	4.5	M6	1x8	1380	3052	44
WOFI02005-4	20	5	3.175	34	57	11	85	45	40	5.5	9.5	5.5	M6	1x8	1551	3875	52
WOFI02505-4	25	5	3.175	40	63	11	86	51	46	5.5	9.5	5.5	M8	1x8	1724	4904	62
WOFI02510-4		10	4.762	46	72	12	130	58	52	6.5	11	6.5	M6	1x8	2954	7295	68
WOFI03205-4	32	5	3.175	46	72	12	87	58	52	6.5	11	6.5	M8	1x8	1922	6343	72
WOFI03210-4		10	6.35	54	88	15	145	70	62	9	14	8.5	M8	1x8	4805	12208	83
WOFI04005-4	40	5	3.175	56	90	15	90	72	64	9	14	8.5	M8	1x8	2110	7988	84
WOFI04010-4		10	6.35	62	104	18	148	82	70	11	17.5	11	M8	1x8	5399	15500	99
WOFI05010-4	50	10	6.35	72	114	18	148	92	82	11	17.5	11	M8	1x8	6004	19614	115
WOFI06310-4	63	10	6.35	85	131	22	153	107	95	14	20	13	M8	1x8	6719	25358	135
WOFI08010-4	80	10	6.35	105	150	22	153	127	115	14	20	13	M8	1x8	7346	31953	156
WDFI01604-4	16	4	2.381	30	49	10	80	39	34	4.5	8	4.5	M6	1x4	973	2406	44
WDFI02004-4	20	4	2.381	34	57	11	80	45	40	5.5	9.5	5.5	M6	1x4	1066	2987	51
WDFI02504-4	25	4	2.381	40	63	11	80	51	46	5.5		5.5	M6	1x4	1180	3795	60
WDFI03204-4	32	4	2.381	46	72	12	80	58	52	6.5	11	6.5	M6	1x4	1296	4838	69

WDFM Precision Grinding Grade Series Specification and Dimension Table

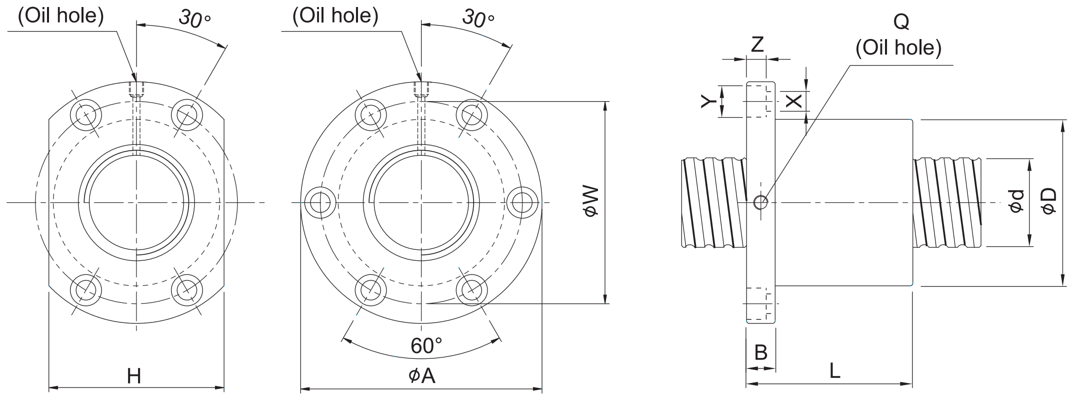


Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WDFM03205-4★	32	5	3.175	48	74	12	102	60	60	6.5	11	6.5	M8	1x4	1922	6343	73
WDFM0325T-4★		5.08	3.175	48	74	12	104	60	60	6.5	11	6.5	M8	1x4	1922	6343	73

Note: Those marked with ★ can be made with left-hand threads. Please consult the business personnel before placing an order for double nuts.。

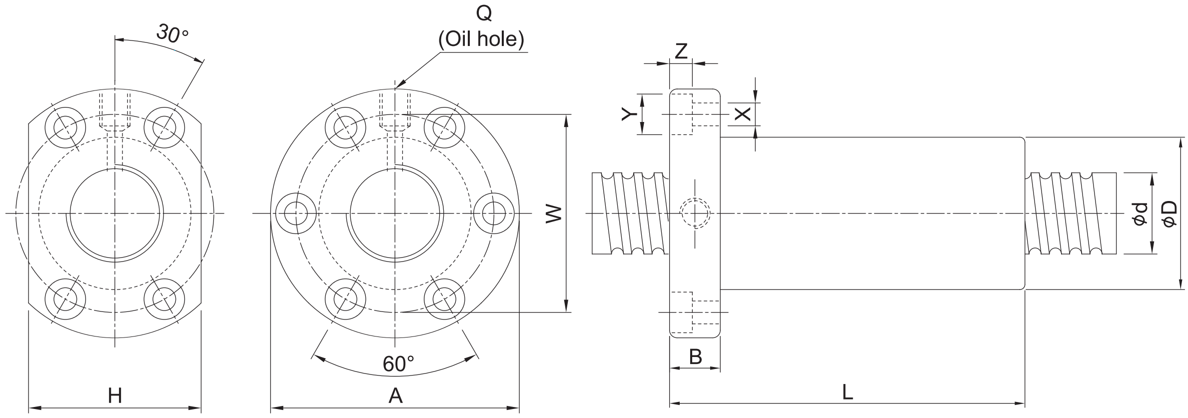
WSFV Precision Grinding Grade Series Specifications and Dimensions Table



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFV01205-2.8	12	5	2.5	30	50	10	42	40	32	4.5	8	4.5	M6	2.8x1	661	1316	19
WSFV01210-2.7		10	2.5	30	50	10	53	40	32	4.5	8	4.5	M6	2.7x1	623	1241	18
WSFV1510-2.7	15	10	3.175	34	58	10	57	45	34	5.5	9.5	5.5	M6	2.7x1	972	2020	23
WSFV01604-3.8	16	4	2.381	34	57	11	45	45	34	5.5	9.5	5.5	M6	3.8x1	931	2285	31
WSFV01605-4.8		5	3.175	40	63	11	58	51	42	5.5	9.5	5.5	M6	4.8x1	1614	3662	40
WSFV01610-2.7		10	3.175	40	63	11	56	51	42	5.5	9.5	5.5	M6	2.7x1	1008	2161	24
WSFV02004-4.8	20	4	2.381	40	60	10	50	50	40	4.5	8	4	M6	4.8x1	1247	3584	45
WSFV02005-4.8		5	3.175	44	67	11	57	55	52	5.5	9.5	5.5	M6	4.8x1	1814	4650	47
WSFV02010-2.7		10	3.969	46	74	13	57	59	46	6.6	11	6.5	M6	2.7x1	1518	3398	30
WSFV02020-1.8		20	3.175	46	74	13	70	59	46	6.6	11	6.5	M6	1.8x1	764	1758	19
WSFV02505-4.8	25	5	3.175	50	73	11	55	61	52	5.5	9.5	5.5	M8	4.8x1	2017	5884	56
WSFV02506-4.8		6	3.969	53	76	11	62	64	58	5.5	9.5	5.5	M6	4.8x1	2711	7268	58
WSFV02508-4.8		8	4.762	56	85	13	70	71	64	6.5	11	6.5	M6	4.8x1	3466	8776	61
WSFV02510-2.7		10	6.35	68	102	15	70	84	82	9	14	8.5	M8	2.7x1	3040	6547	37
WSFV02525-1.8		25	3.175	50	73	13	83	61	52	5.5	9.5	5.5	M8	1.8x1	843	2199	22
WSFV03204-4.8	32	4	2.381	54	81	12	50	67	64	6.6	11	6.5	M6	4.8x1	1517	5806	62
WSFV03205-4.8		5	3.175	58	85	12	56	71	64	6.6	11	6.5	M8	4.8x1	2249	7612	66
WSFV03206-4.8		6	3.969	62	89	12	60	75	68	6.6	11	6.5	M8	4.8x1	3079	9575	70
WSFV03208-4.8		8	4.762	66	100	15	75	82	76	9	14	8.5	M8	4.8x1	3962	11547	74
WSFV03210-4.8		10	6.35	74	108	15	96	90	82	9	14	9	M8	4.8x1	5620	14649	76
WSFV04005-4.8	40	5	3.175	67	101	15	59	83	72	9	14	8.5	M8	4.8x1	2468	9586	76
WSFV04010-4.8		10	6.35	82	124	18	100	102	94	11	17.5	11	M8	4.8x1	6316	18600	90
WSFV04020-2.7		20	6.35	82	124	18	100	102	90	11	17.5	11	M8	2.7x1	3935	10893	56
WSFV05005-4.8	50	5	3.175	80	114	15	60	96	82	9	14	8.5	M8	4.8x1	2698	12053	87
WSFV05010-4.8		10	6.35	93	135	16	93	113	98	11	17.5	11	M6	4.8x1	7023	23537	106
WSFV06310-4.8	63	10	6.35	108	154	22	105	130	110	14	20	13	M8	4.8x1	7860	30430	126
WSFV08010-4.8	80	10	6.35	130	176	22	105	152	132	14	20	13	M8	4.8x1	8593	38344	145

WOFV/WDFV Precision Grinding Grade Series Specifications and Dimensions Table

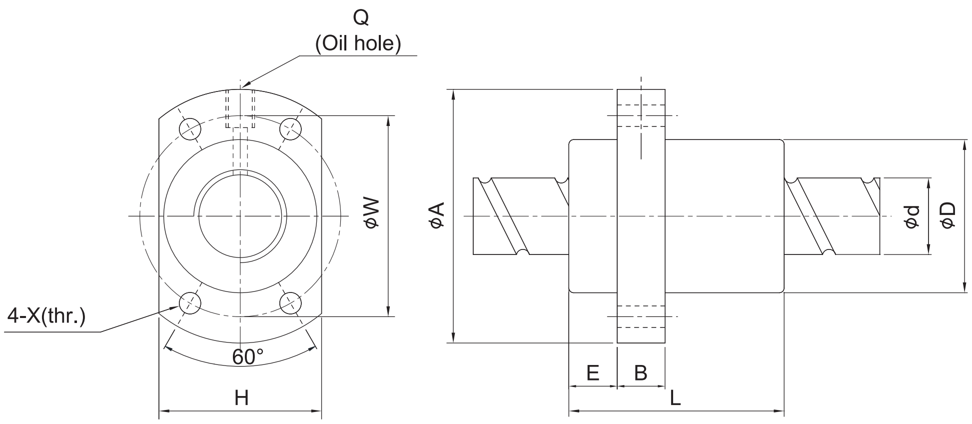


Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WOFV01605-4.8	16	5	3.175	40	63	11	100	51	42	5.5	9.5	5.5	M6	4.8x2	1614	3662	53
WOFV02005-4.8	20	5	3.175	44	67	11	102.5	55	52	5.5	9.5	5.5	M6	4.8x2	1814	4650	63
WOFV02505-4.8	25	5	3.175	50	73	11	96	61	52	5.5	9.5	5.5	M8	4.8x2	2017	5884	75
WOFV03205-4.8	32	5	3.175	58	85	12	98	71	64	6.6	11	6.5	M8	4.8x2	2249	7612	90
WOFV03210-4.8		10	6.35	74	108	15	166	90	82	9	14	9	M8	4.8x2	5620	14649	101
WOFV04005-4.8	40	5	3.175	67	101	15	100	83	72	9	14	8.5	M8	4.8x2	2468	9586	105
WOFV04010-4.8		10	6.35	82	124	18	174	102	94	11	17.5	11	M8	4.8x2	6316	18600	121
WOFV05010-4.8	50	10	6.35	93	135	16	167	113	98	11	17.5	11	M8	4.8x2	7023	23537	144
WOFV06310-4.8	63	10	6.35	108	154	22	177	130	110	14	20	13	M8	4.8x2	7860	30430	172
WOFV08010-4.8	80	10	6.35	130	176	22	178	152	132	14	20	13	M8	4.8x2	8593	38344	201
WDFV01510-2.7	15	10	3.175	34	58	10	107	45	34	5.5	9.5	5.5	M6	2.7x1	972	2020	30
WDFV01604-3.8	16	4	2.381	34	57	11	89	45	34	5.5	9.5	5.5	M6	3.8x1	931	2285	42
WDFV02004-4.8	20	4	2.381	40	60	10	94	50	40	4.5	8	4	M6	4.8x1	1247	3584	61
WDFV02010-2.7		10	3.969	46	74	13	117	59	46	6.6	11	6.5	M6	2.7x1	1518	3398	40
WDFV02506-4.8	25	6	3.969	53	76	11	116	64	58	5.5	9.5	5.5	M6	4.8x1	2711	7268	78
WDFV02508-4.8		8	4.762	56	85	13	134	71	64	6.5	11	6.5	M6	4.8x1	3466	8776	82
WDFV02510-2.7		10	6.35	68	102	15	130	84	82	9	14	8.5	M8	2.7x1	3040	6547	49
WDFV03204-4.8	32	4	2.381	54	81	12	94	67	64	6.6	11	6.5	M6	4.8x1	1517	5806	85
WDFV03206-4.8		6	3.969	62	89	12	114	75	68	6.6	11	6.5	M8	4.8x1	3079	9575	95
WDFV03208-4.8		8	4.762	66	100	15	139	82	76	9	14	8.5	M8	4.8x1	3962	11547	100
WDFV04020-2.7	40	20	6.35	82	124	18	200	102	90	11	17.5	11	M8	2.7x1	3935	10893	74
WDFV05005-4.8	50	5	3.175	80	114	15	115	96	82	9	14	8.5	M8	4.8x1	2698	12053	122

Please consult the business personnel before placing an order for double nuts.

WSFY Precision Grinding Grade Series Specifications and Dimensions Table

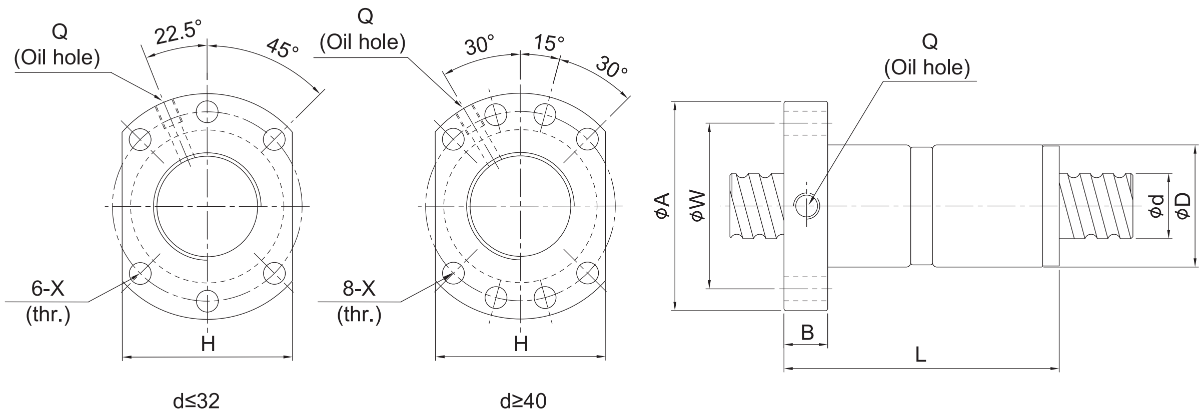


Unit: mm

One lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size D	A	E	B	L	W	H	X	Q	n	Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
WSFY01616-3.6	16	16	2.778	32	53	10.1	10	45	42	34	4.5	M6	1.8x2	1073	2551	31
WSFY01616-5.6		16	2.778	32	53	10.1	10	61	42	34	4.5	M6	2.8x2	1568	3968	47
WSFY02020-3.6	20	20	3.175	39	62	13	10	52	50	41	5.5	M6	1.8x2	1387	3515	37
WSFY02020-5.6		20	3.175	39	62	13	10	72	50	41	5.5	M6	2.8x2	2029	5468	56
WSFY02525-3.6	25	25	3.969	47	74	15	12	64	60	49	6.6	M6	1.8x2	2074	5494	45
WSFY02525-5.6		25	3.969	47	74	15	12	89	60	49	6.6	M6	2.8x2	3032	8546	69
WSFY03232-3.6	32	32	4.762	58	92	17	12	78	74	60	9	M6	1.8x2	3021	8690	58
WSFY03232-5.6		32	4.762	58	92	17	12	110	74	60	9	M6	2.8x2	4417	13517	88

Double lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size D	A	E	B	L	W	H	X	Q	n	Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
WSFY01632-1.6	16	32	2.778	32	53	10.1	10	42.5	42	34	4.5	M6	0.8x2	493	1116	11
WSFY01632-3.6		32	2.778	32	53	10.1	10	74.5	42	34	4.5	M6	1.8x2	989	2511	23
WSFY02040-1.6	20	40	3.175	39	62	13	10	48	50	41	5.5	M6	0.8x2	653	1597	15
WSFY02040-3.6		40	3.175	39	62	13	10	88	50	41	5.5	M6	1.8x2	1311	3592	30
WSFY02550-1.6	25	50	3.969	47	74	15	12	58	60	49	6.6	M6	0.8x2	976	2495	19
WSFY02550-3.6		50	3.969	47	74	15	12	108	60	49	6.6	M6	1.8x2	1960	5614	32
WSFY03264-1.6	32	64	4.762	58	92	17	12	71	74	60	9	M6	0.8x2	1374	3571	22
WSFY03264-3.6		64	4.762	58	92	17	12	135	74	60	9	M6	1.8x2	2759	8441	46
WSFY04080-1.6	40	80	6.35	73	114	19.5	15	90	93	75	11	M6	0.8x2	2273	6387	29
WSFY04080-3.6		80	6.35	73	114	19.5	15	170	93	75	11	M6	1.8x2	4566	14370	50

WDFS (DIN 69051 FORM B)
Precision Grinding Grade Series Specifications and Dimensions Table

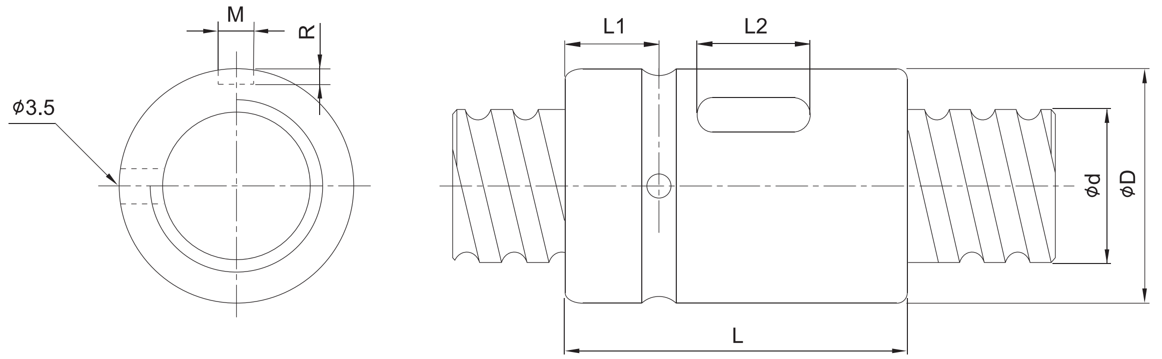


Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size									Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Q	n			
WDFS01605-3.8	15	5	2.778	28	48	10	73	38	40	5.5	M6	3.8x1	1112	2507	41
WDFS01610-2.8		10	2.778	28	48	10	97	38	40	5.5	M6	2.8x1	839	1821	31
WDFS02005-3.8	20	5	3.175	36	58	10	75	47	44	6.6	M6	3.8x1	1484	3681	50
WDFS02010-3.8		10	3.175	36	58	10	120	47	44	6.6	M6	3.8x1	1516	3833	53
WDFS02505-3.8	25	5	3.175	40	62	10	75	51	48	6.6	M6	3.8x1	1650	4658	59
WDFS02510-3.8		10	3.175	40	62	12	122	51	48	6.6	M6	3.8x1	1638	4633	61
WDFS03205-3.8	32	5	3.175	50	80	12	82	65	62	9	M6	3.8x1	1839	6026	71
WDFS03210-3.8	31	10	3.969	50	80	13	122	65	62	9	M6	3.8x1	2460	7255	75
WDFS03220-2.8		20	3.969	50	80	12	160	65	62	9	M6	2.8x1	1907	5482	58
WDFS04005-3.8	40	5	3.175	63	93	15	85	78	70	9	M8	3.8x1	2018	7589	83
WDFS04010-3.8	38	10	6.35	63	93	14	123	78	70	9	M8	3.8x1	5035	13943	91
WDFS04020-2.8		20	6.35	63	93	14	162	78	70	9	M8	2.8x1	3959	10715	73
WDFS05005-3.8	50	5	3.175	75	110	15	85	93	85	11	M8	3.8x1	2207	9542	96
WDFS05010-3.8	48	10	6.35	75	110	18	138	93	85	11	M8	3.8x1	5638	17852	109
WDFS05020-3.8		20	6.35	75	110	18	218	93	85	11	M8	3.8x1	5749	18485	116

Please consult the business personnel before placing an order for double nuts.

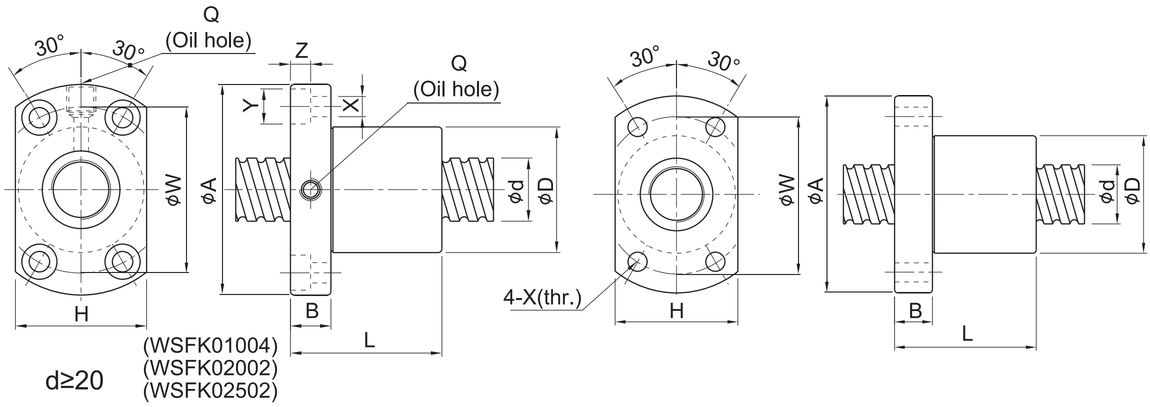
Table of Specifications and Dimensions for WSCNI/WCSI Precision Grinding Grade Series



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size							Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	L	L1	L2	M	R	n			
WSCNI01605-4	16	5	3.175	30	45	9	20	5	3	1x4	1380	3052	33
WSCNI02005-4	20	5	3.175	34	45	9	20	5	3	1x4	1551	3875	39
WSCNI02505-4	25	5	3.175	40	45	9	20	5	3	1x4	1724	4904	45
WSCNI02510-4		10	4.762	46	85	13	30	5	3	1x4	2954	7295	51
WSCNI03205-4	32	5	3.175	46	45	9	20	5	3	1x4	1922	6343	52
WSCNI03210-4		10	6.35	54	85	13	30	5	3	1x4	4805	12208	62
WSCNI04005-4	40	5	3.175	56	45	9	20	5	3	1x4	2110	7988	59
WSCNI04010-4		10	6.35	62	85	13	30	5	3	1x4	5399	15500	72
WSCNI05010-4	50	10	6.35	72	85	13	30	5	3	1x4	6004	19614	83
WSCNI06310-4	63	10	6.35	85	85	13	30	6	3.5	1x4	6719	25358	95
WSCNI08010-4	80	10	6.35	105	85	13	30	8	4.5	1x4	7346	31953	109
WSCI01604-4	16	4	2.381	30	40	9	15	3	1.5	1x4	973	2406	32
WSCI02004-4	20	4	2.381	34	40	9	15	3	1.5	1x4	1066	2987	37
WSCI02504-4	25	4	2.381	40	40	9	15	3	1.5	1x4	1180	3795	43
WSCI03204-4	32	4	2.381	46	40	9	15	3	1.5	1x4	1296	4838	49

WSFK Precision Grinding Grade Series Specifications and Dimensions Table



Unit: mm

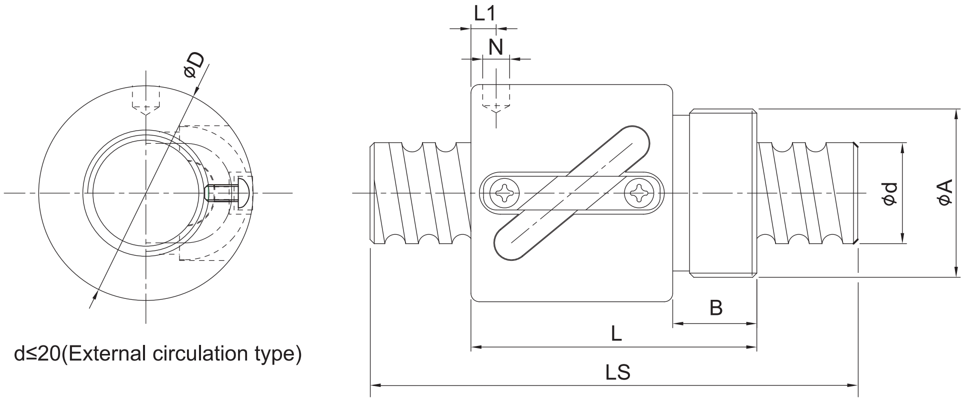
Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFK00601	6	1	0.8	12	24	3.5	15	18	16	3.4	-	-	-	1x3	111	224	9
WSFK00801★	8	1	0.8	14	27	4	16	21	18	3.4	-	-	-	1x4	161	403	14
WSFK00802★		2	1.2	14	27	4	16	21	18	3.4	-	-	-	1x3	222	458	13
WSFK01002★	10	2	1.2	18	35	5	28	27	22	4.5	-	-	-	1x3	243	569	15
WSFK01004		4	2	26	46	10	34	36	28	4.5	8	4.5	M6	1x3	468	905	17
WSFK01202★	12	2	1.2	20	37	5	28	29	24	4.5	-	-	-	1x4	334	906	22
WSFK01402★	14	2	1.2	21	40	6	23	31	26	5.5	-	-	-	1x4	354	1053	24
WSFK01602★	16	2	1.2	25	43	10	40	35	29	5.5	-	-	M6	1x4	373	1200	26
WSFK02002	20	2	1.2	50	80	15	55	65	68	6.5	10.5	6	M6	1x6	581	2284	48
WSFK02502	25	2	1.2	50	80	13	43	65	68	6.5	10.5	6	M6	1x5	540	2381	46

Note: Those marked with ★ can be made with left-hand threads.

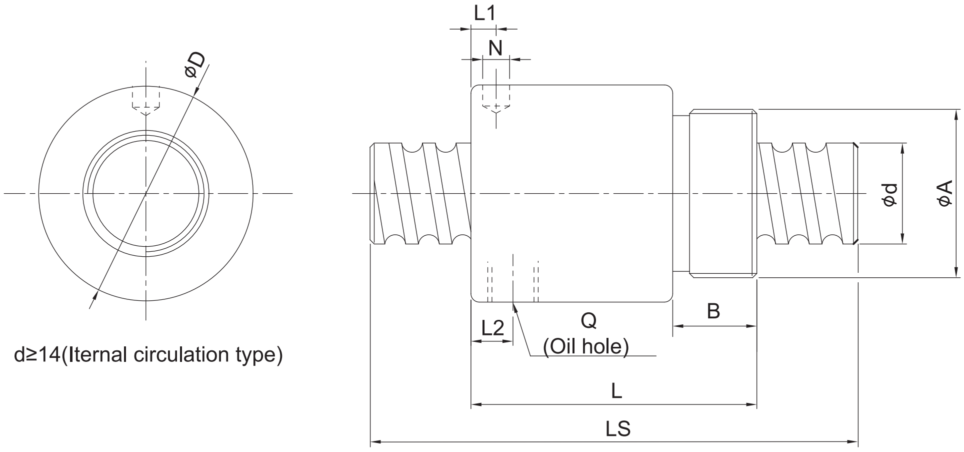
Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WXSUR01204T3D-02	12	4	2.5	24	40	6	28	32	25	3.5	-	-	-	1x3	704	1413	-
WXSUR01205T3D-00		5	2.5	22	37	8	39	29	24	4.5	-	-	-	1x3	702	1409	17

WBSH Precision Grinding Grade Series Specifications and Dimensions Table



d≤20(External circulation type)



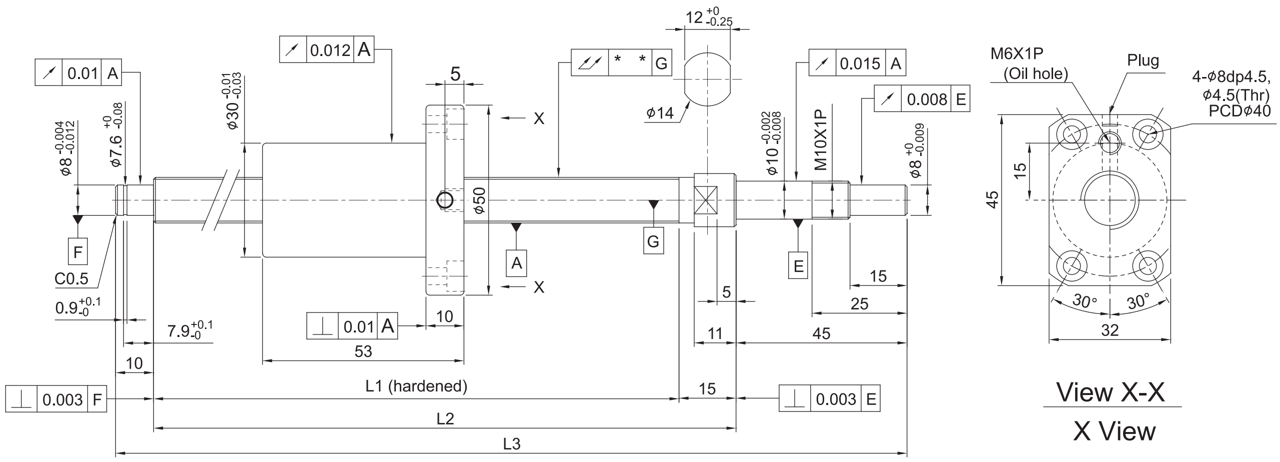
d≥14(Iternal circulation type)

Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size									Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	L1	N	L2	Q	n			
WBSHR0082.5-2.5	8	2.5	1.2	17.5	M15x1P	7.5	23.5	10	3	-	-	2.5x1	189	381	11
WBSHR01002-3.5	10	2	1.2	19.5	M17x1P	7.5	22	3	3.2	-	-	3.5x1	277	664	17
WBSHR01004-2.5		4	2	25	M20x1P	10	34	3	3	-	-	2.5x1	400	754	14
WBSHR01204-3.5	12	4	2.5	25.5	M20x1P	10	34	13	3	-	-	3.5x1	804	1649	23
WBSHR01205-3.5		5	2.5	25.5	M20x1P	10	39	16.25	3	-	-	3.5x1	801	1644	24
WBSHR01404-3	14	4	2.5	32.1	M25x1.5P	10	35	11	3	-	-	1x3	748	1609	26
WBSHR01604-3	16	4	2.381	29	M22x1.5P	8	32	4	3.2	-	-	1x3	759	1804	24
WBSHR01605-3		5	3.175	32.5	M26x1.5P	12	42	19.25	3	-	-	1x3	1077	2289	25
WBSHR01610-2		10	3.175	32	M26x1.5P	12	50	3	4	3	M4	1x2	779	1601	14
WBSHR02005-3	20	5	3.175	38	M35x1.5P	15	45	20.3	3	-	-	1x3	1211	2906	30
WBSHR02505-4	25	5	3.175	43	M40x1.5P	19	69	32.11	3	8	M6	1x4	1724	4904	37
WBSHR02510-4		10	4.762	43	M40x1.5P	19	84	8	6	8	M6	1x4	2954	7295	41

Note: Standard products of external diameter Φ8 to Φ16 nuts do not come with scraper brushes.。

WT-XSVR01210-01 Precision Grinding Grade Series Specification and Dimension Table (Finished Grinding Grade Shaft End)

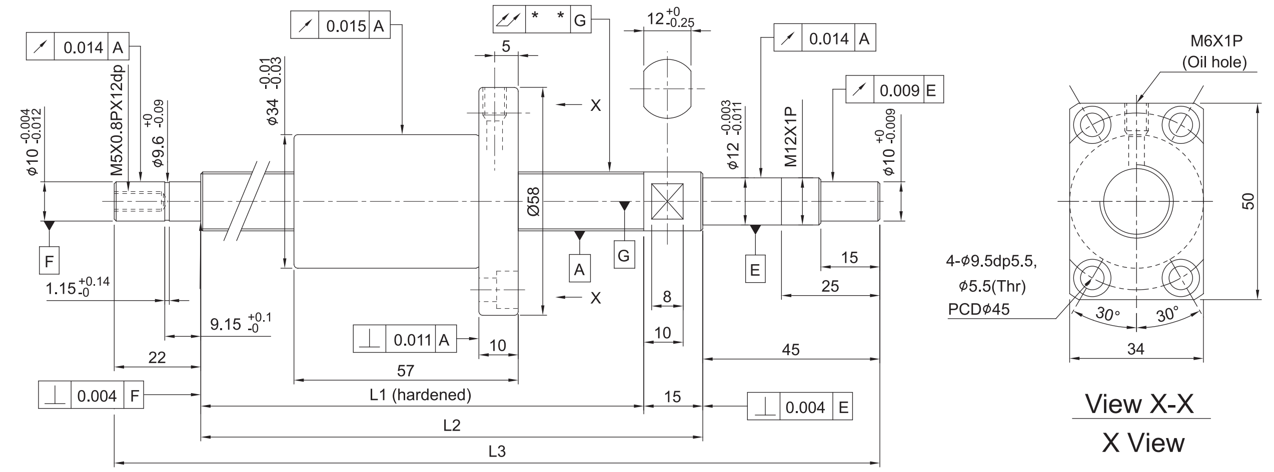


The center of the steel ball	12.85
Steel ball diameter(mm)	2.5
lead distance(mm)	10
Number of rolls	2.7x1
Lead angle	13.91°
helical direction	R
Spring force(kg)	0.1~0.2
Preload amount(kgf)	25
Dynamic loadC_a(kgf)	411
Static loadC_{oa}(kgf)	638
Precision (order)	0.018

Unit: mm

Itinerary(mm)	Nominal model	Screw shaft length(mm)			Axial wobble
		L1	L2	L3	
100	WT-XSVR01210B1DGC5-230-P1	160	175	230	0.035
150	WT-XSVR01210B1DGC5-280-P1	210	225	280	0.035
250	WT-XSVR01210B1DGC5-380-P1	310	325	380	0.050
350	WT-XSVR01210B1DGC5-480-P1	410	425	480	0.060
450	WT-XSVR01210B1DGC5-580-P1	510	525	580	0.075

WT-XSVR01510-00 Precision Grinding Grade Series Specification and Dimension Table (Finished Grinding Grade Shaft End)

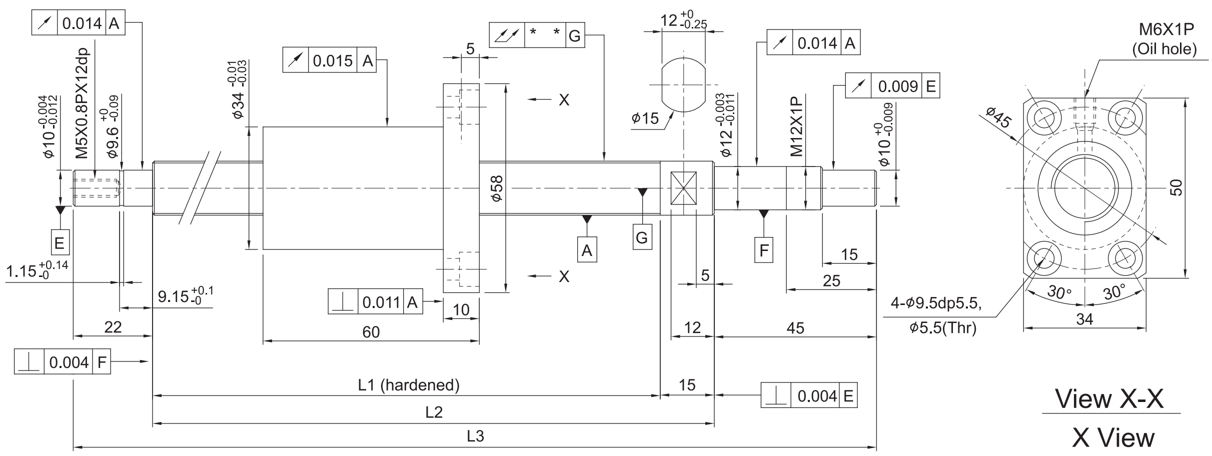


The center of the steel ball	15.5
Steel ball diameter(mm)	3.175
lead distance(mm)	10
Number of rolls	2.7x1
Lead angle	11.6°
helical direction	R
Spring force(kg)	0.1~0.3
Preload amount(kgf)	38
Dynamic loadC_a(kgf)	611
Static loadC_{oa}(kgf)	950
Precision (order)	0.018

Unit: mm

Itinerary(mm)	Nominal model	Screw shaft length(mm)			Axial wobble
		L1	L2	L3	⌰
100	WT-XSVR01510B1DGC5-271-P1	189	204	271	0.025
150	WT-XSVR01510B1DGC5-321-P1	239	254	321	0.035
200	WT-XSVR01510B1DGC5-371-P1	289	304	371	0.035
250	WT-XSVR01510B1DGC5-421-P1	339	354	421	0.040
300	WT-XSVR01510B1DGC5-471-P1	389	404	471	0.040
350	WT-XSVR01510B1DGC5-521-P1	439	454	521	0.050
400	WT-XSVR01510B1DGC5-571-P1	489	504	571	0.050
450	WT-XSVR01510B1DGC5-621-P1	539	554	621	0.050
500	WT-XSVR01510B1DGC5-671-P1	589	604	671	0.065
550	WT-XSVR01510B1DGC5-721-P1	639	654	721	0.065
600	WT-XSVR01510B1DGC5-771-P1	689	704	771	0.065
700	WT-XSVR01510B1DGC5-871-P1	789	804	871	0.085
800	WT-XSVR01510B1DGC5-971-P1	889	904	971	0.085

WT-XSVR01520-01 Precision Grinding Grade Series Specification and Dimension Table (Finished Grinding Grade Shaft End)

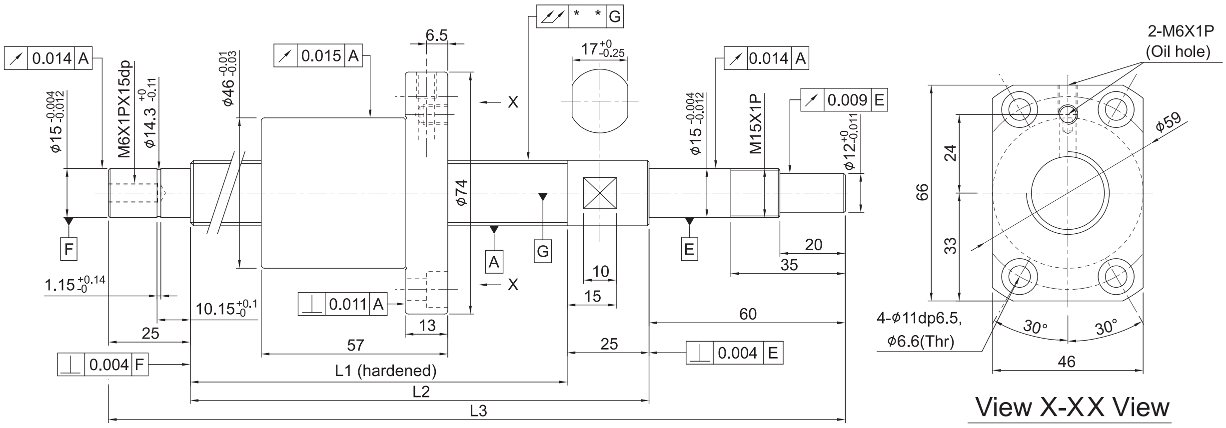


The center of the steel ball	15.5
Steel ball diameter(mm)	3.175
lead distance(mm)	20
Number of rolls	1.8x1
Lead angle	22.33°
helical direction	R
Spring force(kg)	0.1~0.3
Preload amount(kgf)	38
Dynamic loadC_a(kgf)	580
Static loadC_{oa}(kgf)	875
Precision (order)	0.018

Unit: mm

Itinerary(mm)	Nominal model	Screw shaft length(mm)			Axial wobble
		L1	L2	L3	⌰
100	WT-XSVR01520A1DGC5-271-P1	189	204	271	0.025
150	WT-XSVR01520A1DGC5-321-P1	239	254	321	0.035
200	WT-XSVR01520A1DGC5-371-P1	289	304	371	0.035
250	WT-XSVR01520A1DGC5-421-P1	339	354	421	0.040
300	WT-XSVR01520A1DGC5-471-P1	389	404	471	0.040
350	WT-XSVR01520A1DGC5-521-P1	439	454	521	0.050
400	WT-XSVR01520A1DGC5-571-P1	489	504	571	0.050
450	WT-XSVR01520A1DGC5-621-P1	539	554	621	0.050
500	WT-XSVR01520A1DGC5-671-P1	589	604	671	0.065
550	WT-XSVR01520A1DGC5-721-P1	639	654	721	0.065
600	WT-XSVR01520A1DGC5-771-P1	689	704	771	0.065
700	WT-XSVR01520A1DGC5-871-P1	789	804	871	0.085
800	WT-XSVR01520A1DGC5-971-P1	889	904	971	0.085

WT-XSVR02010-00 Precision Grinding Grade Series Specification and Dimension Table (Finished Grinding Grade Shaft End)



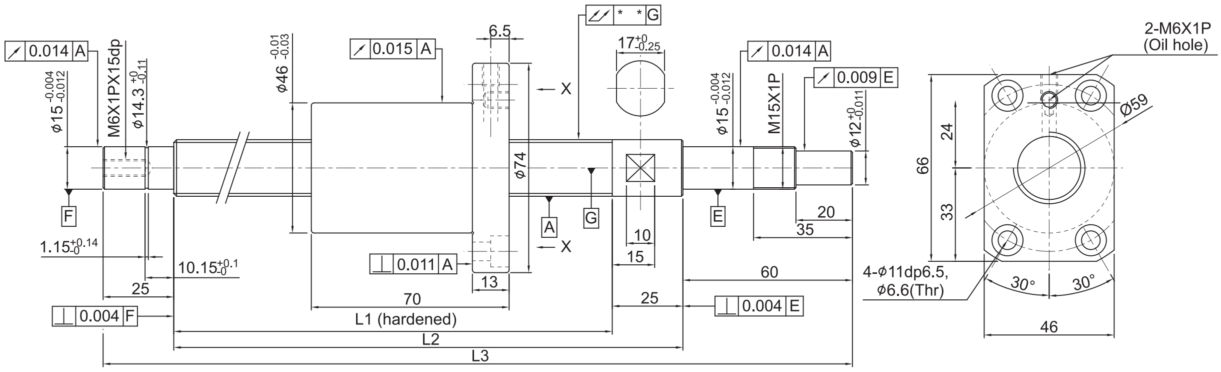
View X-XX View

The center of the steel ball	21.35
Steel ball diameter (mm))	3.969
lead distance(mm)	10
Number of rolls	2.7x1
Lead angle	8.48°
helical direction	R
Spring force(kg)	0.1~0.3
Preload amount(kgf)	43
Dynamic loadC_a(kgf)	977
Static loadC_{oa}(kgf)	1732
Precision (order)	0.018

Unit: mm

Itinerary(mm)	Nominal model	Screw shaft length(mm)			Axial wobble
		L1	L2	L3	⌰
200	WT-XSVR02010B1DGC5-399-P1	289	314	399	0.035
300	WT-XSVR02010B1DGC5-499-P1	389	414	499	0.040
400	WT-XSVR02010B1DGC5-599-P1	489	514	599	0.050
500	WT-XSVR02010B1DGC5-699-P1	589	614	699	0.065
600	WT-XSVR02010B1DGC5-799-P1	689	714	799	0.065
700	WT-XSVR02010B1DGC5-899-P1	789	814	899	0.085
800	WT-XSVR02010B1DGC5-999-P1	889	914	999	0.085
900	WT-XSVR02010B1DGC5-1099-P1	989	1014	1099	0.110
1000	WT-XSVR02010B1DGC5-1199-P1	1089	1114	1199	0.110

WT-XSVR02020-00 Precision Grinding Grade Series Specification and Dimension Table (Finished Grinding Grade Shaft End)



View X-XX View

The center of the steel ball	20.75
Steel ball diameter(mm)	3.175
lead distance(mm)	20
Number of rolls	1.8x1
Lead angle	17.05°
helical direction	R
Spring force(kg)	0.1~0.3
Preload amount(kgf)	31
Dynamic loadC_a(kgf)	649
Static loadC_{oa}(kgf)	1134
Precision (order)	0.018

Unit: mm

Itinerary(mm)	Nominal model	Screw shaft length(mm)			Axial wobble
		L1	L2	L3	⌰
200	WT-XSVR02020A1DGC5-399-P1	289	314	399	0.035
300	WT-XSVR02020A1DGC5-499-P1	389	414	499	0.040
400	WT-XSVR02020A1DGC5-599-P1	489	514	599	0.050
500	WT-XSVR02020A1DGC5-699-P1	589	614	699	0.065
600	WT-XSVR02020A1DGC5-799-P1	689	714	799	0.065
700	WT-XSVR02020A1DGC5-899-P1	789	814	899	0.085
800	WT-XSVR02020A1DGC5-999-P1	889	914	999	0.085
900	WT-XSVR02020A1DGC5-1099-P1	989	1014	1099	0.110
1000	WT-XSVR02020A1DGC5-1199-P1	1089	1114	1199	0.110

2-3Precision grade ball screw

2-3-1 Introduction to Recycled Grade Ball Screws

Rolled ball screws are produced by thread rolling, also known as rolled screws. Compared with the traditional Acme screw and square screw drive methods, rolled ball screws can improve smoothness of operation, reduce axial backlash and friction, etc. Compared with ground screws, rolled screws have the advantages of quick supply and affordable prices.

2-3-2 Features of Recycled Grade Ball Screws

(1)Reach C5 grade precision
The lead accuracy of the recast grade ball screw can reach C5 grade, and it has three standards: C5, C7, and C10.
(2)Equipped with high-precision nuts
The manufacturing process of the reconditioned grade nuts and the ground grade nuts is the same. Both are high-precision nuts with high smoothness and durability.
(3)Can be shipped separately.
The reconditioned grade nuts and screws can be shipped separately, which is more convenient for purchase. The standard for shipping the nuts is P0 preload. Customers can adjust the preload by replacing the steel balls according to their needs.

2-3-3 Nominal designation of recast grade ball screw

Reconditioned screw code

WSC	R	025	05	F	C7	-	1000	+	N3
①	②	③	④	⑤	⑥		⑦		⑧

①

Screw type
WSC：Standard type screw
WSS：Special-purpose screw

②

Thread direction
R：right
L：Left

③

Outer diameter of the screw shaft
Unit: mm

④

lead distance
Unit: mm

⑤

Process code
F：Remanufacture

⑥

Lead accuracy grade
C5,C7,C10

⑦

Screw shaft length
Unit: mm

⑧

Surface treatment of screw shaft
□：Standard
B1：Dye black
N1：Chromium plating
P：Phosphate
N3：Nickel plating
N4：Cold electroplating
N5：Black chrome plating

2-3-3 Nominal designation of recast grade ball screw

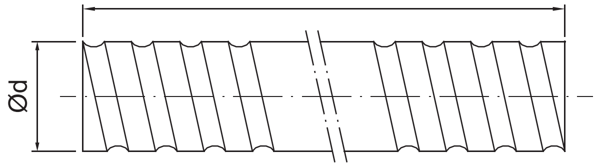


Figure 2.3.1 Schematic Diagram of the Screw

Table 2.3.1 Standard Dimension Specifications Comparison Table for Reconditioned Inventory Screws ϕ6~32 Unit: mm

Model number			Lead accuracy grade	Thread direction	Number of teeth	Standard type screw code	Applicable nut type	Reconditioned screw Maximum length
Outer diameter d	Lead-in l	Jewel Path Da		R: Right L: Left				
6	1	0.8	C10,C7	R	1	WSCR00601	K	1000
8	1	0.8	C10,C7,C5	R	1	WSCR00801	K	1000
	2	1.2	C10,C7,C5	R	1	WSCR00802	K	
	2.5	1.2	C10,C7,C5	R	1	WSCR0082.5	K,BSH	
10	2	1.2	C10,C7,C5	R	1	WSCR01002	K,BSH	3000
	4	2	C10,C7,C5	R	1	WSCR01004	K,BSH	
12	2	1.2	C10,C7,C5	R	1	WSCR01202	K	3000
	4	2.5	C10,C7,C5	R	1	WSCR01204	U,BSH	
	5	2.5	C10,C7,C5	R	1	WSCR01205-A	V,U,BSH,H,A	
	10	2.5	C10,C7,C5	R	2	WSCR01210-B	V	
14	2	1.2	C10,C7,C5	R	1	WSCR01402	K	1800
	4	2.5	C10,C7	R	1	WSCR01404	BSH	3000
16	4	2.381	C10,C7,C5	R	1	WSCR01604(N)	V,I,U,BSH	3000
	5	3.175	C10,C7,C5	R/L	1	WSCR01605	V,NI,NU,BSH	
	10	3.175	C10,C7,C5	R	2	WSCR01610	V,NI,NU,BSH	
	16	2.778	C10,C7,C5	R	4	WSCR01616	Y	
20	4	2.381	C10,C7,C5	R	1	WSCR02004(N)	V,I,U	3000
	5	3.175	C10,C7,C5	R	1	WSCR02005	V,NI,NU,BSH,H,A	
	20	3.175	C10,C7,C5	R	4	WSCR02020	V,Y,H,A	
25	4	2.381	C10,C7	R	1	WSCR02504(N)	I,U	6000
	5	3.175	C10,C7,C5	R/L	1	WSCR02505	V,NI,NU,BSH,H,A	
	10	4.762	C10,C7,C5	R	1	WSCR02510-A	NI,NU,BSH	
	10	6.35	C10,C7,C5	R	1	WSCR02510-B	V	
	25	3.969	C10,C7,C5	R	4	WSCR02525	Y	
32	4	2.381	C10,C7,C5	R	1	WSCR03204(N)	V,I,U	6000
	5	3.175	C10,C7,C5	R/L	1	WSCR03205	V,NI,NU,M,H,A	
	10	6.35	C10,C7,C5	R/L	1	WSCR03210	V,NI,NU	
	32	4.762	C10,C7	R	4	WSCR03232	Y	

2-3-3Nominal designation of recast grade ball screw

Table 2.3.2 Standard Dimension Specifications Comparison Table for Reconditioned Grade Screws∅40~80 Unit: mm

Model number			Lead accuracy grade	Thread direction	Number of teeth	Standard type screw code	Applicable nut type	Reconditioned screw Maximum length
Outer diameter d	Lead-in l	Jewel Path Da		R: Right L: Left				
40	5	3.175	C10,C7,C5	R/L	1	WSCR04005	V,NI,NU,H,A	6000
	10	6.35	C10,C7	R/L	1	WSCR04010	V,NI,NU	
	20	6.35	C10,C7	R	2	WSCR04020	V	
50	5	3.175	C10,C7,C5	R	1	WSCR05005	V,H,A	6000
	10	6.35	C10,C7,C5	R/L	1	WSCR05010	V,NI,NU	
63	10	6.35	C10,C7,C5	R	1	WSCR06310	V,NI,NU	7000
80	10	6.35	C10,C7,C5	R	1	WSCR08010	V,NI,NU	7000

Table 2.3.3 H/A Type Dimension Specifications Comparison Table∅16~50 Unit: mm

Model number			Lead accuracy grade	Thread direction	Number of teeth	Standard type screw code	Applicable nut type	Reconditioned screw Maximum length
Outer diameter d	Lead-in l	Jewel Path Da		R: Right L: Left				
12	10	2.5	C10,C7,C5	R	2	WSSR01210	H,A	3000
16	5	2.778	C10,C7,C5	R	1	WSSR01605	H,A	3000
	10	2.778	C10,C7,C5	R	2	WSSR01610	H,A	
	16	2.778	C10,C7,C5	R	4	WSSR01616	H,A	
	20	2.778	C10,C7,C5	R	4	WSSR01620	H,A	
20	10	3.175	C10,C7,C5	R	2	WSSR02010	H,A	3000
25	10	3.175	C10,C7,C5	R	2	WSSR02510	H,A	6000
	25	3.175	C10,C7	R	4	WSSR02525	H,A	
32	10	3.969	C10,C7,C5	R	1	WSSR03210	H,A	6000
	20	3.969	C10,C7	R	2	WSSR03220	H,A	
	32	3.969	C10,C7	R	4	WSSR03232	H,A	
40	10	6.35	C10,C7	R	1	WSSR04010	H,A	6000
	20	6.35	C10,C7,C5	R	2	WSSR04020	H,A	
50	10	6.35	C10,C7	R	1	WSSR05010	H,A	6000
	20	6.35	C10,C7	R	2	WSSR05020	H,A	

Note: The above is the standard specification. If you have any other requirements, please contact the business personnel for consultation.

2-3-4 Preload Specifications for Recycled Grade Ball Screws

The standard preload for the recirculating ball screw is P0. If you need P1 preload, please contact WODTOP business personnel.

Table 2.3.4 Precision Specifications for Reconditioned Screws Unit: μm

accuracy level	C5(DIN)	C7	C10
e300	23	50	210

2-4Reconditioned grade ball screw series

Reconditioned grade screw cap code

WG	SFU	R	025	05	T4	D	+	N3
①	②	③	④	⑤	⑥	⑦		⑧

①

Process code

②

Nominal model	
S	S：Single nut
	D：Double nuts
F	F：With flange
	C：Flangeless
U	NI：NI type nut
	NU：NU-type nut
	H：H-type nut
	A：Type A nut
	NH：NH type nut (Special for Sliding Table)
	Y：Y-type nut
	V：V-shaped nut
	U：DIN type nut
	M：M-type nut
	K：K-type nut

③

Thread direction
R: Right
L: Left

④

Outer diameter of the screw shaft
Unit: mm

⑤

lead distance
Unit: mm

⑥

Number of rolls (number of rolls × number of columns)
Volume number：T：1
A：1.5(or1.7/1.8)
B：2.5/2.8
C：3.5
D：4.8
Example：(2.5x2=B2)

⑦

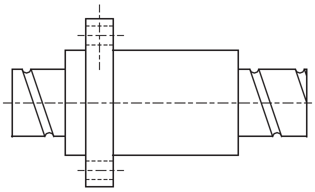
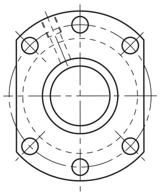
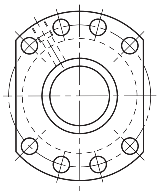
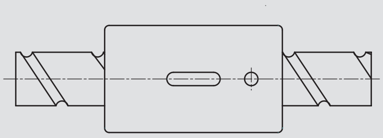
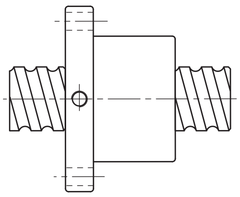
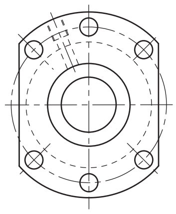
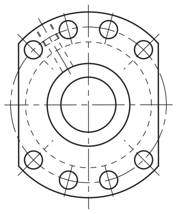
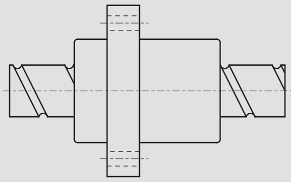
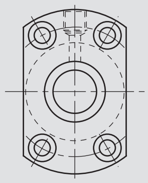
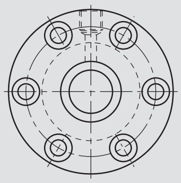
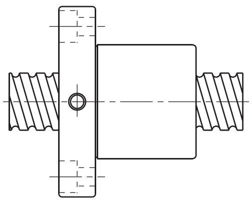
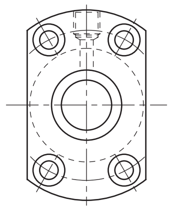
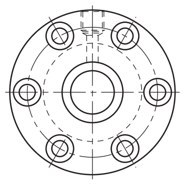
Flange type
N：No trimming
S：Single edge trimming
D：Double edge trimming

⑧

Surface treatment of nuts
S：Standard
B1：Dye black
N1：Chromium plating
P：Phosphate
N3：Nickel plating
N4：Cold electroplating
N5：Black chrome plating

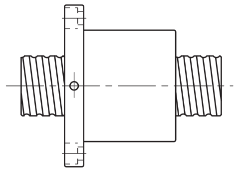
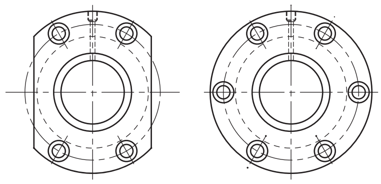
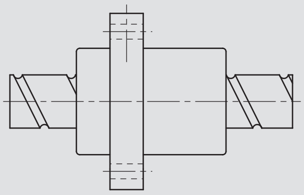
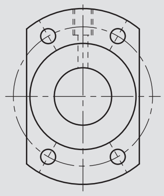
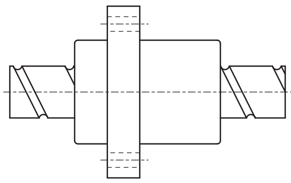
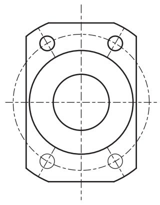
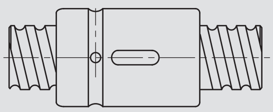
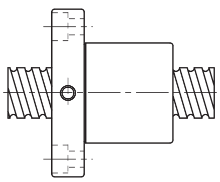
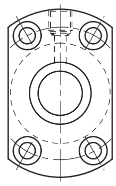
2-4Reconditioned grade ball screw series

2-4-1 Reformed grade nut type

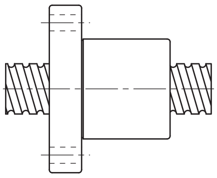
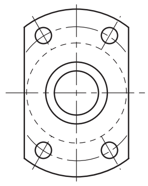
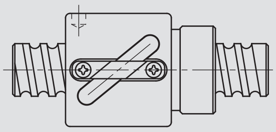
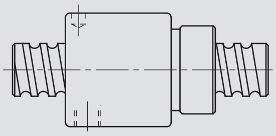
Reformed grade nut type		Flange type
NH/H/A (Slide table dedicated type / High-speed reinforced anti -collision type)	WSFNH/WSFH/WSFA(DIN)  C69	 d≤32  d≥40
CNH (Specialized for Sliding Tables)	WSCNH  C70	Flangeless
NU/U (Reinforced anti -collision type)	WSFNU/WSFU(DIN)  C71	 d≤32  d≥40
NI/I (Reinforced Protective Type)	WSFNI/WSFI  C72	 
M (Special for milling machines)	WSFM  C72	 

Ball screw

2-4-1 Reformed grade nut type

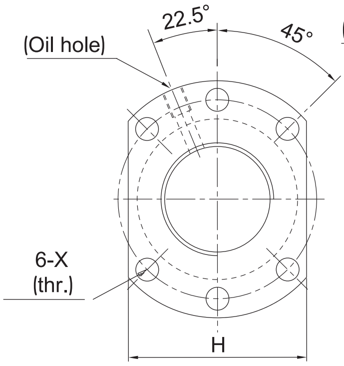
	Reformed grade nut type	Flange type
V(Heavy-duty external circulation type)	WSFV  C73	
Y(high Dm-N value)	WSFY  C74	
XSY (Micro-miniature)	WXSY  C75	
CNI/I (Standard Type)	WSCNI/WSCI  C76	Flangeless
K(Micro-miniature)	WFSK  C77	 (WSFK 01004) (WSFK 02002) (WSFK 02502)

2-4-1 Reformed grade nut type

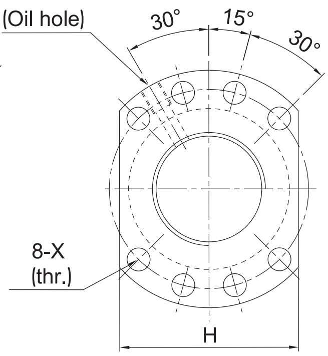
Reformed grade nut type		Flange type
K(Micro-miniature)	WSFK  C77	
BSH	WBSH  d≤12  d≥14 C78	Flangeless

Note: The above is the standard specification. If you have any other requirements, please contact the business personnel for consultation.

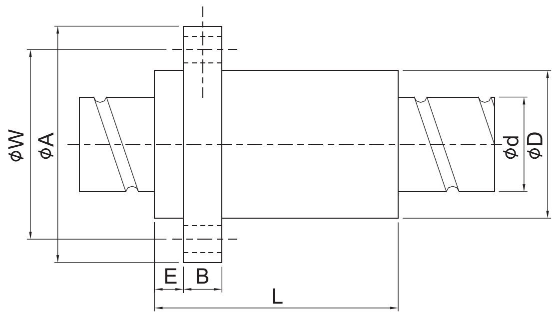
WSFNH/WSFH (DIN 69051 FORM B)
Reconditioned Series Specifications and Dimensions Table



d≤32



d≥40

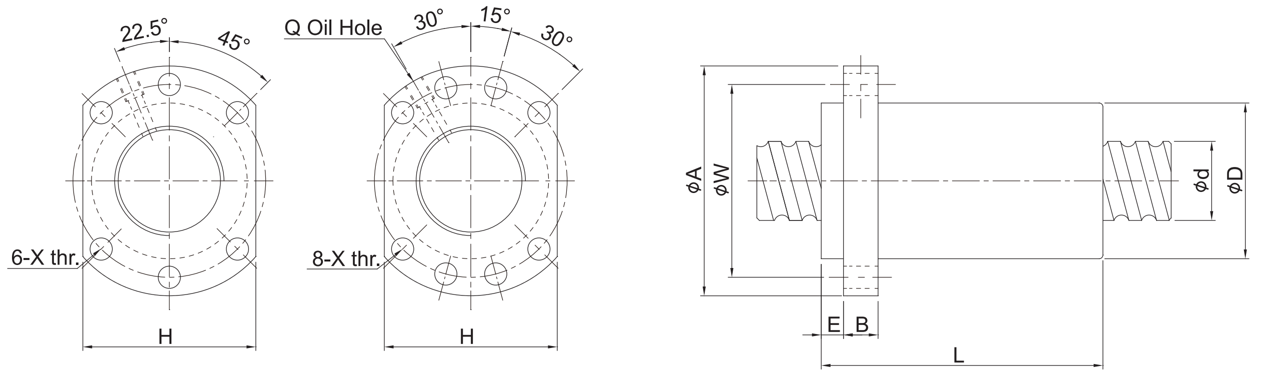


Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size D	A	E	B	L	W	H	X	Q	n	Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
WSFH01205-2.8★	12	5	2.5	24	40	5	10	30	32	30	4.5		2.8x1	661	1316	19
WSFH01210-2.8★		10	2.5	24	40	5	10	45	32	30	4.5		2.8x1	642	1287	19
WSFH01605-3.8★	15	5	2.778	28	48	5	10	37	38	40	5.5	M6	3.8x1	1112	2507	30
WSFH01610-2.8★		10	2.778	28	48	5	10	45	38	40	5.5	M6	2.8x1	839	1821	23
WSFH01616-1.8★		16	2.778	28	48	5	10	45	38	40	5.5	M6	1.8x1	552	1137	14
WSFH01616-2.8★		16	2.778	28	48	5	10	61	38	40	5.5	M6	2.8x1	808	1769	22
WSFH01620-1.8★		20	2.778	28	48	7	10	58	38	40	5.5	M6	1.8x1	554	1170	14
WSFH02005-3.8★	20	5	3.175	36	58	7	10	37	47	44	6.6	M6	3.8x1	1484	3681	37
WSFH02010-3.8★		10	3.175	36	58	7	10	55	47	44	6.6	M6	3.8x1	1516	3833	40
WSFH02020-1.8★		20	3.175	36	58	7	10	54	47	44	6.6	M6	1.8x1	764	1758	19
WSFH02020-2.8★		20	3.175	36	58	7	10	74	47	44	6.6	M6	2.8x1	1118	2734	29
WSFH02505-3.8★	25	5	3.175	40	62	7	10	37	51	48	6.6	M6	3.8x1	1650	4658	43
WSFH02510-3.8★		10	3.175	40	62	7	12	55	51	48	6.6	M6	3.8x1	1638	4633	45
WSFH02525-1.8★		25	3.175	40	62	7	12	64	51	48	6.6	M6	1.8x1	843	2199	22
WSFH02525-2.8★		25	3.175	40	62	7	12	89	51	48	6.6	M6	2.8x1	1232	3421	34
WSFH03205-3.8	32	5	3.175	50	80	9	12	37	65	62	9	M6	3.8x1	1839	6026	51
WSFH03210-3.8	31	10	3.969	50	80	9	12	57	65	62	9	M6	3.8x1	2460	7255	55
WSFH03220-2.8		20	3.969	50	80	9	12	76	65	62	9	M6	2.8x1	1907	5482	43
WSFH03232-1.8		32	3.969	50	80	9	12	80	65	62	9	M6	1.8x1	1257	3426	27
WSFH03232-2.8		32	3.969	50	80	9	12	112	65	62	9	M6	2.8x1	1838	5329	42
WSFH04005-3.8	40	5	3.175	63	93	9	15	42	78	70	9	M8	3.8x1	2018	7589	60
WSFH04010-3.8	38	10	6.35	63	93	9	14	60	78	70	9	M8	3.8x1	5035	13943	67
WSFH04020-2.8		20	6.35	63	93	9	14	80	78	70	9	M8	2.8x1	3959	10715	54
WSFH05005-3.8	50	5	3.175	75	110	10.5	15	42	93	85	11	M8	3.8x1	2207	9542	68
WSFH05010-3.8	48	10	6.35	75	110	10.5	18	60	93	85	11	M8	3.8x1	5638	17852	79
WSFH05020-3.8		20	6.35	75	110	10.5	18	100	93	85	11	M8	3.8x1	5749	18485	87

Note: Those marked with ★ can be made into special specifications for WSFNH linear guides.。

WSFA Transformed Grade Series Specifications and Dimensions Table

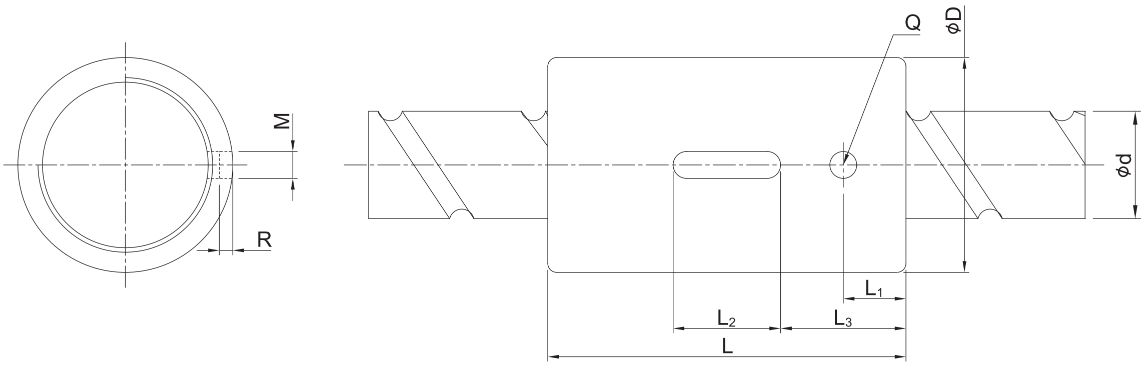


d≦32 d≧40

Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size										Rated load of ball nut		rigidity kgf/μm
				D	A	E	B	L	W	H	X	Q	n	C_a(kgf)	C_{oa}(kgf)	
WSFA1205-2.8	12	5	2.5	24	40	5	10	30	32	30	4.5		2.8x1	661	1316	19
WSFA1210-2.8		10	2.5	24	40	5	10	42	32	30	4.5		2.8x1	642	1287	19
WSFA1605-3.8	15	5	2.778	28	48	5	10	31	38	40	5.5	M6	3.8x1	1112	2507	30
WSFA1610-2.8		10	2.778	28	48	5	10	42	38	40	5.5	M6	2.8x1	839	1821	23
WSFA1616-1.8		16	2.778	28	48	5	10	43	38	40	5.5	M6	1.8x1	552	1137	14
WSFA1616-2.8		16	2.778	28	48	5	10	59	38	40	5.5	M6	2.8x1	808	1769	22
WSFA1620-1.8		20	2.778	28	48	5	10	50	38	40	5.5	M6	1.8x1	554	1170	14
WSFA1630-1.8		30	2.778	28	48	7	10	70	38	40	5.5	M6	1.8x1	534	1195	14
WSFA2005-3.8	20	5	3.175	36	58	7	10	33	47	44	6.6	M6	3.8x1	1484	3681	37
WSFA2010-1.8		10	3.175	36	58	7	10	52	47	44	6.6	M6	3.8x1	1516	3833	40
WSFA2020-1.8		20	3.175	36	58	7	10	52	47	44	6.6	M6	1.8x1	764	1758	19
WSFA2020-2.8		20	3.175	36	58	7	10	72	47	44	6.6	M6	2.8x1	1118	2734	29
WSFA2505-3.8	25	5	3.175	40	62	7	10	33	51	48	6.6	M6	3.8x1	1650	4658	43
WSFA2510-3.8		10	3.175	40	62	7	12	52	51	48	6.6	M6	3.8x1	1638	4633	45
WSFA2525-1.8		25	3.175	40	62	7	12	60	51	48	6.6	M6	1.8x1	843	2199	22
WSFA2525-2.8		25	3.175	40	62	7	12	85	51	48	6.6	M6	2.8x1	1232	3421	34
WSFA3205-3.8	32	5	3.175	50	80	9	12	35	65	62	9	M6	3.8x1	1839	6026	51
WSFA3210-3.8	31	10	3.969	50	80	9	12	53	65	62	9	M6	3.8x1	2460	7255	55
WSFA3220-2.8		20	3.969	50	80	9	12	72	65	62	9	M6	2.8x1	1907	5482	43
WSFA3232-1.8		32	3.969	50	80	9	12	78	65	62	9	M6	1.8x1	1257	3426	27
WSFA3232-2.8		32	3.969	50	80	9	12	110	65	62	9	M6	2.8x1	1838	5329	42
WSFA4005-3.8	40	5	3.175	63	93	9	14	39	78	70	9	M8	3.8x1	2018	7589	60
WSFA4010-3.8	38	10	6.35	63	93	9	14	57	78	70	9	M8	3.8x1	5035	13943	67
WSFA4020-2.8		20	6.35	63	93	9	14	78	78	70	9	M8	2.8x1	3959	10715	54
WSFA5005-3.8	50	5	3.175	75	110	10.5	15	42	93	85	11	M8	3.8x1	2207	9542	68
WSFA5010-3.8	48	10	6.35	75	110	10.5	18	57	93	85	11	M8	3.8x1	5638	17852	79
WSFA5020-3.8		20	6.35	75	110	10.5	18	98	93	85	11	M8	3.8x1	5749	18485	87

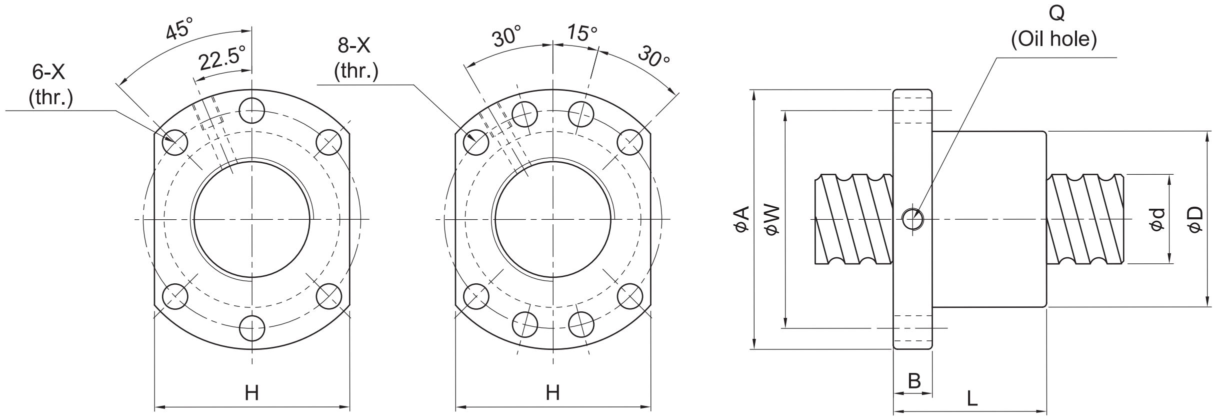
Specification and Dimension Table of WSCNH Reproduction Grade Series



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size									Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	L	L_1	L_2	L_3	M	R	Q	n			
WSCNH01205-4.8	12	5	2.5	24	40	7	12	14	3	1.5	3	4.8x1	1051	2255	34
WSCNH01210-2.8		10	2.5	24	45	8	15	15	3	1.5	3	2.8x1	642	1287	19
WSCNH01210-1.8		10	2.5	24	40	10.5	12	14	3	1.5	3	1.8x1	439	827	33
WSCNH01605-5.8	15	5	2.778	28	45	7	20	12.5	5	3	3	5.8x1	1599	3827	49
WSCNH01610-2.8		10	2.778	28	45	7	20	12.5	5	3	3	2.8x1	839	1821	23
WSCNH01616-1.8		16	2.778	28	45	7	20	12.5	5	3	3	1.8x1	552	1137	18
WSCNH01620-1.8		20	2.778	28	58	10	20	19	5	3	3	1.8x1	554	1170	14
WSCNH02005-5.8	20	5	3.175	36	47	8	20	13.5	5	3	3	5.8x1	2134	5619	60
WSCNH02010-3.8		10	3.175	36	55	8	20	17.5	5	3	3	3.8x1	1516	3833	40
WSCNH02020-1.8		20	3.175	36	55	8	20	17.5	5	3	3	1.8x1	764	1758	19

WSFNU/WSFU (DIN 69051 FORM B)
Reconditioned Series Specifications and Dimensions Table



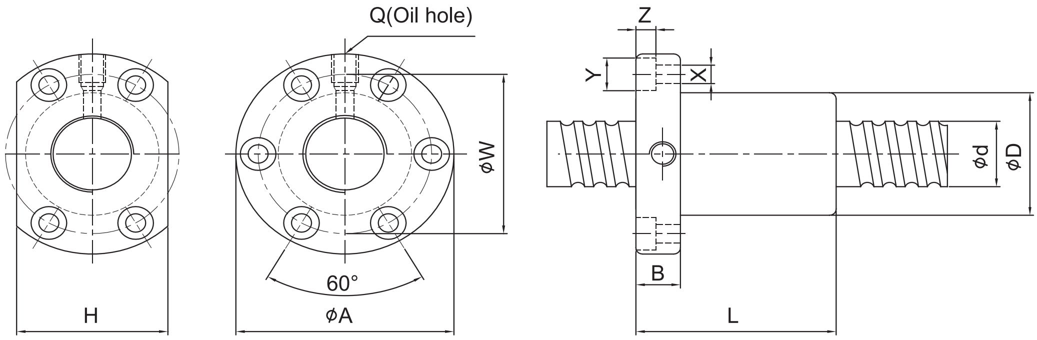
d≤32 d≥40

Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size									Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Q	n			
WSFNU01605-4*	16	5	3.175	28	48	10	45	38	40	5.5	M6	1x4	1380	3052	32
WSFNU01610-3*		10	3.175	28	48	10	57	38	40	5.5	M6	1x3	1103	2401	26
WSFNU02005-4*	20	5	3.175	36	58	10	51	47	44	6.6	M6	1x4	1551	3875	39
WSFNU02505-4*	25	5	3.175	40	62	10	51	51	48	6.6	M6	1x4	1724	4904	45
WSFNU02510-4*		10	4.762	40	62	12	80	51	48	6.6	M6	1x4	2954	7295	50
WSFNU03205-4*	32	5	3.175	50	80	12	52	65	62	9	M6	1x4	1922	6343	54
WSFNU03210-4*		10	6.35	50	80	12	85	65	62	9	M6	1x4	4805	12208	61
WSFNU04005-4*	40	5	3.175	63	93	14	55	78	70	9	M8	1x4	2110	7988	63
WSFNU04010-4*		10	6.35	63	93	14	88	78	70	9	M8	1x4	5399	15500	73
WSFNU05010-4*	50	10	6.35	75	110	16	88	93	85	11	M8	1x4	6004	19614	85
WSFNU06310-4	63	10	6.35	90	125	18	93	108	95	11	M8	1x4	6719	25358	99
WSFNU08010-4	80	10	6.35	105	145	20	93	125	110	13.5	M8	1x4	7346	31953	109
WSFU01204-4	12	4	2.5	24	40	10	40	32	30	4.5		1x4	902	1884	26
WSFU01604-4	16	4	2.381	28	48	10	40	38	40	5.5	M6	1x4	973	2406	32
WSFU02004-4	20	4	2.381	36	58	10	42	47	44	6.6	M6	1x4	1066	2987	38
WSFU02504-4	25	4	2.381	40	62	10	42	51	48	6.6	M6	1x4	1180	3795	43
WSFU02506-4		6	3.969	40	62	10	54	51	48	6.6	M6	1x4	2318	6057	47
WSFU02508-4		8	4.762	40	62	10	63	51	48	6.6	M6	1x4	2963	7313	49
WSFU03204-4	32	4	2.381	50	80	12	44	65	62	9	M6	1x4	1296	4838	51
WSFU03206-4		6	3.969	50	80	12	57	65	62	9	M6	1x4	2632	7979	57
WSFU03208-4		8	4.762	50	80	12	65	65	62	9	M6	1x4	3387	9622	60
WSFU04006-4	40	6	3.969	63	93	14	60	78	70	9	M6	1x4	2873	9913	66
WSFU04008-4		8	4.762	63	93	14	67	78	70	9	M6	1x4	3712	11947	70
WSFU05020-4	50	20	7.144	75	110	16	138	93	85	11	M8	1x4	7142	22588	94

Note: Those marked with ★ can be made with left-hand threads.

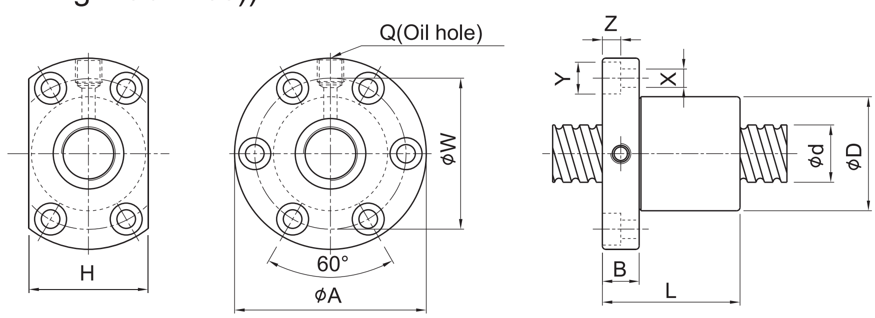
WSFNI/WSFI Reconditioned Series Specifications and Dimensions Table



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFNI01605-4*	16	5	3.175	30	49	10	45	39	34	4.5	8	4.5	M6	1x4	1380	3052	33
WSFNI01610-3*		10	3.175	34	58	10	57	45	34	5.5	9.5	5.5	M6	1x3	1103	2401	27
WSFNI02005-4*	20	5	3.175	34	57	11	51	45	40	5.5	9.5	5.5	M6	1x4	1551	3875	39
WSFNI02505-4*	25	5	3.175	40	63	11	51	51	46	5.5	9.5	5.5	M8	1x4	1724	4904	45
WSFNI2510-4*		10	4.762	46	72	12	80	58	52	6.5	11	6.5	M6	1x4	2954	7295	51
WSFNI03205-4*	32	5	3.175	46	72	12	52	58	52	6.5	11	6.5	M8	1x4	1922	6343	52
WSFNI03210-4*		10	6.35	54	88	15	85	70	62	9	14	8.5	M8	1x4	4805	12208	62
WSFNI04005-4*	40	5	3.175	56	90	15	55	72	64	9	14	8.5	M8	1x4	2110	7988	59
WSFNI04010-4*		10	6.35	62	104	18	88	82	70	11	17.5	11	M8	1x4	5399	15500	72
WSFNI05010-4*	50	10	6.35	72	114	18	88	92	82	11	17.5	11	M8	1x4	6004	19614	83
WSFNI06310-4	63	10	6.35	85	131	22	93	107	95	14	20	13	M8	1x4	6719	25358	95
WSFNI08010-4	80	10	6.35	105	150	22	93	127	115	14	20	13	M8	1x4	7346	31953	109
WSFI01604-4	16	4	2.381	30	49	10	45	39	34	4.5	8	4.5	M6	1x4	973	2406	32
WSFI02004-4	20	4	2.381	34	57	11	46	45	40	5.5	9.5	5.5	M6	1x4	1066	2987	37
WSFI0205T-4		5.08	3.175	34	57	11	51	45	40	5.5	9.5	5.5	M6	1x4	1550	3875	39
WSFI02504-4*	25	4	2.381	40	63	11	46	51	46	5.5	9.5	5.5	M6	1x4	1180	3795	43
WSFI03204-4	32	4	2.381	46	72	12	47	58	52	6.5	11	6.5	M6	1x4	1296	4838	49

WSFM Reconditioned Series Specifications and Dimensions Table (Special for Milling Machines))

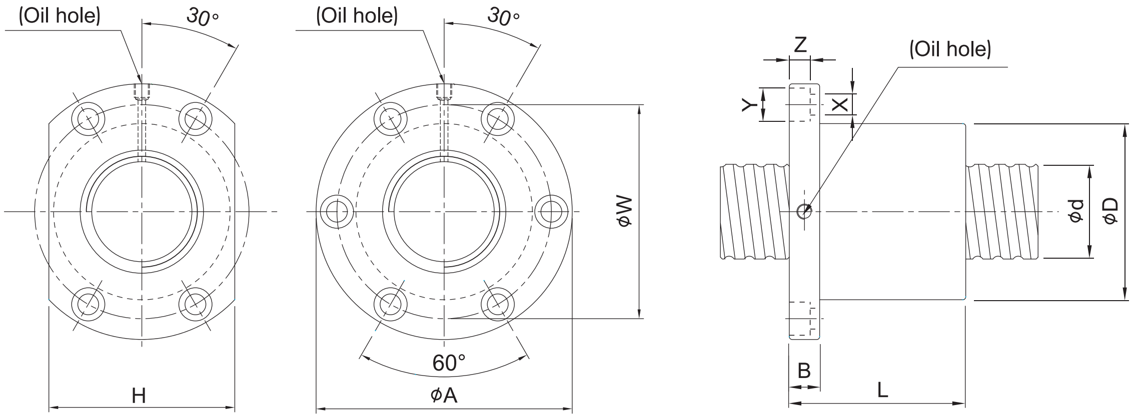


Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFM03205-4*	32	5	3.175	48	74	12	52	60	60	6.5	11	6.5	M8	1x4	1922	6343	53
WSFM0325T-4*		5.08	3.175	48	74	12	53	60	60	6.5	11	6.5	M8	1x4	1922	6343	53

Note: Those marked with ★ can be made with left-hand threads.。

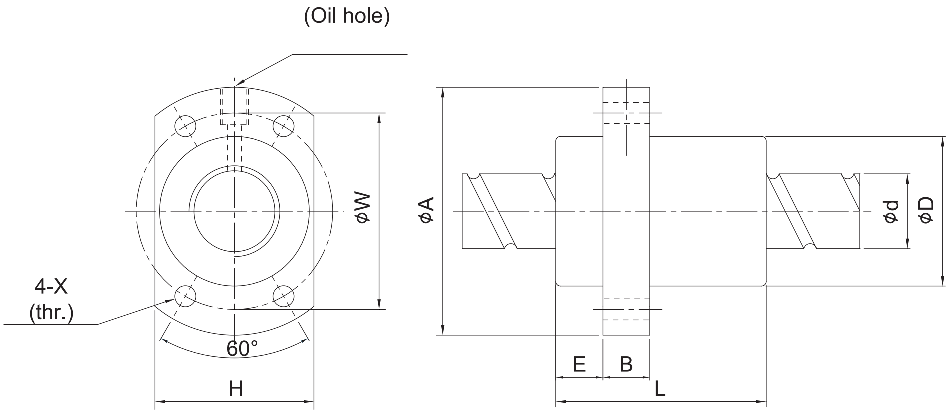
WSFV Reproduction Grade Series Specifications and Dimensions Table



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFV01205-2.8	12	5	2.5	30	50	10	42	40	32	4.5	8	4.5	M6	2.8x1	661	1316	19
WSFV01210-2.7		10	2.5	30	50	10	53	40	32	4.5	8	4.5	M6	2.7x1	623	1241	18
WSFV01604-3.8	16	4	2.381	34	57	11	45	45	34	5.5	9.5	5.5	M6	3.8x1	931	2285	31
WSFV01605-4.8		5	3.175	40	63	11	58	51	42	5.5	9.5	5.5	M6	4.8x1	1614	3662	40
WSFV01610-2.7		10	3.175	40	63	11	56	51	42	5.5	9.5	5.5	M6	2.7x1	1008	2161	24
WSFV02004-4.8	20	4	2.381	40	60	10	50	50	40	4.5	8	4	M6	4.8x1	1247	3584	45
WSFV02005-4.8		5	3.175	44	67	11	57	55	52	5.5	9.5	5.5	M6	4.8x1	1814	4650	47
WSFV02020-1.8		20	3.175	46	74	13	70	59	46	6.6	11	6.5	M6	1.8x1	764	1758	19
WSFV02505-4.8	25	5	3.175	50	73	11	55	61	52	5.5	9.5	5.5	M8	4.8x1	2017	5884	56
WSFV02525-1.8		25	3.175	50	73	13	83	61	52	5.5	9.5	5.5	M8	1.8x1	843	2199	22
WSFV03204-4.8	32	4	2.381	54	81	12	50	67	64	6.6	11	6.5	M6	4.8x1	1517	5806	62
WSFV03205-4.8		5	3.175	58	85	12	56	71	64	6.6	11	6.5	M8	4.8x1	2249	7612	66
WSFV03210-4.8		10	6.35	74	108	15	96	90	82	9	14	9	M8	4.8x1	5620	14649	76
WSFV04005-4.8	40	5	3.175	67	101	15	59	83	72	9	14	8.5	M8	4.8x1	2468	9586	76
WSFV04010-4.8		10	6.35	82	124	18	100	102	94	11	17.5	11	M8	4.8x1	6316	18600	90
WSFV04020-2.7		20	6.35	82	124	18	100	102	90	11	17.5	11	M8	2.7x1	3935	10893	56
WSFV05005-4.8	50	5	3.175	80	114	15	60	96	82	9	14	8.5	M8	4.8x1	2698	12053	87
WSFV05010-4.8		10	6.35	93	135	16	93	113	98	11	17.5	11	M6	4.8x1	7023	23537	106
WSFV06310-4.8	63	10	6.35	108	154	22	105	130	110	14	20	13	M8	4.8x1	7860	30430	126
WSFV08010-4.8	80	10	6.35	130	176	22	105	152	132	14	20	13	M8	4.8x1	8593	38344	145

WSFY Transformed Grade Series Specifications and Dimensions Table



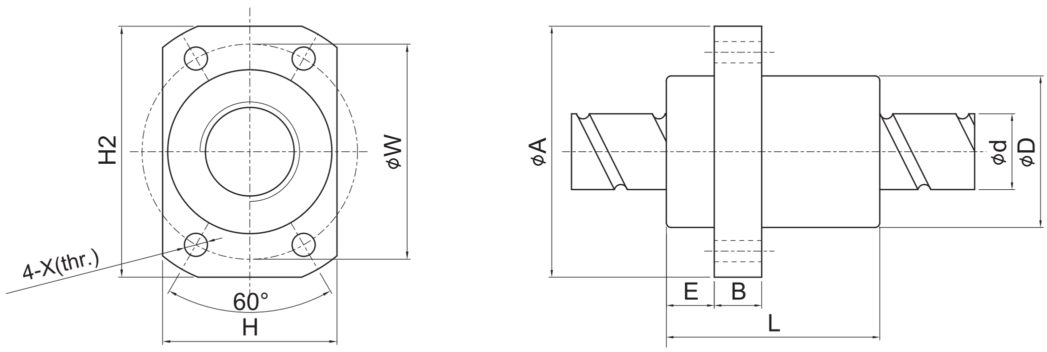
Unit: mm

One lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size										Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	E	B	L	W	H	X	Q	n			
WSFY01616-3.6	16	16	2.778	32	53	10.1	10	45	42	34	4.5	M6	1.8x2	1073	2551	31
WSFY02020-3.6	20	20	3.175	39	62	13	10	52	50	41	5.5	M6	1.8x2	1387	3515	37
WSFY02525-3.6	25	25	3.969	47	74	15	12	64	60	49	6.6	M6	1.8x2	2074	5494	45
WSFY03232-3.6	32	32	4.762	58	92	17	12	78	74	60	9	M6	1.8x2	3021	8690	58

Unit: mm

Double lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size										Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	E	B	L	W	H	X	Q	n			
WSFY01632-1.6	16	32	2.778	32	53	10.1	10	42.5	42	34	4.5	M6	0.8x2	493	1116	11
WSFY02040-1.6	20	40	3.175	39	62	13	10	48	50	41	5.5	M6	0.8x2	653	1597	15
WSFY02550-1.6	25	50	3.969	47	74	15	12	58	60	49	6.6	M6	0.8x2	976	2495	19
WSFY03264-1.6	32	64	4.762	58	92	17	12	71	74	60	9	M6	0.8x2	1374	3571	22
WSFY04080-1.6	40	80	6.35	73	114	19.5	15	90	93	75	11	M6	0.8x2	2273	6387	29

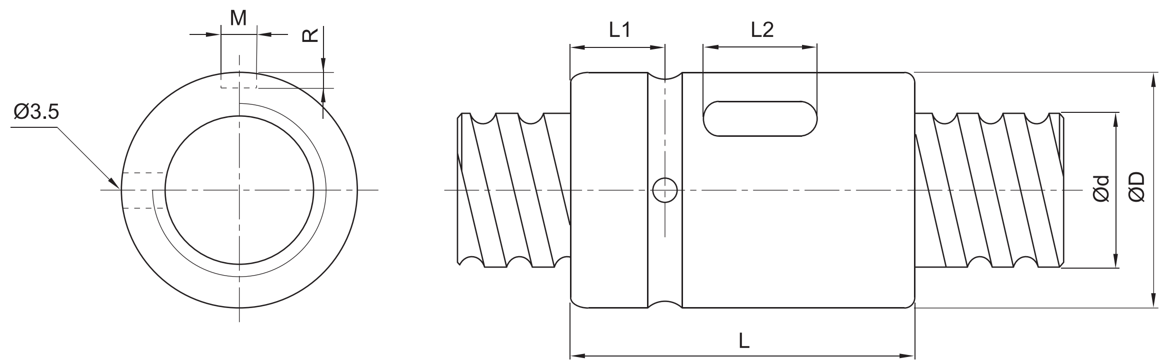
WXSY Transformed Grade Series Specifications and Dimensions Table



Unit: mm

One lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size										Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	E	B	L	W	H	H_2	X	n			
WXSYR01220A2D-00	12	20	2.5	24	41	3.8	5	50	32	24	36	4.5	1.8x2	777	1718	13

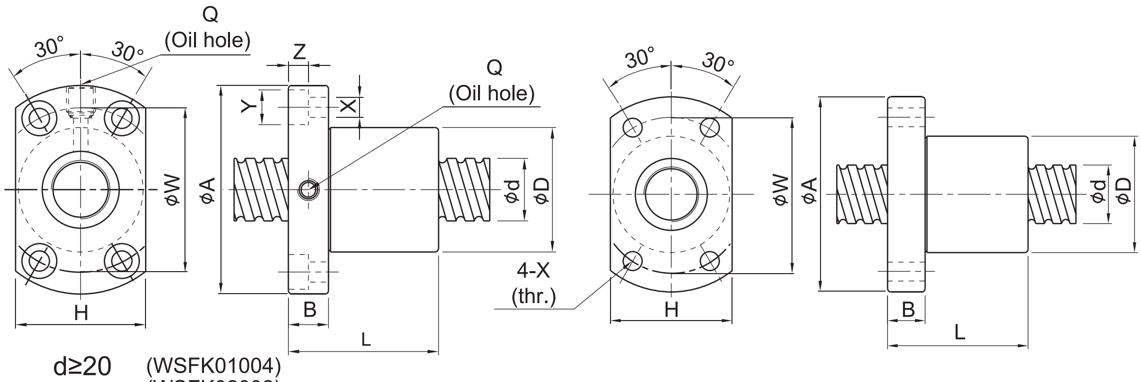
Specification and Dimension Table of WSCNI/WCSI Remanufactured Series



Unit: mm

Model number	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size							Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	L	L1	L2	M	R	n			
WSCNI01605-4	16	5	3.175	30	45	9	20	5	3	1x4	1380	3052	33
WSCNI02005-4	20	5	3.175	34	45	9	20	5	3	1x4	1551	3875	39
WSCNI02505-4	25	5	3.175	40	45	9	20	5	3	1x4	1724	4904	45
WSCNI02510-4		10	4.762	46	85	13	30	5	3	1x4	2954	7295	51
WSCNI03205-4	32	5	3.175	46	45	9	20	5	3	1x4	1922	6343	52
WSCNI03210-4		10	6.35	54	85	13	30	5	3	1x4	4805	12208	62
WSCNI04005-4	40	5	3.175	56	45	9	20	5	3	1x4	2110	7988	59
WSCNI04010-4		10	6.35	62	85	13	30	5	3	1x4	5399	15500	72
WSCNI05010-4	50	10	6.35	72	85	13	30	5	3	1x4	6004	19614	83
WSCNI06310-4	63	10	6.35	85	85	13	30	6	3.5	1x4	6719	25358	95
WSCNI08010-4	80	10	6.35	105	85	13	30	8	4.5	1x4	7346	31953	109
WSCI01604-4	16	4	2.381	30	40	9	15	3	1.5	1x4	973	2406	32
WSCI02004-4	20	4	2.381	34	40	9	15	3	1.5	1x4	1066	2987	37
WSCI02504-4	25	4	2.381	40	40	9	15	3	1.5	1x4	1180	3795	43
WSCI03204-4	32	4	2.381	46	40	9	15	3	1.5	1x4	1296	4838	49

WSFK Reproduction Grade Series Specifications and Dimensions Table



d≥20 (WSFK01004)
(WSFK02002)
(WSFK02502)

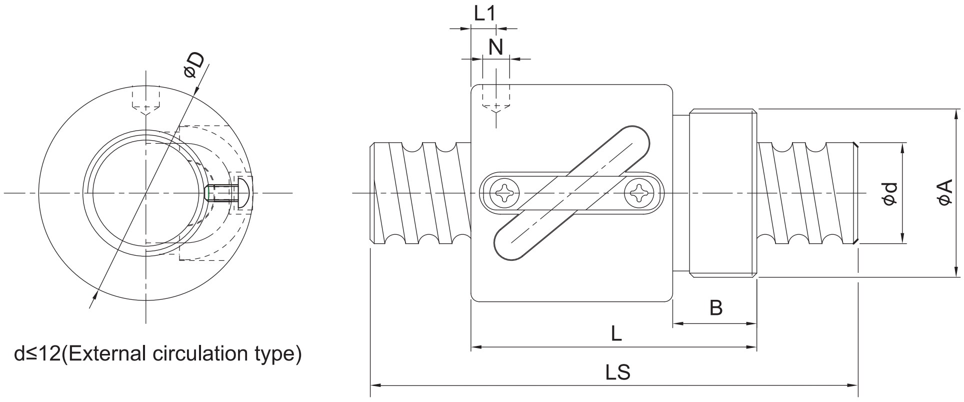
Unit: mm

Double lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WSFK00601	6	1	0.8	12	24	3.5	15	18	16	3.4	-	-	-	1x3	111	224	9
WSFK00801	8	1	0.8	14	27	4	16	21	18	3.4	-	-	-	1x4	161	403	14
WSFK00802		2	1.2	14	27	4	16	21	18	3.4	-	-	-	1x3	222	458	13
WSFK0082.5		2.5	1.2	16	29	4	26	23	20	3.4	-	-	-	1x3	221	457	13
WSFK01002	10	2	1.2	18	35	5	28	27	22	4.5	-	-	-	1x3	243	569	15
WSFK01004		4	2	26	46	10	34	36	28	4.5	8	4.5	M6	1x3	468	905	17
WSFK01202	12	2	1.2	20	37	5	28	29	24	4.5	-	-	-	1x4	334	906	22
WSFK01402	14	2	1.2	21	40	6	23	31	26	5.5	-	-	-	1x4	354	1053	24

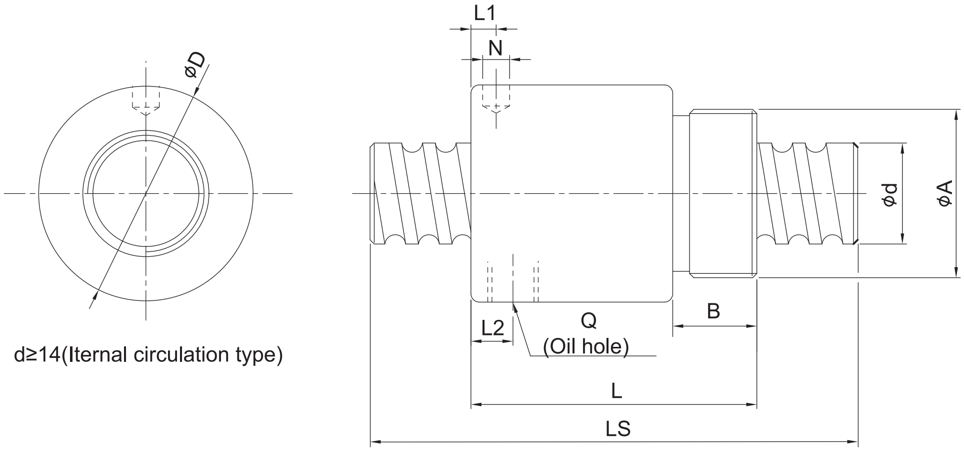
Unit: mm

Double lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size											Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	W	H	X	Y	Z	Q	n			
WXSUR01204T3D-02	12	4	2.5	24	40	6	28	32	25	3.5	-	-	-	1x3	704	1413	-
WXSUR01205T3D-00		5	2.5	22	37	8	39	29	24	4.5	-	-	-	1x3	702	1409	17

WBSH Transformed Grade Series Specifications and Dimensions Table



d≤12(External circulation type)



d≥14(Iternal circulation type)

Unit: mm

Double lead Nominal model	shaft diameter d	lead screw pitch l	Pearl Path Da	Nut size									Rated load of movement Ca	Static rated load Coa	rigidity kgf/μm
				D	A	B	L	L1	N	L2	Q	n			
WBSHR0082.5-2.5	8	2.5	1.2	17.5	M15x1P	7.5	23.5	10	3	-	-	2.5x1	189	381	11
WBSHR01002-3.5	10	2	1.2	19.5	M17x1P	7.5	22	3	3.2	-	-	3.5x1	277	664	17
WBSHR01004-2.5		4	2	25	M20x1P	10	34	3	3	-	-	2.5x1	400	754	14
WBSHR01204-3.5	12	4	2.5	25.5	M20x1P	10	34	13	3	-	-	3.5x1	804	1649	23
WBSHR01205-3.5		5	2.5	25.5	M20x1P	10	39	16.25	3	-	-	3.5x1	801	1644	24
WBSHR01404-3	14	4	2.5	32.1	M25x1.5P	10	35	11	3	-	-	1x3	748	1609	26
WBSHR01604-3	16	4	2.381	29	M22x1.5P	8	32	4	3.2	-	-	1x3	759	1804	24
WBSHR01605-3		5	3.175	32.5	M26x1.5P	12	42	19.25	3	-	-	1x3	1077	2289	25
WBSHR01610-2		10	3.175	32	M26x1.5P	12	50	3	4	3	M4	1x2	779	1601	14
WBSHR02005-3	20	5	3.175	38	M35x1.5P	15	45	20.3	3	-	-	1x3	1211	2906	30
WBSHR02505-4	25	5	3.175	43	M40x1.5P	19	69	32.11	3	8	M6	1x4	1724	4904	37
WBSHR02510-4		10	4.762	43	M40x1.5P	19	84	8	6	8	M6	1x4	2954	7295	41

Note: Standard nuts with outer diameters of ϕ8 to ϕ16 do not come with attached scraper brushes.

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Specifications are subject to change without prior notice.

Distributor：