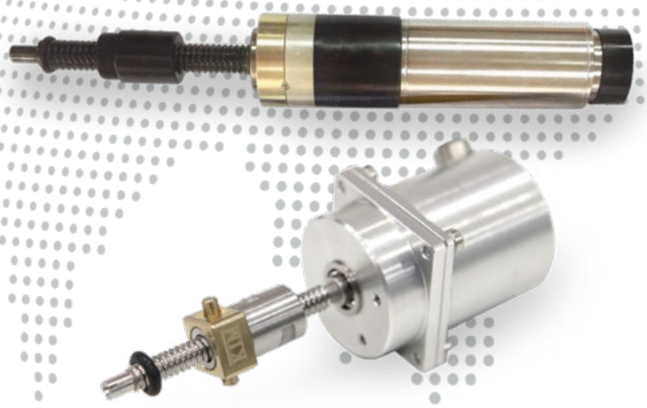
Miniature
Ball Screw

We invite you to explore and challenges
for the future of KIM



KIM

Precision moves,
Reliability proves.

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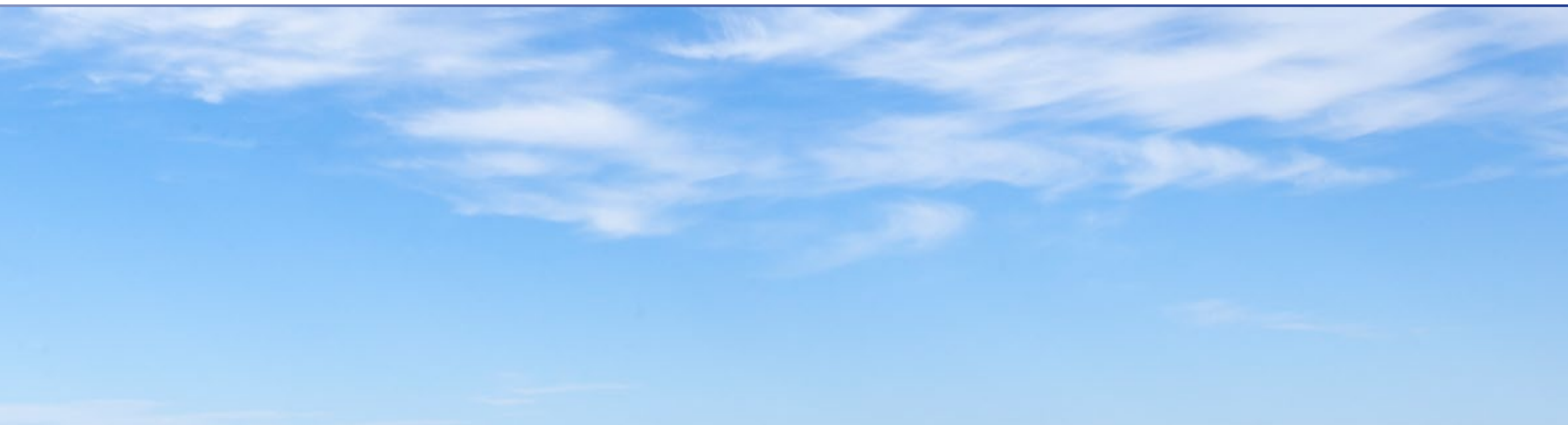
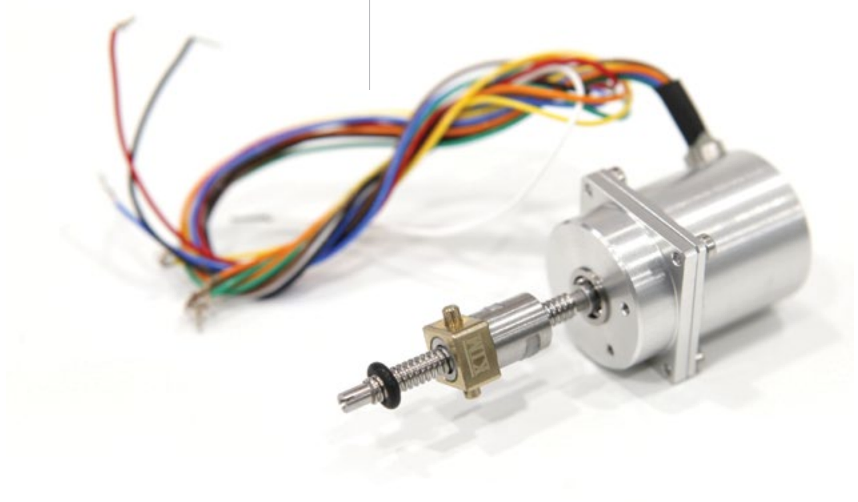




The Global Leader of **Mechanical Engineering Solution**

KIM Co., Ltd.

As a result of continuous investment in R&D on precision gears for decades, KIM Co. has grown to a specialist in driving device.

From designing, manufacturing to solution offer, KIM Co. can serve everything customers require with simple specification provided.

Applications

Defense Industry

Injection Molding

Medical

Aeronautics

Robotics

Machine Tools

Optics

Fields of High Technology

Product Overview

Ball screws convert the rotary motion into linear motion and consist of screw shaft, nut, cycle parts, and balls. Unlike sliding screw, ball screw can get a high transmission efficiency due to the rolling motion of the rotation and revolution.

Features

High Mechanical Efficiency

In ball screw, steel balls or stainless balls are assembled, and they have rolling contact between nut and screw. So ball screw has mechanic efficiency more than 90% and its torque is 1/3 smaller than general thread.

Axial Play

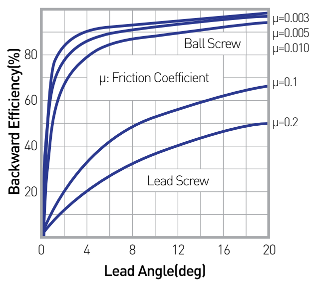
In case of general thread, to reduce axial play runout, the friction coefficient is increased and it will cause the rotation torque get higher. But the ball screw easily rotates without friction even though there is no axial play runout. And Double nut that applied to ball screw to reduce axial play runout increases hardness.

High Quality Assurance System

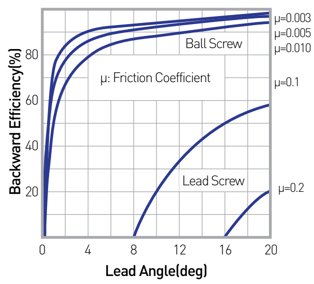
Machining, assembly, and inspection of KIM Co.'s ball screws are performed in thermostatic chamber where is maintained well with temperature and humidity and we have quality assurance system to guarantee our quality.

Long Life

KIM Co. ball screws are made with adequate materials and heat-treated parts and have rolling contact for low abrasion. For this reason, accuracy and long lift are assured.



Forward Efficiency



Backward Efficiency

Miniature Ball Screw

Ball screws translate rotational motion to linear motion with little friction. KIM Co. can deliver ball screws with C3-C9 precision that its diameter starts from 3mm.

Design Guidelines

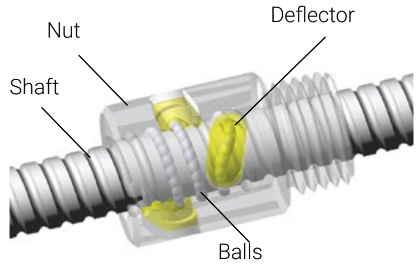
Identification System

①	②	③	④	⑤	⑥		⑦	⑧
BS	08	01	R	K	S	–	C5	Z

① Ball Screw Symbol
② External Diameter of Ball Screw Axis (mm)
③ Lead (mm)
④ Direction of Rotation : R, L, B
⑤ Circulation System : K, P, E
⑥ Symbol of Double Nut : S, D
⑦ Accuracy Grade : C0 – C7
⑧ Axial Clearance : Z, T, S, N, L

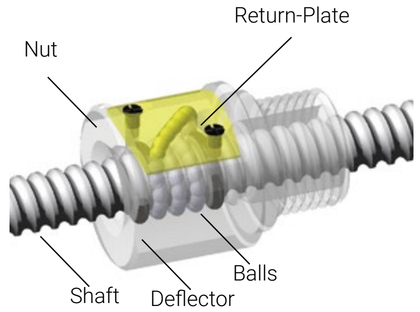
Types of Ball Screw

Internal-Deflector System (K)



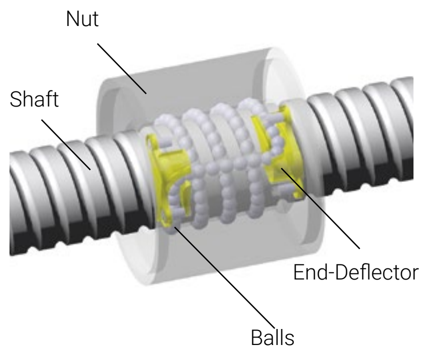
The Internal-deflector system employs a lightweight miniature ball screw, which enables the nut diameter and length to be reduce to the smallest possible size. The balls bear the load while rolling along the screw groove between the shaft and the nut. The balls are continuously circulated, transferred to the adjacent groove in the screw via the Internal-deflector channel and then back to the loaded groove area.

Return-Plate System (P)



The return-plate system uses coil-type deflectors incorporated inside the nut to pick up the steel balls and circulate them via the return-plate channel. This system has the advantage of allowing the use of a nut that is smaller in diameter than those employed in return-tube systems. In addition, the upward-angle installation of the return-plate ensures even smoother rotation.

End-Deflector System (E)

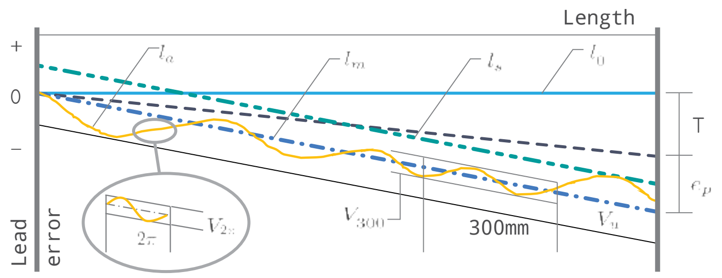


The balls are circulated from end-deflector incorporated inside the nut or outside the nut through the hole in the nut and the channels in the recirculating sections. Ball nut diameter can be smaller than return-plate system. This is suitable for the middle lead ball screws.

Lead Precision

Ball screw lead accuracy conforming to JIS B1192 is specified by the tolerance of actual mean travel error over the nut effective travel amount, or screw shaft effective length, travel variation and travel variation within arbitrary 1 revolution over the screw shaft effective length. Tolerance of each accuracy grades are shown in the Table 1,2.

Diagram 01



Nominal travel (l_0) : Amount of travel for a particular number of revolutions along nominal lead.

Target specified travel (T) : Target value for cumulative specified lead which has been increased or decreased in advance.

Specified travel (l_s) : Amount of travel for a particular number of revolutions along specified lead.

Actual travel (l_a) : Actual displacement of ball nut relative to the ball screw shaft, or vice versa, for a given number of revolutions.

Actual mean travel (l_m) : Straight line representing the trend of actual travel (l_m) and the nominal travel (l_0) or the specified travel (l_s), within the useful travel.

Actual mean travel deviation (e_p) : Difference between Actual mean travel (l_m) and Nominal travel (l_0) or Specified travel (l_s).

Travel variation (V_u) : The maximum width of the actual travel curve enclosed between two parallel lines along the actual mean travel line.

Travel variation (V_{300}) : The widest range of the actual travel for any 300mm within the useful travel or the effective screw thread length.

Travel variation ($V_{2\pi}$) : The widest range of the actual travel for one revolution (2π rad) within the useful travel or the effective screw thread length.

table 01 Target travel error ($\pm e_p$) and limit of travel variation (μm)

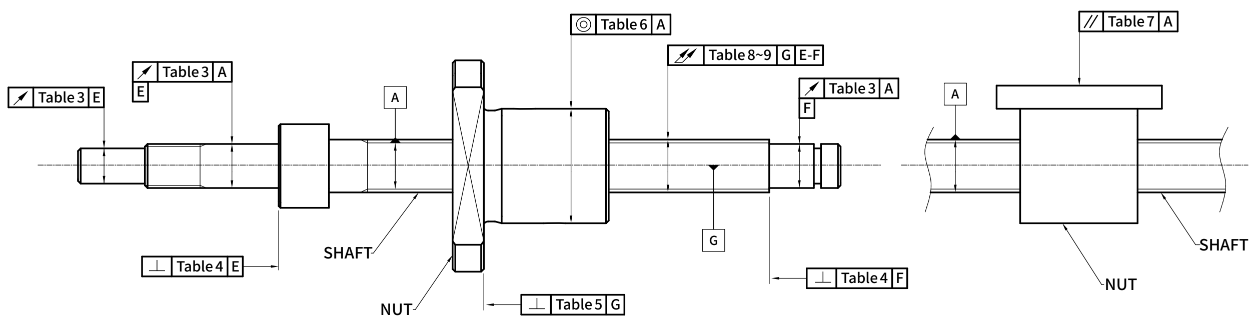
Effective Screw Length (mm)		Accuracy Grade (μm)							
		C0		C1		C3		C5	
Over	Up To	$\pm e_p$	V_u	$\pm e_p$	V_u	$\pm e_p$	V_u	$\pm e_p$	V_u
0	100	3	3	3.5	5	8	8	18	18
100	200	3.5	3	4.5	5	10	8	20	18
200	315	4	3.5	6	5	12	8	23	18
315	400	5	3.5	7	5	13	10	25	20
400	500	6	4	8	5	15	10	27	20
500	630	6	4	9	6	16	12	30	23
630	800	7	5	10	7	18	13	35	25
800	1,000	8	6	11	8	21	15	40	27

table 02 Limit of change of per 300mm and 1 round (V_{300}) ($V_{2\pi}$)

Accuracy Grade (μm)	C0		C1		C3		C5	
Item	V_{300}	$V_{2\pi}$	V_{300}	$V_{2\pi}$	V_{300}	$V_{2\pi}$	V_{300}	$V_{2\pi}$
Permissible Value	3.5	3	5	4	8	6	18	8

Ball Screw Run-Out and Location Tolerance

The connection precision of ball screw is produced based on the standard below.



(table 03) Radial run-out bearing seat related to the centerline of screw groove and radial run-out of journal diameter related to the bearing seat

Shaft Nominal Diameter (mm)		Permissible Deviation of Radial Run-Out (㎛)					
Over	Up To	C0	C1	C3	C5	C7	C10
0	8	3	5	8	10	14	40
8	12	4	5	8	11	14	40
12	20	4	6	9	12	14	40

(table 04) Axial run-out (perpendicularity) of shaft (bearing) face related to the centerline of the bearing seat

Shaft Nominal Diameter (mm)		Permissible Deviation of Radial Run-Out (Perpendicularity) (㎛)					
Over	Up To	C0	C1	C3	C5	C7	C10
0	8	3	5	8	10	14	40
8	12	4	5	8	11	14	40
12	20	4	6	9	12	14	40

(table 05) Axial run-out (perpendicularity) of ball nut location face related to the centerline of screw shaft

Shaft Nominal Diameter (mm)		Permissible Deviation of Radial Run-Out (Perpendicularity) (㎛)					
Over	Up To	C0	C1	C3	C5	C7	C10
0	20	5	6	8	10	14	20
20	32	5	6	8	10	14	20
32	50	6	7	8	11	18	30

(table 06) Radial run-out of ball nut location diameter related to the centerline of screw shaft (Unit : µm)

Shaft Nominal Diameter (mm)		Permissible Deviation of Radial Run-Out					
Over	Up To	C0	C1	C3	C5	C7	C10
-	20	5	6	9	12	20	40
20	32	6	7	10	12	20	40
32	50	7	8	12	15	30	60

(table 07) Parallelism of rectangular ball nut related to the centerline of screw shaft (Unit : µm)

Mounting Length (mm)		Permissible Deviations of Parallelism					
Over	Up To	C0	C1	C3	C5	C7	C10
-	50	5	6	8	10	17	30
50	100	7	8	10	13	17	30

(table 08) Total run-out in radial direction of screw shaft related to the centerline of screw shaft (Unit : µm)

Accuracy Grade		C0			C1			C3			C5			C7			C10		
Shaft Total Length	Over	-	8	12	-	8	12	-	8	12	-	8	12	-	8	12	-	8	12
	Up To	8	12	20	8	12	20	8	12	20	8	12	20	8	12	20	8	12	20
Over	Up To	Permissible Deviations of Total Run-Out In Radial Direction (Unit: µm)																	
-	125	15	15	15	20	20	15	25	25	20	35	35	35	60	55	55	100	95	90
125	200	25	20	20	30	25	20	35	35	25	50	40	40	75	65	60	140	120	110
200	315	35	25	20	40	30	25	50	40	30	65	55	45	100	80	70	210	160	130
315	400	-	35	25	45	40	30	60	50	40	75	65	55	-	100	80	-	210	160
400	500	-	45	35	-	50	40	-	65	50	-	80	60	-	120	95	-	270	200
500	630	-	50	40	-	60	45	-	70	55	-	90	75	-	150	110	-	350	250
630	800	-	-	50	-	-	60	-	-	70	-	-	90	-	-	140	-	460	320
800	1,000	-	-	65	-	-	75	-	-	95	-	-	120	-	-	170	-	-	420

Axial Play and Preload

Axial Play

Symbol and permissible value for axial play are shown in table 9.

table 09 **Symbol and permissible value for axial play**

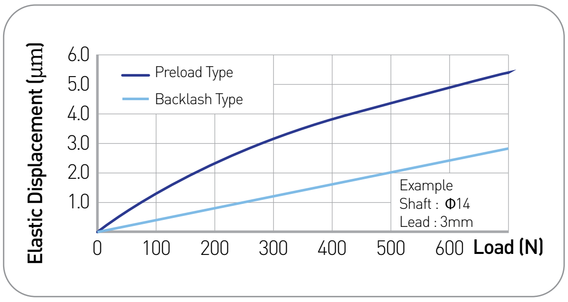
Symbol	Z	T	S	N	L
Axial Paly	0 (preloading)	0.005 max.	0.020 max.	0.050 max.	0.100 max.

Preload

Preload Effect

Preload is not only used for removing axial play, it also has the effect of reducing the amount of axial displacement due to axial load, and improving the rigidity in ball screw. Dia.2 shows the difference of the amount of elastic displacement (theoretical value) regarding ball screw with axial paly and ball screw with preload under the axial load.

Diagram 02 Elastic displacement curve comparison between backlash type and preload type



Proper Amount of Preload

Although the amount of preload should be determined by the required Rigidity and the permissible amount of backlash, when setting Preload, there are some concerning issues as follows.

- Increased Dynamic Drag Torque
- Heat Generation : lowering of positioning accuracy due to the temperature rise.
- Shortened Life

Therefore, it is advisable to establish the amount of preload at the lowest possible limits.

Preload Methods

Generally, a method of double nut preload by inserting a spacer between two nuts is adopted. KIM Co. ball screw adopts [oversized ball preload] by inserting balls slightly bigger than space between screw shaft and nut. As a result, it can eliminate axial play even with a single nut and it is possible to maintain compact. Moreover, operating performance will never be deteriorated by using spacer balls (balls with slightly smaller diameter than those of the oversize balls) alternatively with oversize balls.

Diagram 03 Preload by oversized balls

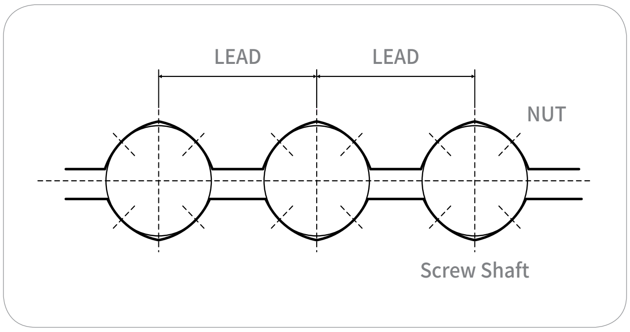
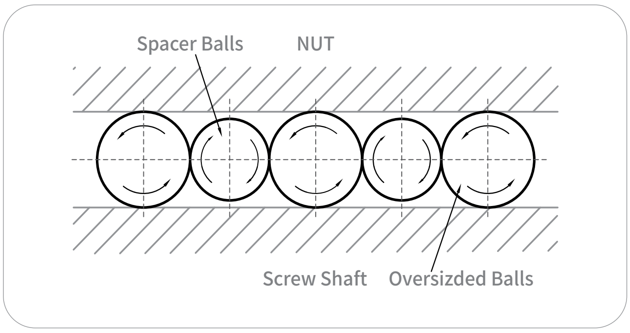


Diagram 04 Spacer balls



Design Calculation

Calculation of Permissible Axial Load

It is recommended that ball screw shafts be used almost exclusively under tension load conditions. However, in some applications, compression loads may exist, and under such conditions it must be determined that shaft buckling will not occur. Also, when the mounting span distance is short, there is a restriction on the permissible tension or compression load and the basic static load rating C_{0a} unrelated to mounting. Buckling load, permissible tension and permissible compression load can be calculated below.

$$\mathrm{P} = \mathrm{a} \times \frac{\mathrm{n}\pi^2 \mathrm{E{\cdot}I}}{\mathrm{L}^2} \ (N) \qquad \mathrm{I} = \frac{\pi}{64} d^4 \ (mm^4)$$

a : Substitute safety factor = 0.5

E : Young's modulus

= 2.08 x 10^5 (N/mm^2)

d : Root diameter (mm)

L : Mounting span distance (mm)

n : Mounting factor

Supported - Supported, n = 1

Fixed - Supported, n = 2

Fixed - Fixed, n = 3

Fixed - Free, n = 1/4

Calculation of Permissible Revolution

For screw shaft rotation, the mounting method determines the established rotation limits. When this value is approached, resonance phenomenon can occur, and operation becomes impossible. There is also rotation limit which causes damages to recirculating parts. This limit is unrelated to mounting methods.

$$\mathrm{N} = \beta \times \frac{60{\cdot}\lambda^2}{2^{\pi}} \times \sqrt{\frac{E{\cdot}I{\cdot}g}{\gamma{\cdot}A{\cdot}L^4}} \ (RPM)$$

$$\mathrm{I} = \frac{\pi}{64} d^4 \ (mm^4) \qquad \mathrm{A} = \frac{\pi}{4} d^2 \ (mm^2)$$

β : Substitute safety factor = 0.8

E : Young's modulus

= 2.08 x10^5 (N/mm^2)

d : Root diameter (mm)

g : Gravity acceleration = 9.8 x 10^3 (mm/sec^2)

γ : Material specific gravity = 7.7 x 10^{-5} (N/mm^3)

L : Mounting span distance (mm)

λ : Factor for ball screw mounting method

Supported - Supported, λ = π

Fixed - Supported, λ = 3.927

Fixed - Fixed, λ = 4.730

Fixed - Free, λ = 1.875

Basic Dynamic Load Rating C_a and Basic Rating Life

The basic rating life of ball screws means the total number of revolutions which 90% of the ball screws can endure. Failure is indicated by flaking caused by rolling fatigue on the surface of grooves or balls.

These figures are valid when a group of the same type ball screws is operated individually under the same conditions. The basic dynamic load rating C_a is the axial load for which the basic rating life is 1,000,000 revolutions. These values are listed under C_a in the dimension tables. Ball screw's basic rating life L_{10} can be estimated using basic dynamic load rating C_a in the following formula.

$$L_{10} = \left(\frac{C_a}{f \cdot F_a} \right)^3 \times 10^6 \text{ (rev)}$$

Also, in place of the total number of revolutions, the basic rating life can be expressed in hours : L_{10h} or traveled distance : L_{10d}, and these can be calculated through the following formulas.

$$L_{10h} = \left(\frac{1}{60N} \right) \times L_{10} \text{ (hours)}$$

$$L_{10d} = \left(\frac{\ell}{10^6} \right) \times L_{10} \text{ (km)}$$

C_a : Basic dynamic load rating (N)
F_a : Axial load (N)
N : Revolution (rpm)
ℓ : Lead (mm)
f : Load factor
- f = 1.0~1.2 : for almost no vibration, no shock condition
- f = 1.2~1.5 : for slight vibration, shock condition
- f = 1.5~3.0 : for severe vibration, shock condition

Generally, axial load on the most machine is not constant and it can be divided into several operating pattern. In this case, basic rating life can be calculated to figure up average axial load F_{am}, average revolution N_m in the following formula.

$$F_{am} = \left(\frac{F_{a1}{}^3 \cdot N_1 \cdot t_1 + F_{a2}{}^3 \cdot N_2 \cdot t_2 + F_{a3}{}^3 \cdot N_3 \cdot t_3}{N_1 \cdot t_1 + N_2 \cdot t_2 + N_3 \cdot t_3} \right)^{\frac{1}{3}} (N)$$

$$N_{am} = \frac{N_1 \cdot t_1 + N_2 \cdot t_2 + N_3 \cdot t_3}{t_1 + t_2 + t_3} \text{ (rpm)}$$

table 10

Axial Load (N)	Revolution (rpm)	Working Time (%)
F_{a1}	N_1	t_1
F_{a2}	N_2	t_2
F_{a3}	N_3	t_3

Also, for axial loads which vary linearly, the average axial load F_{am} can be calculated approximately using the following formula.

$$F_{am} = \left(\frac{F_{a\,min} + F_{a\,max}}{3} \right) (N)$$

$F_{a\,min}$ = Minimum axial load (N)
$F_{a\,max}$ = Maximum axial load (N)

Basic Static Load Rating C_{0a}

The basic static load rating C_{0a} is the axial static load at which the amount of permanent deformation (Ball + Raceway) occurring at the maximum stress contact point between the ball and raceway surfaces is 1/10,000 times the ball diameter. These values are listed under C_{0a} in the dimension tables. The basic static load rating C_{0a} values apply to investigation of stationary state or extremely low revolution load conditions (less than 10 rpm).

However, in most cases the amount of permanent deformation causes absolutely no problems under the general conditions. The maximum permissible load Fa max for the screw groove can be found by suing the following formula.

$$\mathrm{F}_{a\,max} = \left(\frac{C_{0a}}{f_s}\right)\ (N)$$

f_S : Static safety factor

f_S = 1~2 (for normal operation)

f_S = 2~3 (for vibration, shock)

Driving Torque

The feed screw system driving torque T is expressed according to the following formula.

$$T = T_1+T_2+T_3+T_4 \quad (N \cdot m)$$

T_1 : Acceleration torque $(N \cdot m)$

T_2 : Load torque $(N \cdot m)$

T_3 : Preload dynamic drag torque $(N \cdot m)$

T_4 : Additional torque $(N \cdot m)$

$T1 \sim T3$ can be calculated by the following formula.

$$T_1 = a \cdot I\ (N \cdot m)$$

$$a = \frac{2\pi N}{60 \cdot t} \quad (rad/sec^2)$$

$$I = IW \cdot A^2 + I_S \cdot A^2 + I_A \cdot A^2 + I_B \quad (kg \cdot m^2)$$

$$\mathrm{I}_w = m_w \times \left(\frac{\ell}{2\pi}\right)^2 \quad (kg \cdot m^2)$$

$$\mathrm{I}_S = m_S \times \left(\frac{d^2}{8}\right) \quad (kg \cdot m^2)$$

$$m_S = \pi \times \left(\frac{d}{8}\right)^2 \times L \times \gamma \quad (kg)$$

a : Angular acceleration (rad/sec^2)

I : Inertia moment $(kg \cdot m^2)$

I_w : Inertia moment of moving object by Motor axial conversion $(kg \cdot m^2)$

I_s : Inertia moment of Screw shaft $(kg \cdot m^2)$

I_A : Inertia moment of gears on screw side $(kg \cdot m^2)$

I_B : Inertia moment of gears on motor side $(kg \cdot m^2)$

m_w : Mass of moving object (kg)

m_s : Mass of screw shaft (kg)

ℓ : Lead (m)

d : Screw shaft diameter (m)

L : Ball screw length (m)

γ : Specific gravity 7.85×10^3 $(kg \cdot m^3)$

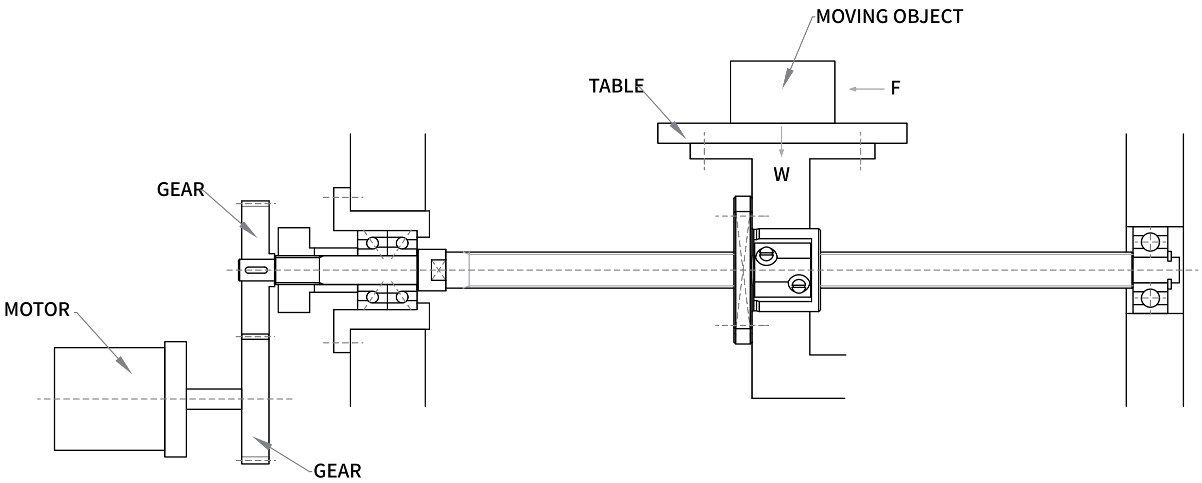
A : Reduction ratio

N : Motor speed (rpm)

t : Acceleration time (sec)

$$T_2 = \frac{P \cdot \ell \cdot A}{2\pi\eta} \times 10^{-3} = \frac{(F+\mu W)}{2\pi\eta} \cdot \ell \cdot A \times 10^{-3} \quad (N \cdot m)$$

P = Axial load (N)
F = Load (N)
W = Weight of moving object (N)
ℓ = Lead (mm)
μ = Sliding surface friction coefficient
η = Efficient = 0.9
A = Reduction ratio



$$T_3 = 0.05 \times (\tan\beta)^{-0.5} \times \frac{F_a \cdot \ell}{2\pi} \times 10^{-3} \quad (N \cdot m)$$

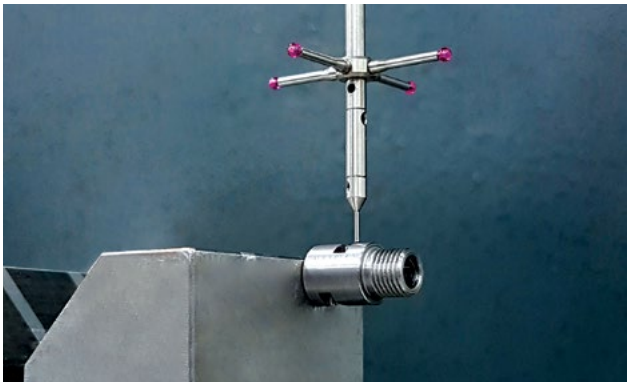
P : Lead angle (deg)
F_a : Preload (N)
ℓ : Lead (mm)

Additional Torque T_4

Described as torque which occurs in addition to those listed above.
For example, support bearing friction torque, oil seal resistance torque, etc.

Guarantee of Reliability

Quality Management System



Cert'	AS9100D
No.	SEO6019691
Description	Design & Development and manufacture of gear box, electromechanical control systems, servo-actuators and components for aviation, defense and industries

KIM Co.'s quality management system is built up based on ISO 9001:2015 / AS 9100D. Considering clients' requirements, Inspection/test equipment are highly advanced and automated. This equipment ensures the reproducibility and reliability of inspection by preventing human error.

For the rigorous quality assurance, KIM Co. continues to perform quality assurance activities based on Military specifications (MIL-STD), AS9100, ISO9001. also, we are equipped with test & inspection equipment such as 3D CMM, gear tester, environmental chamber, and heat treatment hardness tester. In addition, we have been committed to improving the reliability of products through our performance test facilities.

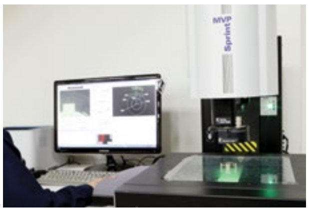
Gear / Screw Inspector

Klingelnberg (Switzland) PNC30
Spec : M (0.3~15) Dia (Φ5~300mm) Grade (DIN2)

Klingelnber (Switzland) PNC65
Spec : M (15) Dia (650) Grade (DIN2)

Tokyo Tech (Japan) TTI150H
Spec : M (0.3~10) Dia (Φ5~Φ160) Grade (DIN2)

Tokyo Tech (Japan) TTI450E
Spec : M (0.3~10) Dia (Φ5~Φ450) Grade (DIN2)



Non-Contact 3D Measuring Device
Measuring Ranges : X = 250 mm, Y = 150 mm, Z = 150 mm

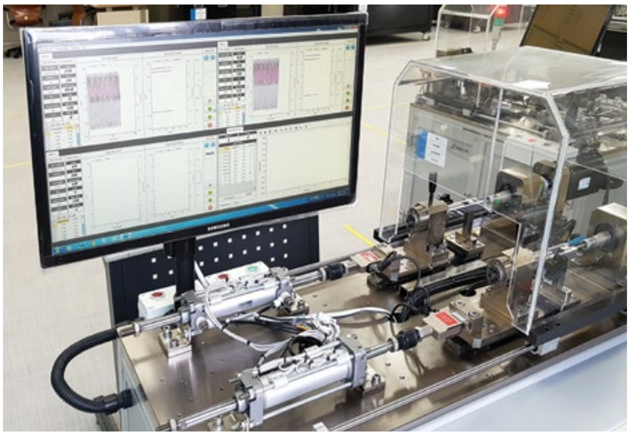
Mahr (Germany) 898D
Center Dis. (25~600mm) Grade (DIN2)

3-Axis CNC Coordinate Measuring Machine Hexagon (USA) Explorer 7105
Spec : 700×900×500

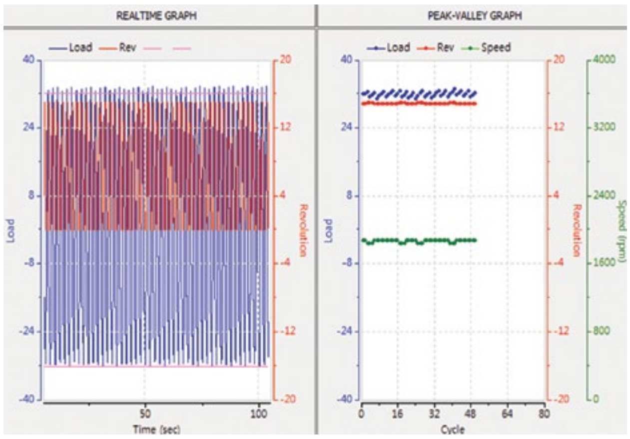
ZEISS 3D Measuring Device
Measuring Ranges : X = 500 mm, Y = 500 mm, Z = 500 mm

Assurance System

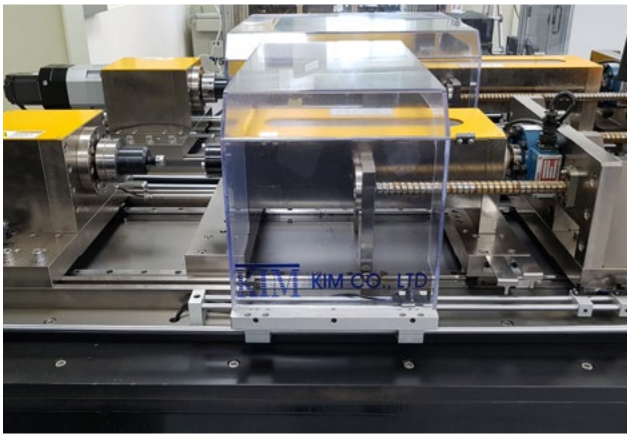
KIM Co.'s Ball screws are produced by the highest level of machines in the environment where the temperature is strictly managed. And we assure its quality based on the quality system that includes manufacture, assemble and test. KIM Co. tests the Ball Screws' durability, axial direction backlash and function system by using the machine below.



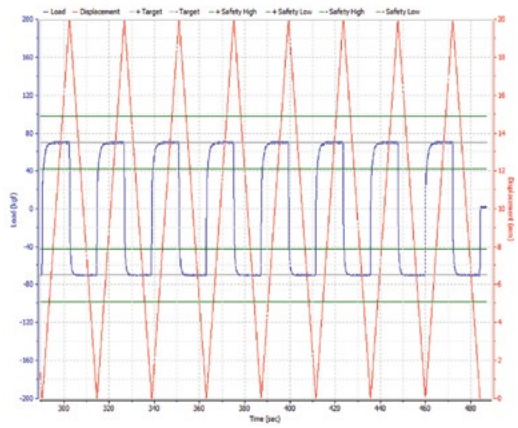
Function Test Machine



Function Test Data

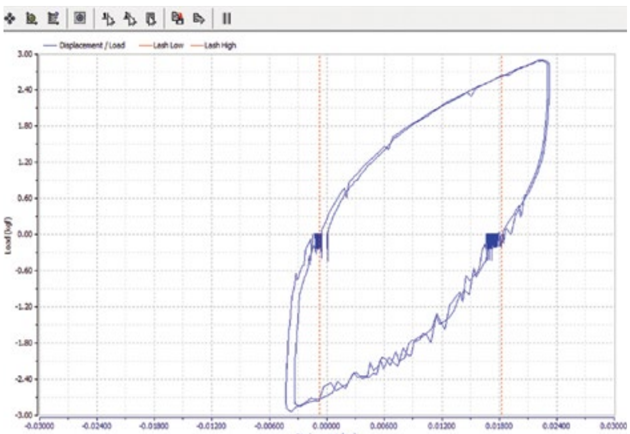


Endurance Test Machine



Endurance Test Data

Backlash Test Machine



Backlash Test Data

Product Information

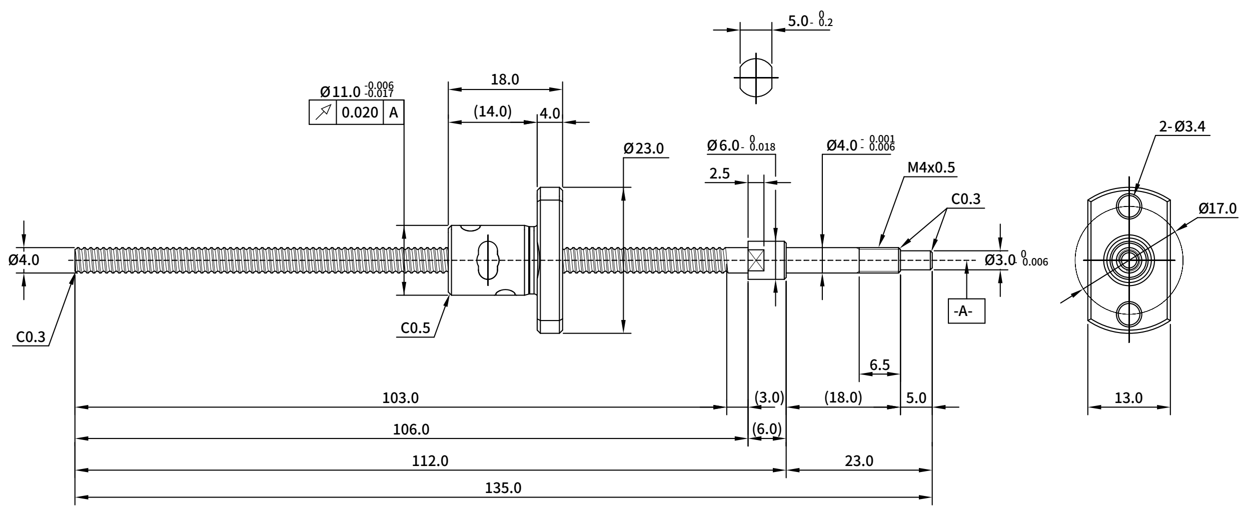
Applicable Circulation System of Each Model

KIM Co. delivers the 3 types of Ball Screw. The shown models below is the standard and you can change the specifications such as external-diameter, lead and so on.

Applicable Circulation System of Each Model	K Type	P Type	E Type
BS0401	●		
BS0501	●		
BS0601	●		
BS0602		●	
BS07.401.5		●	
BS0801	●		
BS0802	●	●	
BS1001	●		
BS1002	●	●	
BS1003		●	
BS1202		●	
BS1203	●	●	
BS1402	●		
BS1404	●		●
BS1602	●		
BS2005	●		●

Standardized Ball Screw

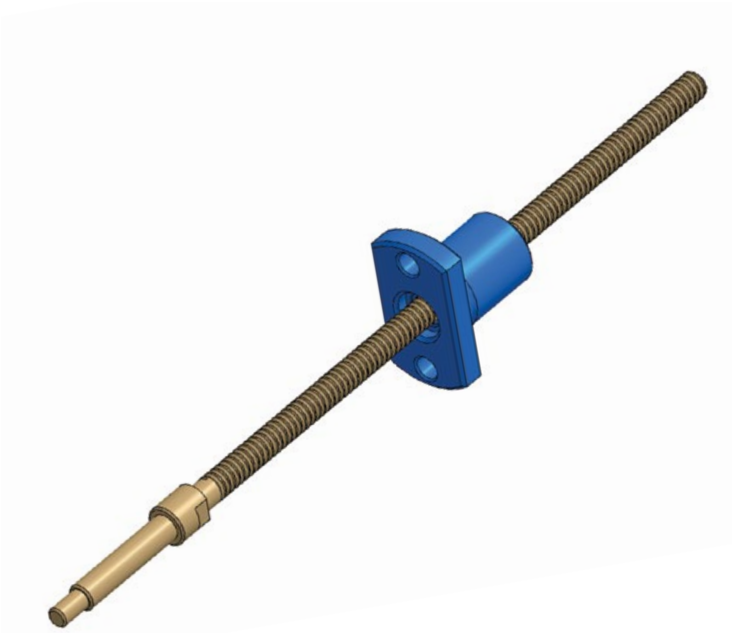
BS0401RKS-C5T



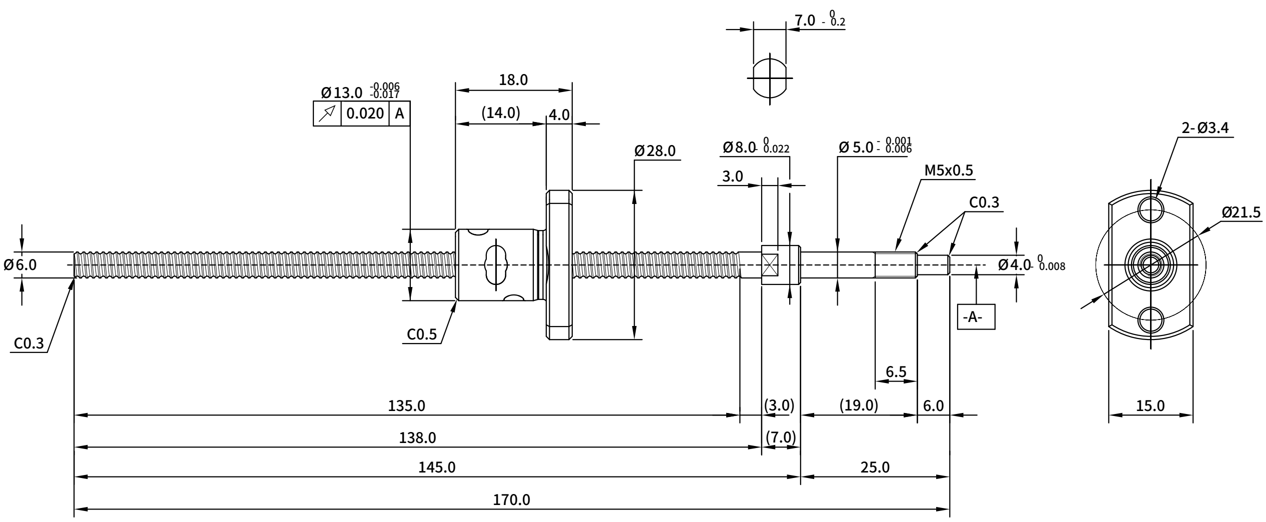
Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
86	C5	±0.020	0.018	570	790	~0.005

Specification of Ball Screw

Diameter (mm)	4
Lead (mm)	1
Grade	C5T
Diameter of Ball (mm)	0.8
Number of Loaded Turn	1 × 4
Direction	Right
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Internal-Deflector Type



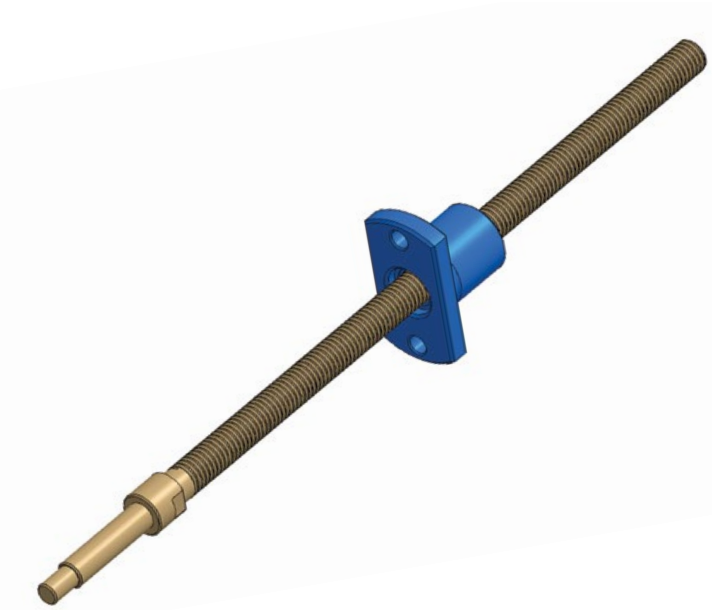
BS0601RKS-C5T



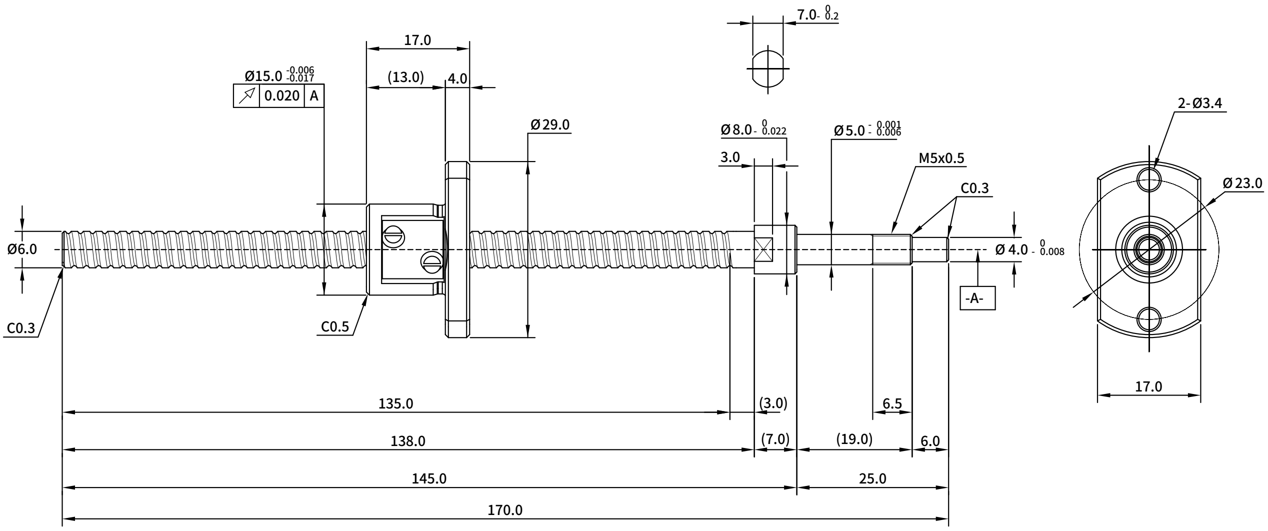
Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
117	C5	±0.020	0.018	670	1,210	~0.005

Specification of Ball Screw

Diameter (mm)	6
Lead (mm)	1
Grade	C5T
Diameter of Ball (mm)	0.8
Number of Loaded Turn	1 × 4
Direction	Right
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Internal-Deflector Type



BS0602RPS-C5T

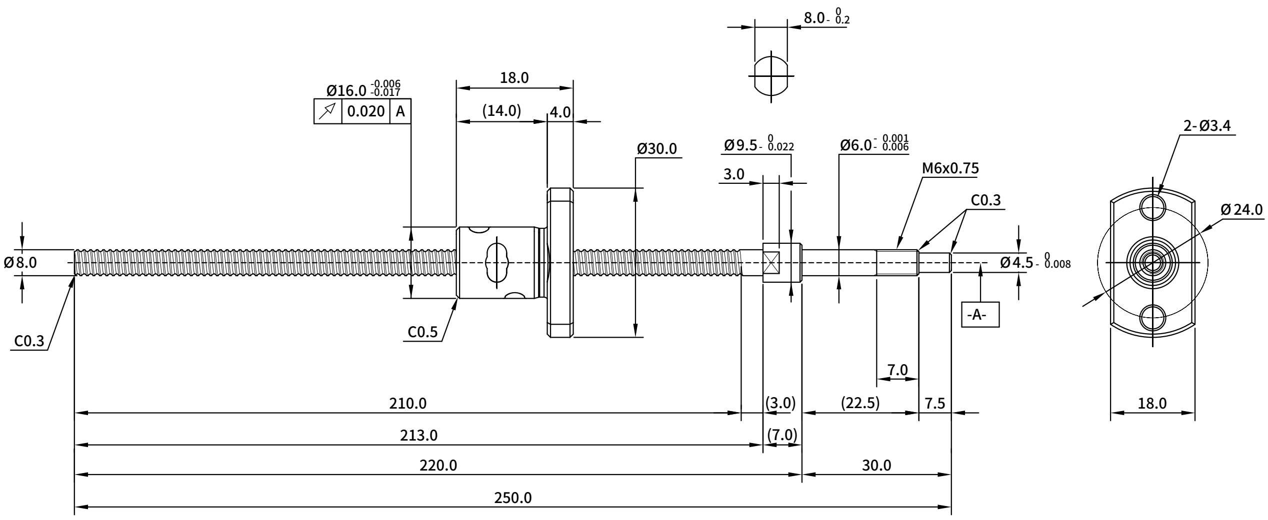


Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
118	C5	±0.020	0.018	755	1,210	~0.005

Specification of Ball Screw

Diameter (mm)	6
Lead (mm)	2
Grade	C5T
Diameter of Ball (mm)	1.0
Number of Loaded Turn	2.7 × 1
Direction	Right
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Return-Plate Type

BS0801RKS-C5T

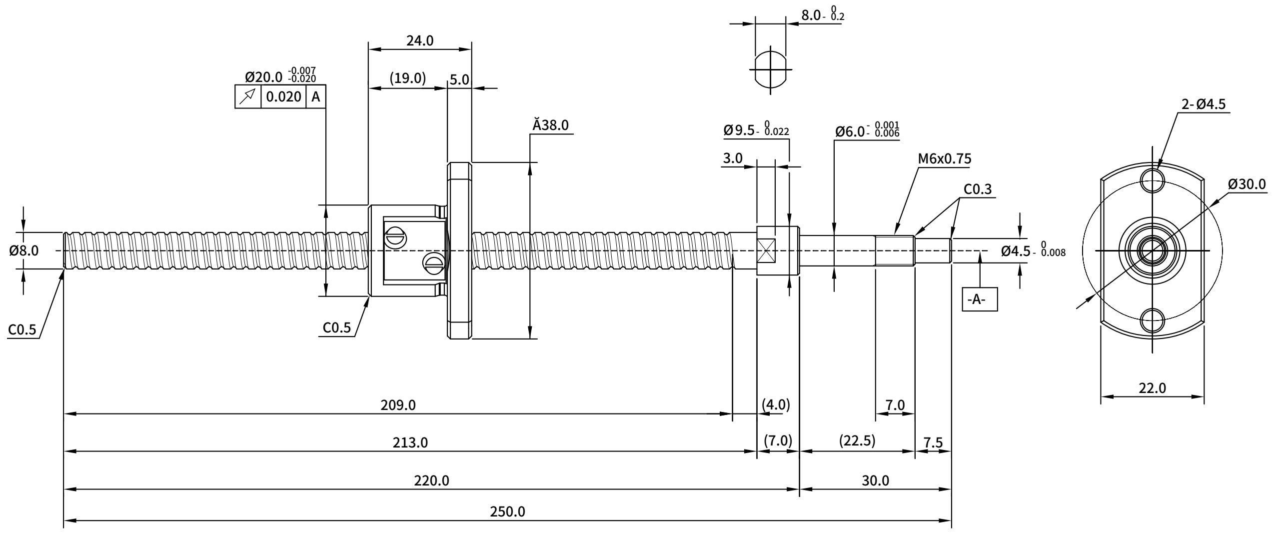


Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
192	C5	±0.023	0.018	770	1,600	~0.005

Specification of Ball Screw

Diameter (mm)	8
Lead (mm)	1
Grade	C5T
Diameter of Ball (mm)	0.8
Number of Loaded Turn	1 × 4
Direction	Right
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Internal-Deflector Type

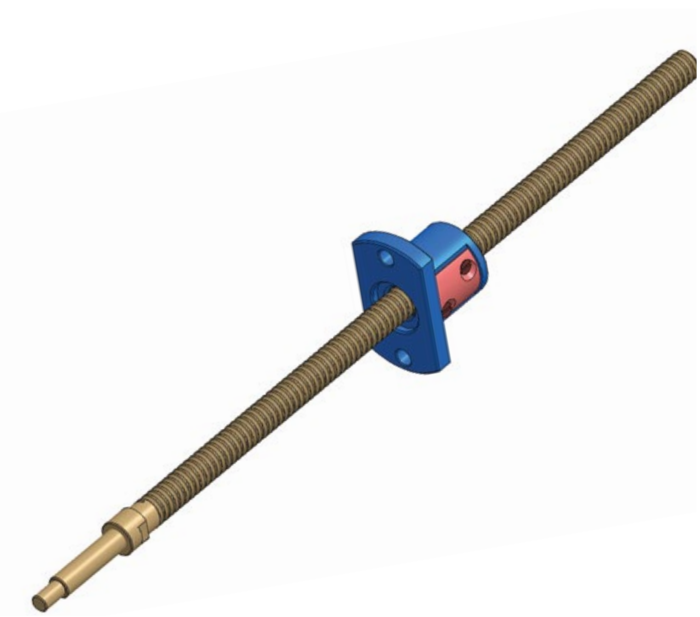
BS0802RPS-C5T



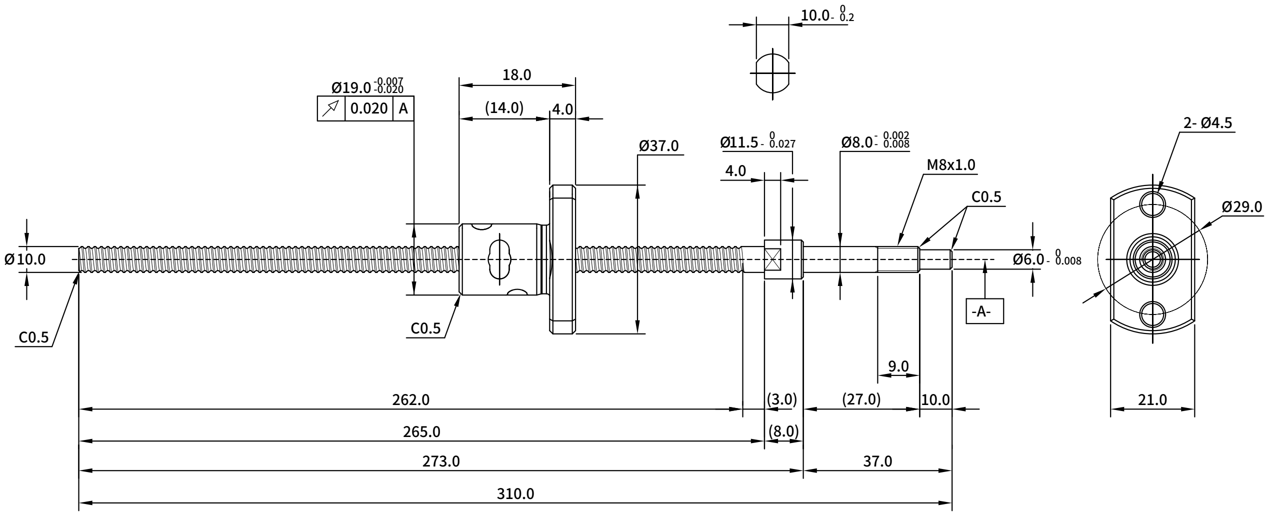
Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
185	C5	±0.023	0.018	2,300	4,000	~0.005

Specification of Ball Screw

Diameter (mm)	8
Lead (mm)	2
Grade	C5T
Diameter of Ball (mm)	1.5875
Number of Loaded Turn	3.7 X 1
Direction	Right
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Return-Plate Type



BS1001RKS-C5T

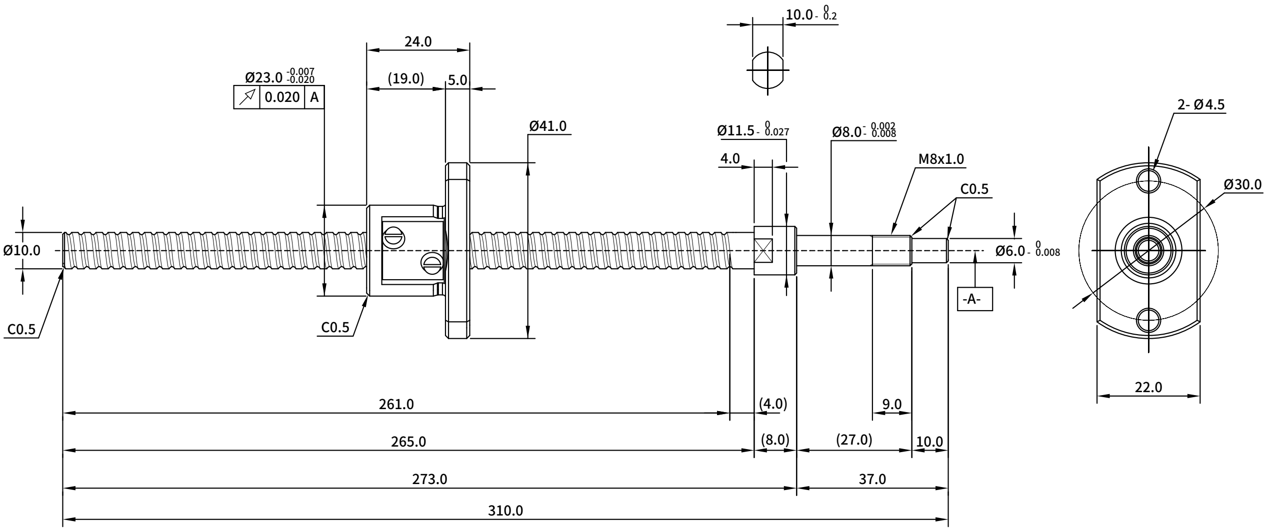


Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
244	C5	±0.023	0.018	850	2,100	~0.005

Specification of Ball Screw

Diameter (mm)	10
Lead (mm)	1
Grade	C5T
Diameter of Ball (mm)	0.8
Number of Loaded Turn	1 × 4
Direction	Right
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Internal-Deflector Type

BS1002RPS-C5T

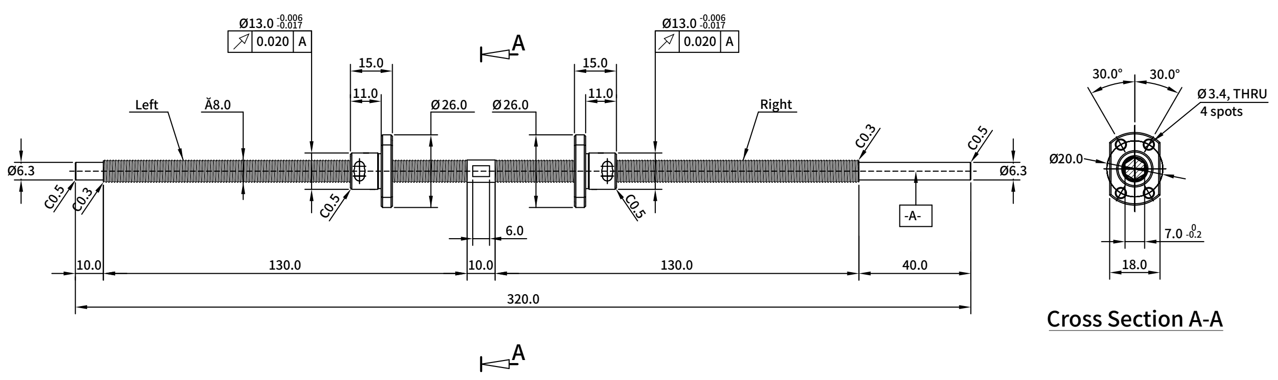


Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
237	C5	±0.023	0.018	2,710	5,310	~0.005

Specification of Ball Screw

Diameter (mm)	10
Lead (mm)	2
Grade	C5T
Diameter of Ball (mm)	1.5875
Number of Loaded Turn	3.7 × 4
Direction	Right
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Return-Plate Type

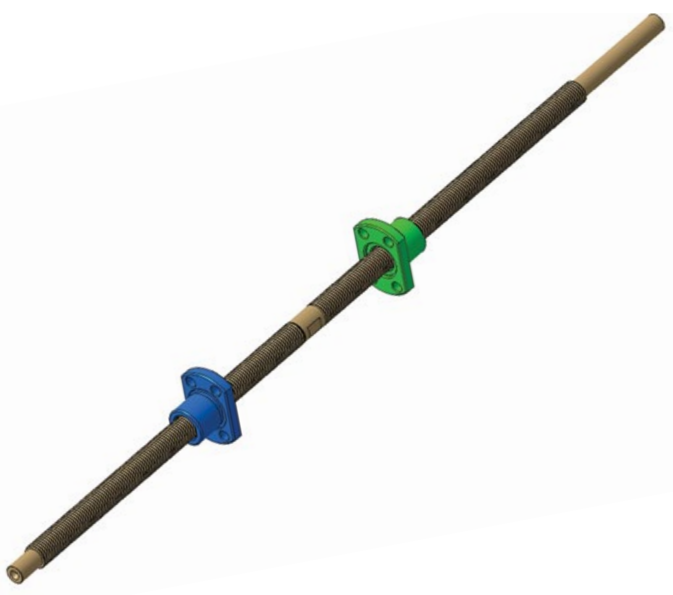
BS0801BKD-C5T



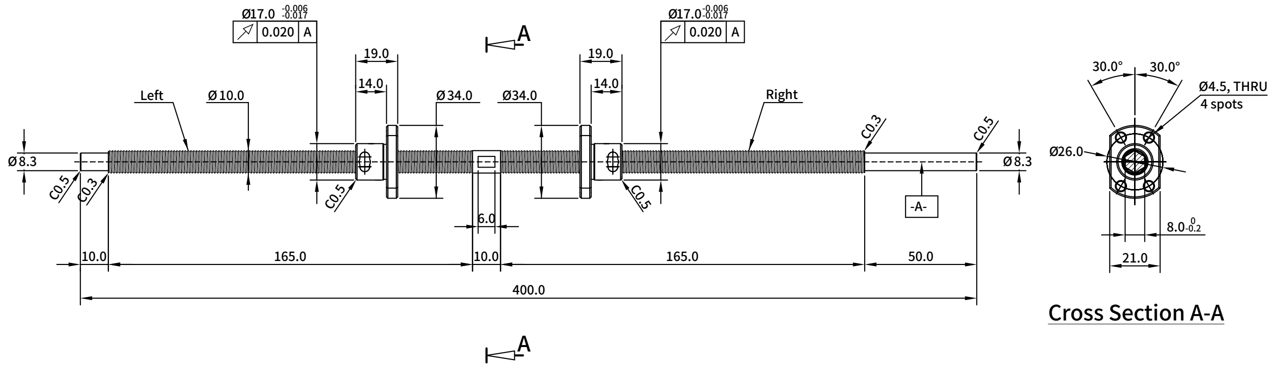
Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
115	C5	±0.020	0.018	660	1,200	~0.005

Specification of Ball Screw

Diameter (mm)	8
Lead (mm)	1
Grade	C5T
Diameter of Ball (mm)	0.8
Number of Loaded Turn	1 × 3
Direction	Right and Left
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Internal-Deflector Type



BS1002BKD-C5T



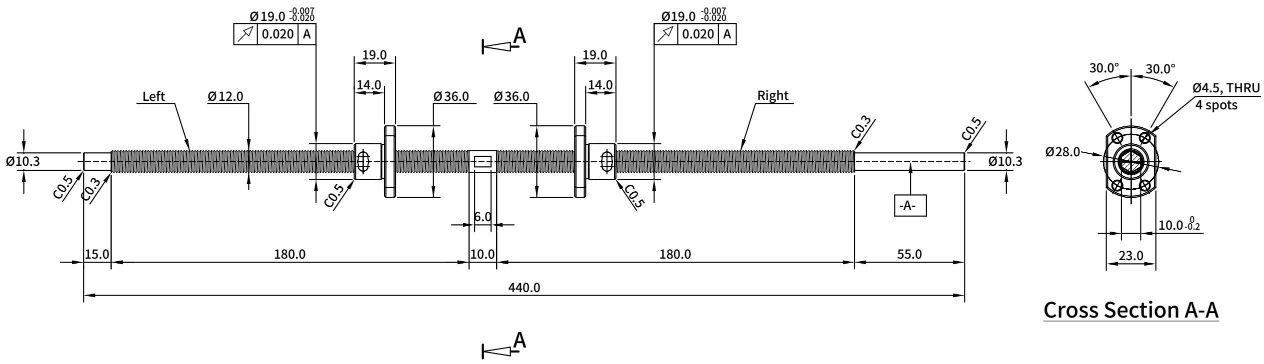
Cross Section A-A

Stroke (max.)	Grade	Lead Grade		Basic load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
145	C5	±0.020	0.018	1,200	2,600	~0.005

Specification of Ball Screw

Diameter (mm)	10
Lead (mm)	2
Grade	C5T
Diameter of Ball (mm)	1.5875
Number of Loaded Turn	1 × 3
Direction	Right and Left
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Internal-Deflector Type

BS1202BKD-C5T



Stroke (max.)	Grade	Lead Grade		Basic Load (N)		Backlash
		Actual Mean Travel Deviation e_p	Travel Variation V_u	Dynamic Load C_a	Static Load C_{0a}	
160	C5	±0.020	0.018	1,500	3,500	~0.005

Specification of Ball Screw

Diameter (mm)	12
Lead (mm)	2
Grade	C5T
Diameter of Ball (mm)	1.5875
Number of Loaded Turn	1 × 3
Direction	Right and Left
Number of Thread	1
Hardness	HRC58~62 (Tread Area)
Circulation	Internal-Deflector Type

Examples of Customized Ball Screw

The great flexibility of KIM Co.'s Ball Screw means we can make various types of products that customer requested as shown in the examples below.

Dia	Lead	Backlash	Grade
Ø 4	1 mm	~0.03 mm	C5

Dia	Lead	Backlash	Grade
Ø5	1 mm	~0.03 mm	C5

Dia	Lead	Backlash	Grade
Ø 6	2 mm	~0.01 mm	C5

Dia	Lead	Backlash	Grade
Ø 6	1 mm	~0.005 mm	C5

Dia	Lead	Backlash	Grade
Ø 7.4	1.5 mm	~0.005 mm	C5

Dia	Lead	Backlash	Grade
Ø 10	2 mm	~0.01 mm	C5

Dia	Lead	Backlash	Grade
Ø 10	3 mm	~0.005 mm	C5

Dia	Lead	Backlash	Grade
Ø10	3 mm	~0.05 mm	C7

Service Range

KIM's Enjoyable Challenge for Moving the World

We design innovative and challenging research and development for precision driving technology.

KIM Co. delivers from Designing to Maintaining. We focused on the highest quality and technological improvements through the joint research, mutual growth with national and international defense companies and precision driving system companies based on a global network. Our objective is to help customers improve productivity and get solutions.

VISION

JUMP UP **KIM 2020**

Pioneer Leading Technology Innovation

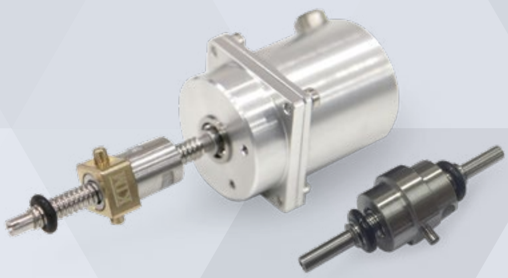
R&D VISION

Creative Talent
Open-Thinking
Proactive Attitude

The Confidence of KIM Co., Ltd.

R&D VALUE

Global Sense
Challenge
Communication & Cooperation
Creative Thinking
Client Satisfaction



- Design& Development
- Manufacturing
- Test & Monitoring
- Mass Production
- A/S & Maintenance
- Solution

Precision moves, Reliability proves.

269, Jinsan-daero, Daesan-myeon, Uichang-gu, Changwon-si, Gyeongsangnam-do, Republic of KOREA

Tel +82-55-251-0261 **Fax** +82-55-251-2520
Website www.kimm.co.kr **E-mail** gear@kimm.co.kr

Ball Screw Application Configuration Worksheet

Company Name	Contact

Load & Life Requirements

Extension Max Load ______________________ lbf, kN

Extension Mean Load ______________________ lbf, kN

Retraction Max Load ______________________ lbf, kN

Retraction Mean Load ______________________ lbf, kN

Static Load Max ______________________ lbf, kN

Cycle Rate ______________________ cycles per min, hour, day

Operating Hours per Day ______________________

Operating Days per Week ______________________

Life Requirement ______________________ Total #cycles, #days, #years

Stroke & Speed Requirements

Maximum Stroke ______________________ inches, mm

Maximum Speed ______________________ inches, mm per second

Minimum Speed ______________________ inches, mm per second

Accuracy Grade ______________________ inches, mm

(Standard Accuracy Grade is C5T for KIM Co.'s Ball Screw)

Stroke & Speed Requirements

Application? ______________________

Special Nut Features? ______________________

Include Motors? ______________________

Others? ______________________

Please fill in and E-mail (gear@kimm.co.kr) to be contacted by a KIM Co. sales engineer.

Scan QR code
with your smartphone

www.kimm.co.kr

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***Reliability** proves.*

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