DINGS'

Precision Motion Specialist

SCREW-NUT
PRODUCT CATALOG

Jiangsu DINGS' Intelligent Control Technology Co., Ltd.

www.dingsmotion.com

Founded in 2008, Jiangsu DINGS' Intelligent Control Technology Co., Ltd. is guided by the philosophy,
"Quality stems from responsibility, and details determine success."

As a global leader in precision linear motion, DINGS' delivers a comprehensive portfolio of precision stepper, DC and BLDC motors, voice coil motors, lead and ball screw linear actuators, PMSM motors for eco-mobility, and advanced motion controllers — setting new benchmarks in the global motion control market.

SCALE

200+	Advanced Machining Equipment	
20+	Automated Assembly Lines	
100+	Precision Testing & Analysis Systems	
140+	Patents & Intellectual Properties	

CERTIFICATIONS

ISO 9001 — Quality
ISO 14001 — Environmental
ISO 45001 — Health & Safety
ISO 13485 — Medical Device Quality
IATF16949 — Automotive Quality
IPMS — Intellectual Property
CE — Safety Standards
RoHS COMPLIANT — Environmental Standards - RoHS
REACH NPS — Environmental Standards - REACH

GROWTH

2008	Company Founded & DINGS' Brand Established
2010	DINGS' Motion USA Established
2016	DINGS' Korea Established
2019	Joined LEILI Group
2021	Changzhou Intelligent Manufacturing Plant Established Listed on China NEEQ Market
2022	Korea R&D Center Established
2023	Listed on Beijing Stock Exchange [Stock Code: 920593] DINGS' Korea Converted to Corporate Entity DINGS' Japan Established
2024	New Headquarters & Plant Established DINGS' Motion Europe Established
2025	Thailand Manufacturing Facility Established

PRODUCT WARRANTY

Warranty period: 1 year from shipment.

Free repair is provided for defects in materials or workmanship under normal use.

Warranty does not apply to:

- Warranty expiration or damaged/lost nameplates
- Improper installation or operating conditions
- Unauthorized disassembly or modification
- Repairs conducted outside of official service channels
- Force majeure, including natural disasters

DINGS' is committed to quality, reliability, and responsibility
— delivering high-performance motion solutions built on precision engineering.

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Content

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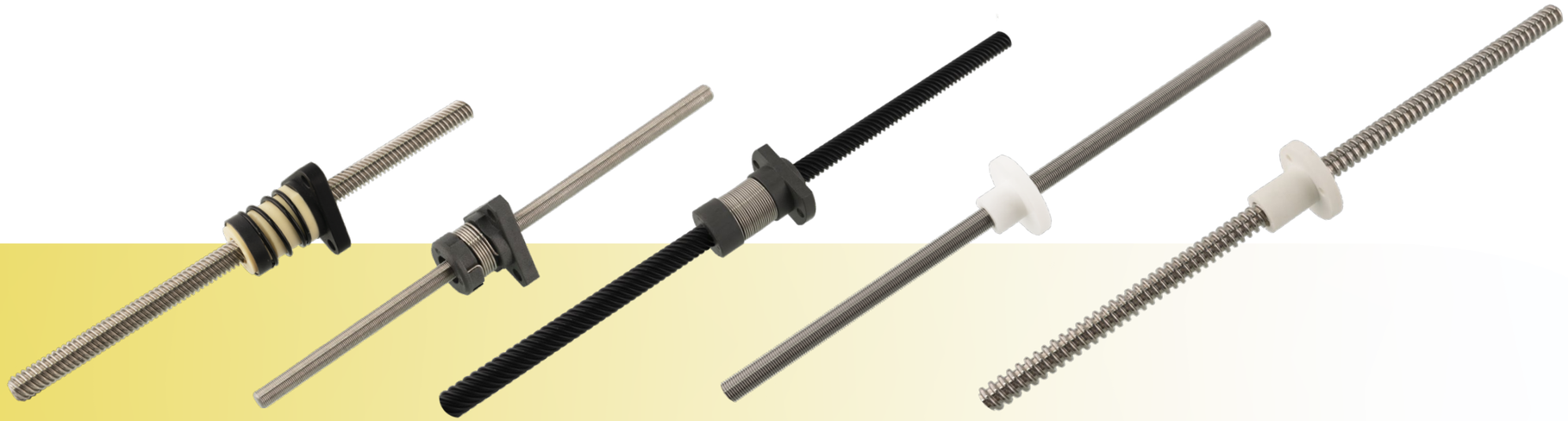
SLIDING TRAPEZOIDAL LEAD SCREW ASSEMBLY



Technical Overview

DINGS' is continuously exploring and improving its Linear Actuator products with the goal of meeting customers' application requirements. DINGS' products are not ordinary screws and nuts. The design of screw threads takes into account the requirements of high precision, long life and low noise, and some special designs are made to increase the fluidity of the material when the screw is processed, which is very important for the screw. Finally, it is used with special material nuts of DINGS' to get the maximum economic value.

1. Precision Lead Screw Manufacturing Technology

Lead Screw Material

DINGS' standard screw material is SUS303/316, we believe that to get a high quality screw, the material performance is the key. We strictly inspect the size and hardness of the material of each batch; customers can find that DINGS' screws are very stable and have good anti-corrosion properties, which can be applied to a variety of strict environments.

In order to get a more accurate thread, the key lies in the stability of the process such as: speed, vibration, temperature and precise control of the flow of coolant. Precision CNC tumblers ensure that the process is stable and adjustable.

Excellent Lead Accuracy

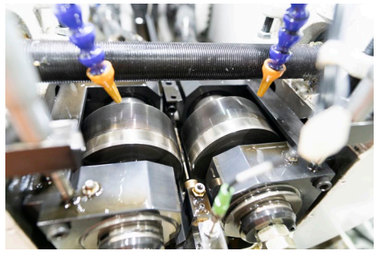
DINGS' has a dynamic lead accuracy measuring instrument, so that the lead accuracy already gets a stable detection in the manufacturing stage. Accuracy can be stably controlled within 0.07mm/300mm, 2 times higher than the industrial standard.

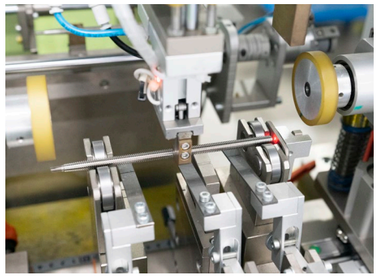
Quality Inspection

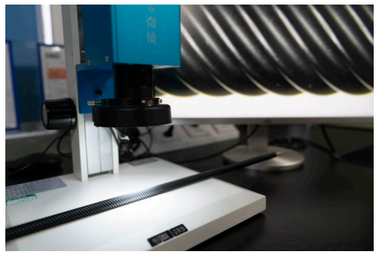
Thread surface is inspected using a high magnification optical device in the manufacturing and coating process.

Teflon Coating Technology

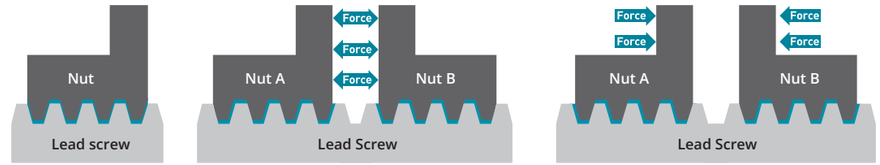
Teflon coating technology, developed and processed in-house, reduces the friction coefficient on the surface of the screw, improving its efficiency and extending its service life. Every coated screw is inspected with an optical device to ensure that there is no flaking or unevenness in the layers.

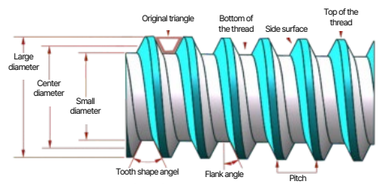


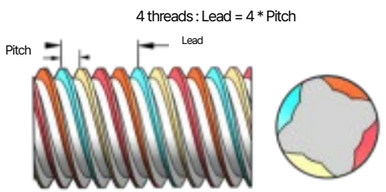


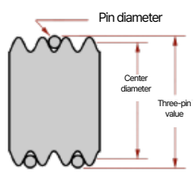


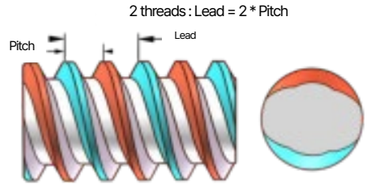
Terminology and Technical Parameters

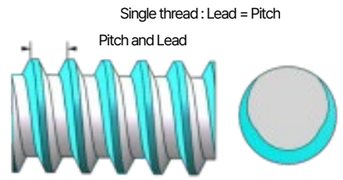
Backlash	Backlash (clearance) is the relative axial movement between a screw and a nut without rotating the screw or nut. Backlash increases with operating time. DINGS' has developed several unique methods to minimize or eliminate the clearance between a screw and a nut.  Standard nut　Torsional spring anti-backlash nut　Compression spring anti-backlash nut
Center diameter	The center diameter is diameter of an imaginary cylindrical. The bushes of that cylinder pass through the threads with equal distances towards grooves and bosses. In an ideal product, each of these distances is equal to half of the pitch of the thread.
Helix angle	The helix angle is the angle formed by the pitch helix and the plane perpendicular to the axis.
Lead accuracy	Lead accuracy is the difference between the actual distance when traveling a lead and the theoretical lead.
Top of thread	Top of the thread.
Bottom of thread	Bottom of the thread.
Side surface	The side surface between the top and the bottom of thread.
Pitch	Pitch is the distance between the corresponding points on two adjacent threads parallel to the thread axis.
Lead	Lead is the axial distance the nut advances in one revolution of the screw. The lead is equal to the pitch multiplied by the number of thread heads. Pitch x number of heads = lead
Tooth shape angle	The flank angle is the angle between the side of the tooth and the vertical thread axis. The flank angle is sometimes referred to as the "half angle" of the thread, but this only applies when adjacent flanks have the same angle (i.e. when the thread is symmetrical).
Actual center diameter	The actual center diameter is determined by measuring the three-needle value and cotter angle in the projected profile perpendicular to the axis, and then calculating with the following formula. Three-needle value - needle diameter × (1 + 1 / sin flank angle) + 0.5 × pitch × cot flank angle = actual center diameter
Inner thread	Small diameters occur at the top of threaded teeth, while large diameters occur at the bottom of threaded teeth.
Outer thread	Small diameters occur at the bottom of threaded teeth, while large diameters occur at the top of threaded teeth.



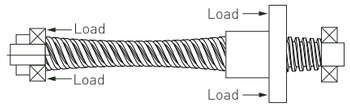
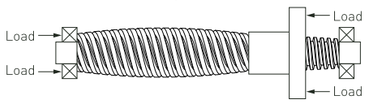
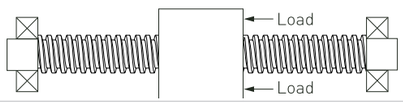
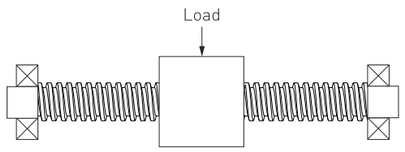








Terminology and Technical Parameters

Thread types	After more than 100 years of development, the ACME thread form replaced the square-threaded screw, which had straight sides and was difficult to manufacture and process, although it was mechanically efficient. There are three main types of ACME thread forms: universal, center and short trapezoidal. The general purpose and center type thread forms have a nominal thread depth of 0.50 x pitch and a thread angle of 29°. The trapezoidal thread form has a thread angle of 30°. High screw precision screw assemblies have an angle of 40°. Short trapezoidal threads follow the same basic design, but the thread depth is less than half the pitch. If the apex nut flank is subjected to radial loads, the large diameter of the screw will wedge into the large diameter of the nut when the nut thread flank contacts the screw thread flank. To prevent wedging, a smaller clearance and tighter tolerances are allowed between the nut's large diameter and the screw's large diameter. Note: Although lateral loads do not cause centering threads to wedge, the nut is still not suitable for lateral loads such as pulleys, drive belts, etc. Centering threads are manufactured to tighter tolerances and have less backlash on larger diameters than general purpose thread forms.
Static load	Maximum thrust load (including impact) applied to the non-moving nut assembly. The actual maximum static load may be reduced depending on the end mechanism and screw mounting hardware.
Dynamic load	The maximum recommended thrust load is applied to both the screw and the nut during movement.
PV load	Any material that carries sliding loads is limited by the heat rising caused by friction. Factors affecting the rate of heat generation during application are the pressure on the nut in kilograms per square centimeter of contact area and the surface sliding speed in meters per minute at large diameters. The product of these factors can be used to assess the superiority of the device.
Tension load	Load that tends to stretch the screw. 
Compression load	Load that tends to press the screw. 
Axial load	A load parallel to and concentric with the axis of the screw. 
Radial load	Radial load applied to the nut. 
Rollover load	Rotate the load along the longitudinal axis of the screw toward the radius.

Terminology and Technical Parameters

Screw and Stepper Motor Selection

The theoretical torque required to drive a load with a screw is :

$$\text{Driving torque} = \frac{\text{Load} * \text{Lead}}{2\pi * \text{screw efficiency}}$$

In order to properly use the above formula, the customer first needs to estimate the total axial load that must be driven by the screw system. The estimated total load should include all mass loads, acceleration loads, system friction loads and nut resistance loads. The frictional loads of the actuator or bearings and the rail system must also be considered - especially if flat bearings or bushings are used. In addition, moving parts and drag forces due to misalignment of the assembly need to be considered. Resistance Torque - Backlash nut assemblies are typically supplied with a resistance torque of 0.007Nm~0.049Nm. The amount of resistance torque depends on the standard shipment. The amount of drag torque depends on standard factory settings or customer specified settings. Generally, the higher the preset force, the better the backlash characteristics. See the Nut Details page for a description of its traction load.

Alternatively, the customer can create a table of estimated total loads at important application speeds and use the above formula to estimate the theoretical value of motor torque for each combination of screw diameter and lead wanted.

After estimating the required motor torque and determining the speed of the application, the customer can review the torque-speed graphs in the DINGS' Product Catalog and User's Guide to determine the specifications of the motor to be selected. Note that it is usually necessary to ensure that the stepper motor produces 1.5 to 2 times the thrust at all speeds at which it is operating. The 1.5 to 2 multiplier helps to compensate for variations in motor torque, friction, small misalignments, cable tray resistance, and other factors that were not taken into account when estimating the total load.

Reverse Drive of the Screw

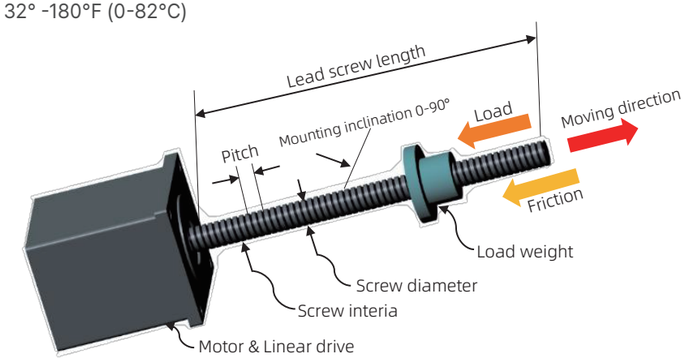
If the efficiency of the screw and nut is high enough, the screw can be driven in reverse when axial thrust is applied to the nut. Generally, reverse drive does not occur when the lead of the screw is less than 1/3 the diameter of an uncoated screw or 1/4 the diameter of a coated screw. Applying a lubricant to the screw reduces the coefficient of friction of the screw & nut system and gives it the ability to reverse drive. A vibrating nut system will reverse drive less efficiently than a comparable nut system that does not vibrate.

The theoretical braking torque required to hold the load is :

$$\text{Holding torque} = \frac{\text{Load} * \text{Lead} * \text{Lead screw efficiency}}{2\pi}$$

Other Systemic Factors

The customer should also check that the 80% critical speed limit of the screw, the maximum compression column load of the screw and the PV derated nut load capacity do not exceed the charts on the following pages. Standard operating temperature range is 32° -180°F (0-82°C)

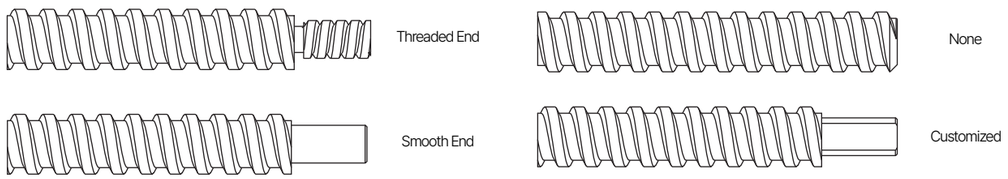


DINGS' lead screw, nut and hybrid linear actuator

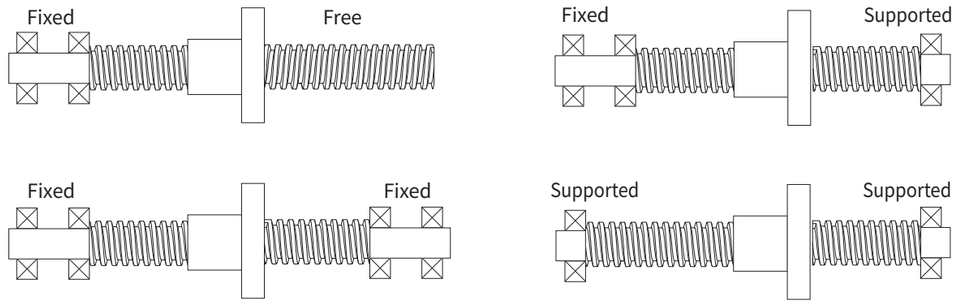
Lead Screw Components

End Machining

Select the end machining specification according to the actual size of the outer diameter of the screw, and contact our technical support engineers for confirmation.



Type of End Fixity

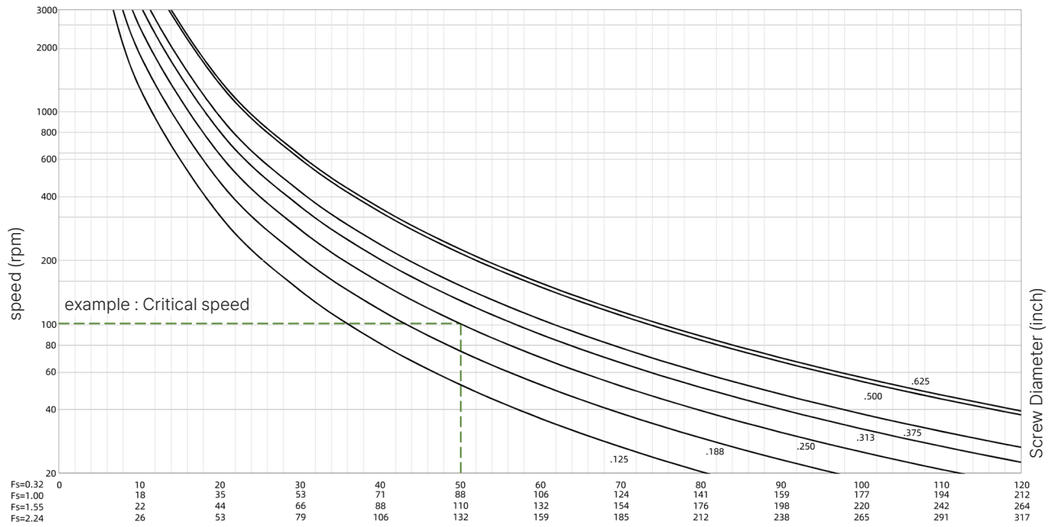


Critical Speed of the Screw

When customers use this chart, they need to determine the fixing method and linear speed of the screw ends, and then calculate the rotational speed based on the lead of the screw.

Note: The speed of the screw should be less than 80% of the critical speed.

Safety Factor K = 1.25



Fix end distance adjusted according to support mode

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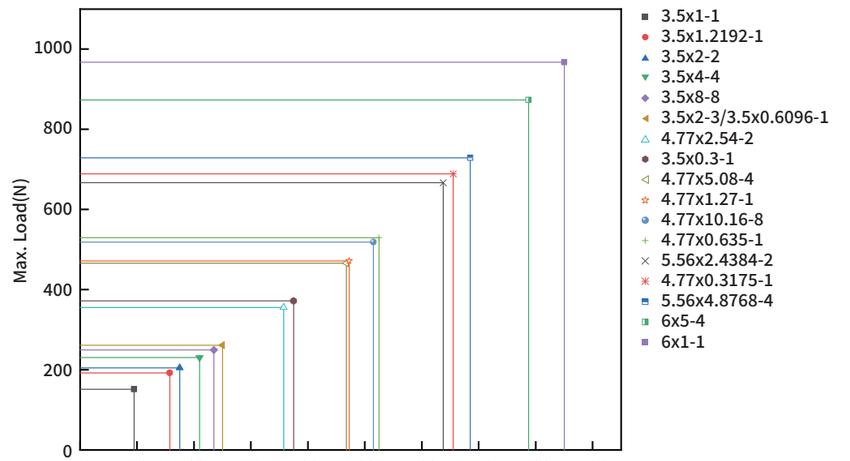
Lead Screw Components

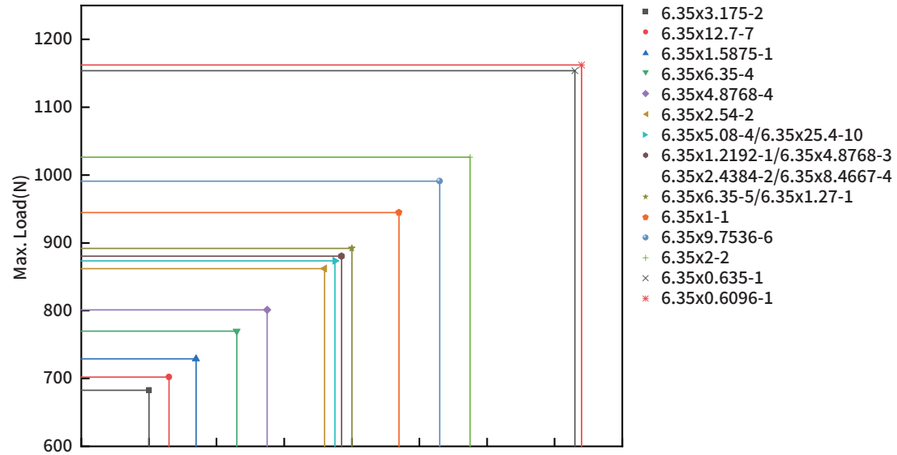
Critical Load of the Screw (Small Diameter Range)

To use this chart: first confirm the fixing method by locating the point where the maximum length between the bearing support and the sliding nut intersects the maximum load, and then ensure that the selected screws are located above and to the right of this point.



Fixed-free	40	50	60	70	80	90	100	110	120	130
Supported-supported	80	100	120	140	160	180	200	220	240	260
Fixed-supported	113	141	170	198	226	255	283	311	339	368
Fixed-fixed	160	200	240	280	320	360	400	440	480	520

Max. length between bearings (mm)



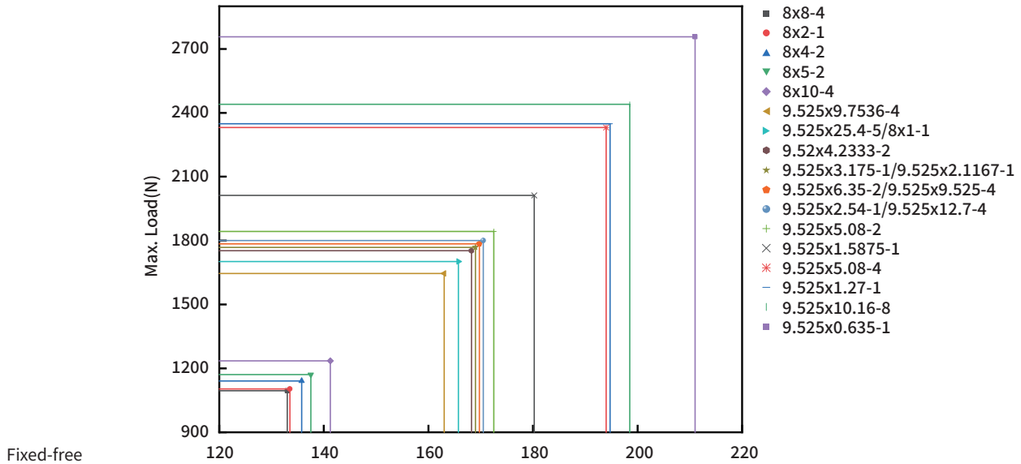
Fixed-free	100	105	110	115	120	125	130	135	140
Supported-supported	200	210	220	230	240	250	260	270	280
Fixed-supported	283	297	311	325	339	354	368	382	396
Fixed-fixed	400	420	440	460	480	500	520	540	560

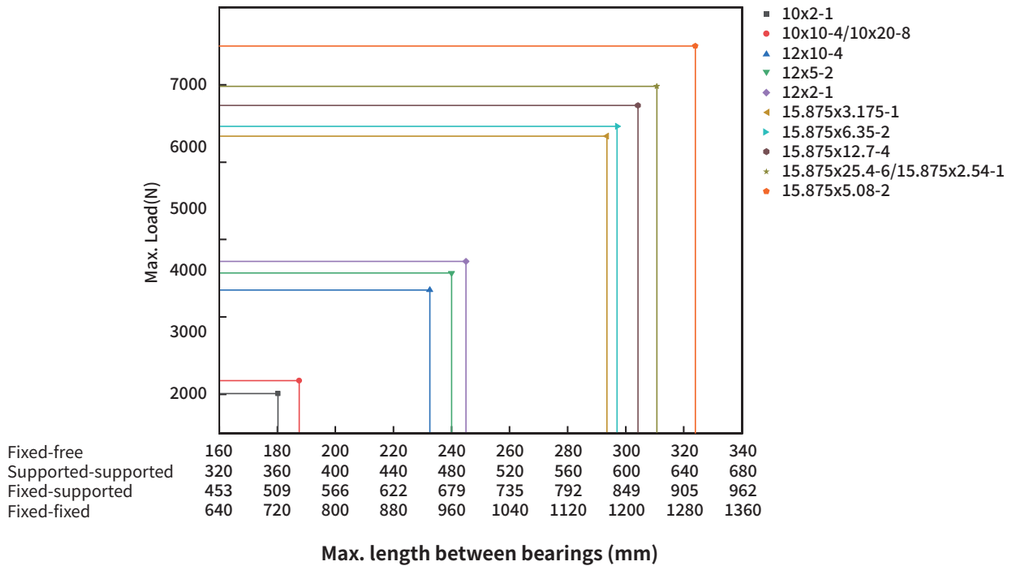
Max. length between bearings (mm)

Lead Screw Components

Critical Load of the Screw (Medium & Large Diameter Range)

To use this chart: first confirm the fixing method by locating the point where the maximum length between the bearing support and the sliding nut intersects the maximum load, and then ensure that the selected screws are located above and to the right of this point.





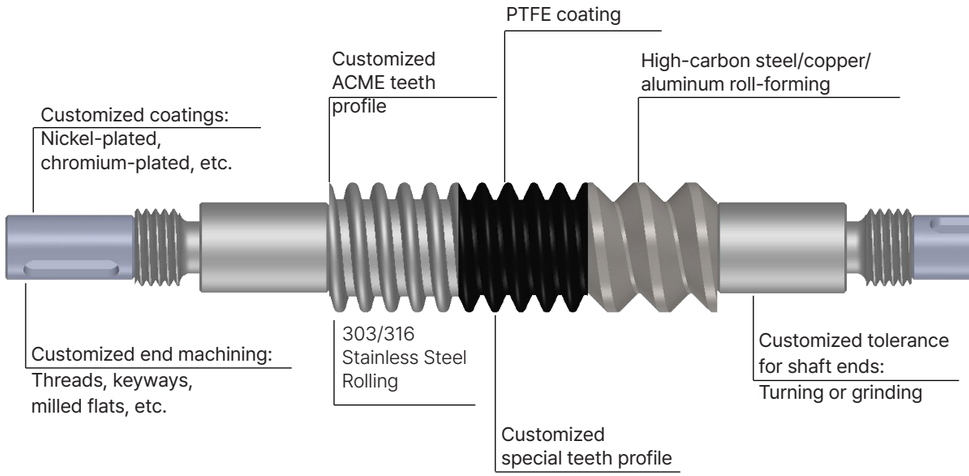
Customized Screw Assembly

Customized Nuts

DINGS' can machine nuts from a wide range of high performance engineered materials such as polyacetal, polyamide, polyphenylene sulfide, polyester or custom engineered polymers including fillers, PTFE, carbon fibers, aramid fibers, glass fibers, etc. In your R&D phase we can provide you with rapid prototyping through machining or 3D printing. In the mass production phase, if you have significant cost and design constraints, then our engineers can help you to reduce costs and optimize your design by opening molds.

Customized Screws

DINGS' manufactures world-class precision screws. Over the years, we have continuously optimized our screw design and rolling process, and we also have the ability to grind and turn screws, all in order to satisfy our customers' requirements. We have customized hundreds of non-standard screws in sizes that are not in our catalog, and we are experts in rolled screws in non-standard materials such as aluminum, copper, high carbon steel, 300 and 400 series stainless steel, etc.



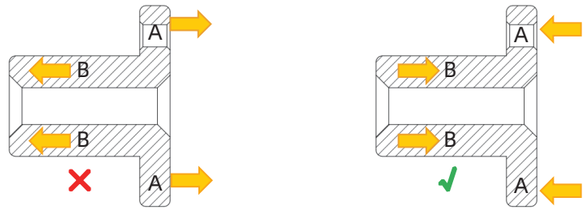
Installation and Maintenance of Sliding Lead Screws

Mounting Screws

The screw must be carefully aligned with the aid of a measuring tool to ensure that the axis is horizontal or vertical. If no measuring tool is available, rotate the screw manually over its entire length before installing the drive unit. Unevenness of force or traces of movement on the outer diameter of the screw may result in axial deviation between the screw shaft and the guide element. In this case the corresponding fixing bolts should be loosened and the screw manually rotated again until the strength is even.

Mounting Nuts

The installation of the nut usually requires attention to coincide with the axis of the screw and is usually commissioned using the same method as for the installation of the screw. It should also be noted that the direction of the load should not attempt to separate flange A from cylinder B, as this is detrimental to the strength of the mechanism.



Lubrication

1. Lubricating oil : Not commonly used, special cases only (e.g. strict costs, short-term use, inability to get the right grease fast enough)
2. Grease : The lubrication method in common cases, will generally give a long service life. It is recommended to clean the screws before lubrication.
3. Type of grease: Bearing grease without solid lubricant or with very fine solid lubricant.

Operating Temperature

Depends on the nut material used, lubrication conditions and operating conditions. For temperatures above 100°C, please consult our engineers.

Wear and Maintenance

1. The lubricating frequency of the screws depend on the operating conditions : Smaller loads and speeds and proper installation are generally associated with a longer service life, which is usually maintenance-free, as we simply wait for the nut to reach the end of its service life and then replace it.
2. Moderate loads and speeds usually require periodic inspection of the condition of the screw and nut. We recommend annual maintenance to remove dust from the surface of the screw and then re-grease the screw, which will prolong its service life.
3. For higher loads and speeds, we recommend that the screws be maintained every three months by cleaning the surface of the screws of dust and replenishing the grease.
4. During maintenance, the screw needs to be rotated manually, if the backlash exceeds the customer's ideal value, then the nut needs to be replaced. If the customer has no requirements for backlash, then according to DINGS' standard, the nut must be replaced when the backlash exceeds 1/3 of the pitch.

Service

We can carry out professional repair work on screws within a short period of time, either at DINGS' or at the customer's premises. This service is also available for third party products. If DINGS' has the standardized product, it can be obtained within a very short period of time.

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Lead Screw Dimension Table

Standard Dia.		Dia. Code	Lead		Lead Code	Outer Dia. (Reference)		Bottom Dia. (Reference)		Corresponding to Left-Handed Thread	Efficiency %
Imperial (inch)	Metric (mm)		Imperial (inch)	Metric (mm)		Imperial (inch)	Metric (mm)	Imperial (inch)	Metric (mm)		
0.098	2.5	009	0.0197	0.5	AD	0.0984	2.5	0.0787	2	-	42
			0.0394	1	AB	0.0976	2.48	0.078	1.98	-	55
0.1181	3	012	0.0197	0.5	AD	0.1169	2.97	0.0933	2.37	-	42
9/64	3.5	014	0.0118	0.3	AF	0.137	3.48	0.1213	3.08	-	24
			0.024	0.6096	AA	0.1358	3.45	0.102	2.59	-	40
			0.0394	1	AB	0.1283	3.26	0.078	1.98	-	58
			0.048	1.2192	B	0.1366	3.47	0.0878	2.23	-	61
			0.0787	2	G	0.137	3.48	0.0874	2.22	yes	72
			0.096	2.4384	J	0.1339	3.4	0.1102	2.8	-	75
			0.1575	4	M	0.1366	3.47	0.0961	2.44	-	79
			0.315	8	T	0.1366	3.47	0.1	2.54	-	81
3/16	4.77	018	0.0125	0.3175	AL	0.1882	4.78	0.1661	4.22	-	21
			0.025	0.635	A	0.1874	4.76	0.1457	3.7	-	33
			0.05	1.27	D	0.1882	4.78	0.1374	3.49	yes	58
			0.0625	1.5875	F	0.1878	4.77	0.1563	3.97	-	60
			0.1	2.54	K	0.1882	4.78	0.1193	3.03	-	69
			0.1874	4.76	AC	0.187	4.75	0.1646	4.18	-	78
			0.192	4.8768	Q	0.1878	4.77	0.1378	3.5	-	79
			0.2	5.08	R	0.1874	4.76	0.1366	3.47	-	80
			0.4	10.16	X	0.1874	4.76	0.1441	3.66	-	82
0.24	6	024	0.0394	1	AB	0.2354	5.98	0.1961	4.98	-	40
			0.0787	2	G	0.2303	5.85	0.1752	4.45	-	59
			0.1969	5	E	0.2354	5.98	0.1862	4.73	-	76
1/4	6.35	025	0.024	0.6096	AA	0.2492	6.33	0.2157	5.48	yes	26
			0.025	0.635	A	0.25	6.35	0.215	5.46	-	27
			0.0313	0.794	N	0.2492	6.33	0.2106	5.35	-	32
			0.0394	1	AB	0.25	6.35	0.1945	4.94	-	37
			0.048	1.2192	B	0.2492	6.33	0.1878	4.77	-	45
			0.05	1.27	D	0.2492	6.33	0.1894	4.81	-	46
			0.0625	1.5875	F	0.2469	6.27	0.1894	4.81	yes	46
			0.096	2.4384	J	0.2496	6.34	0.1886	4.79	-	61
			0.1	2.54	K	0.2488	6.32	0.1886	4.79	yes	62
			0.125	3.175	L	0.2488	6.32	0.1669	4.24	-	67
			0.192	4.8768	Q	0.2492	6.33	0.1791	4.55	-	76
			0.2	5.08	R	0.2496	6.34	0.187	4.75	-	76
			0.25	6.35	S	0.2488	6.32	0.189	4.8	-	76
			0.25	6.35	S	0.2488	6.32	0.1756	4.46	-	78
			0.3333	8.4667	U	0.2492	6.33	0.1886	4.79	-	78
			0.384	9.7536	W	0.2492	6.33	0.1992	5.06	-	78
			0.5	12.7	Y	0.248	6.3	0.1677	4.26	-	82
			1	25.4	Z	0.2496	6.34	0.187	4.75	-	84

Lead Screw Dimension Table

Standard Dia.		Dia. Code	Lead		Lead Code	Outer Dia. (Reference)		Bottom Dia. (Reference)		Corresponding to Left-Handed Thread	Efficiency %
Imperial (inch)	Metric (mm)		Imperial (inch)	Metric (mm)		Imperial (inch)	Metric (mm)	Imperial (inch)	Metric (mm)		
0.315	8	032	0.0394	1	AB	0.3118	7.92	0.2638	6.7	-	34
			0.0787	2	G	0.3122	7.93	0.2102	5.34	-	53
			0.1575	4	M	0.3146	7.99	0.2138	5.43	-	68
			0.1969	5	E	0.3142	7.98	0.2165	5.5	-	73
			0.315	8	T	0.3209	8.15	0.2087	5.3	-	80
			0.3937	10	C	0.3142	7.98	0.2165	5.5	-	82
3/8	9.525	037	0.025	0.635	A	0.374	9.5	0.3323	8.44	-	19
			0.05	1.27	D	0.374	9.5	0.3067	7.79	-	36
			0.0625	1.5875	F	0.3732	9.48	0.2839	7.21	-	41
			0.0833	2.1167	H	0.3728	9.47	0.2673	6.79	-	48
			0.1	2.54	K	0.3732	9.48	0.2677	6.8	yes	53
			0.125	3.175	L	0.3728	9.47	0.2657	6.75	-	59
			0.1667	4.2333	P	0.3728	9.47	0.265	6.73	-	61
			0.2	5.08	R	0.3736	9.49	0.2717	6.9	-	68
			0.25	6.35	S	0.3728	9.47	0.2665	6.77	-	71
			0.375	9.525	V	0.3736	9.49	0.2673	6.79	-	77
			0.384	9.7536	W	0.3732	9.48	0.2567	6.52	-	77
			0.4	10.16	X	0.372	9.45	0.3126	7.94	-	78
			0.5	12.7	Y	0.374	9.5	0.2685	6.82	-	80
			1	25.4	Z	0.3732	9.48	0.261	6.63	-	84
0.394	10	039	0.0787	2	G	0.3902	9.91	0.2839	7.21	-	47
			0.3937	10	C	0.3929	9.98	0.2953	7.5	-	79
			0.7874	20	I	0.3929	9.98	0.2953	7.5	-	82
0.47	12	047	0.0787	2	G	0.4717	11.98	0.3858	9.8	-	39
			0.1965	5	E	0.4717	11.98	0.378	9.6	-	60
			0.3937	10	C	0.4717	11.98	0.3661	9.3	-	73
			0.5906	15	CE	0.4717	11.98	0.3591	9.12	-	78
			0.9843	25	IE	0.4717	11.98	0.3543	9	-	80
0.5	12.7	050	1	25.4	Z	0.4902	12.45	0.3709	9.42	-	84
0.625	15.875	062	0.1	2.54	K	0.6228	15.82	0.4886	12.41	-	40
			0.125	3.175	L	0.6236	15.84	0.4622	11.74	-	47
			0.2	5.08	R	0.6205	15.76	0.5102	12.96	-	58
			0.25	6.35	S	0.622	15.8	0.4677	11.88	-	63
			0.5	12.7	Y	0.6217	15.79	0.4791	12.17	-	74
			1	25.4	Z	0.6228	15.82	0.4894	12.43	-	80

[CS] Circular flange standard Nut

Part Number Construction

Example: L ① CS ② M1 ③ G ④ R ⑤ - 014AB ⑥ 0150.00 ⑦ N ⑧ - 001 ⑨

① Lead Screw Type
- L = Sliding Screw

② Nut Model
- S = Without Nut
- CS = Circular flange standard nut
- CTS = Circular flange trimming standard nut
- CTC = Circular flange trimming compression spring anti-backlash nut
- CTA = Circular flange trimming torsion spring anti-backlash nut A
- TTA = Triangle flange torsion spring anti-backlash nut A
- TTB = Triangle flange torsion spring anti-backlash nut B
- TC = Triangle flange compression spring anti-backlash nut
- NS = Non-standard customization nut

③ Nut Material
- M1 = POM
- M2 = PBT
- M3 = PPS
- M4 = Bronze

④ Screw Surface Treatment
- G = Standard lubrication grease
- T = PTFE coating
- S = No oil, No coating
- D = Non-standard customization

⑤ Thread Direction
- R = Right hand thread
- L = Left hand thread
- C = Non-standard customization

⑥ Lead Screw Specification
- 014 = Diameter code
- AB = Lead code

(Refer to the lead screw dimension table for details)

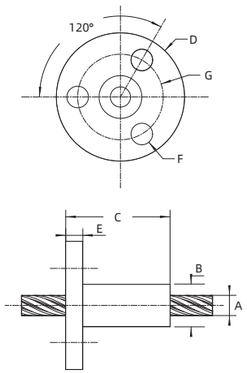
⑦ Lead Screw Length

Metric (mm) : 0000

⑧ End Type
- M = Metric thread
- S = Smooth shaft
- B = Non-standard customization
- N = No machining

⑨ Customization Serial Number

Mechanical Dimension



Material	Operating Temperature
POM	5°C - 80°C (41°F - 176°F)
PBT	-40°C - 120°C (-40°F - 248°F)
PPS	-40°C - 220°C (-40°F - 428°F)

Lead Screw Diameter (A) mm (inch)	3.5 (9/64)	4.77 (3/16)	6 (0.24)	6.35 (1/4)	8 (0.315)	9.5 (3/8)	10 (0.394)	12 (0.47)	15.8 (0.625)
Nut Diameter (B) mm (inch)	6.35 (0.25)	8 (0.31)	12 (0.47)	12 (0.47)	12 (0.47)	15.88 (0.63)	15.88 (0.63)	22 (0.866)	28.6 (1.13)
Nut Length (C) mm (inch)	15.5 (0.61)	9.5 (0.37)	13.4 (0.52)	13.4 (0.52)	13.4 (0.52)	25.4 (1)	25.4 (1)	30 (1.181)	31.7 (1.25)
Flange Diameter (D) mm (inch)	19.05 (0.75)	19.05 (0.75)	25.4 (1)	25.4 (1)	25.4 (1)	31.75 (1.25)	31.75 (1.25)	44 (1.732)	57.15 (2.25)
Flange Thickness (E) mm (inch)	2.54 (0.1)	3.2 (0.126)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)	4.76 (0.19)	4.76 (0.19)	5 (0.197)	12.7 (0.5)
Mounting Hole Diameter (F) mm (inch)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)	3.5 (0.14)	3.5 (0.14)	5.4 (0.213)	7 (0.28)
Bolt Circle Diameter (G) mm (inch)	12.7 (0.5)	12.7 (0.5)	19.05 (0.75)	19.05 (0.75)	19.05 (0.75)	22.22 (0.87)	22.22 (0.87)	31 (1.122)	44.45 (1.75)
Maximum Dynamic Load Capacity Kg (lbs)	11 (24)	15 (33)	20 (44)	20 (44)	20 (44)	35 (75)	35 (75)	68 (149)	100 (220)
Maximum Resistance Torque N-m (oz-in)	No torque	No torque	No torque	No torque	No torque	No torque	No torque	No torque	No torque

[CTS] Circular flange trimming standard nut

Part Number Construction

Example L CTS M1 G R - 014AB 0150.00 N - 001
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Lead Screw Type
L = Sliding Screw

② Nut Model
S = Without Nut
CS = Circular flange standard nut
CTS = Circular flange trimming standard nut
CTC = Circular flange trimming compression spring anti-backlash nut
CTA = Circular flange trimming torsion spring anti-backlash nut A
TTA = Triangle flange torsion spring anti-backlash nut A
TTB = Triangle flange torsion spring anti-backlash nut B
TC = Triangle flange compression spring anti-backlash nut
NS = Non-standard customization nut

③ Nut Material
M1 = POM
M2 = PBT
M3 = PPS
M4 = Bronze

④ Screw Surface Treatment
G = Standard lubrication grease
T = PTFE coating
S = No oil, No coating
D = Non-standard customization

⑤ Thread Direction
R = Right hand thread
L = Left hand thread
C = Non-standard customization

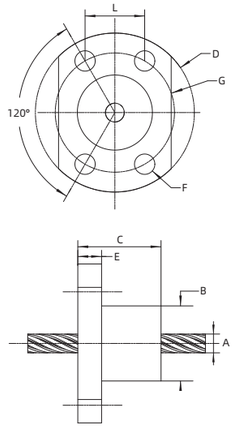
⑥ Lead Screw Specification
014 = Diameter code
AB = Lead code
(Refer to the lead screw dimension table for details)

⑦ Lead Screw Length
Metric (mm) : 0000

⑧ End Type
M = Metric thread
S = Smooth shaft
B = Non-standard customization
N = No machining

⑨ Customization Serial Number

Mechanical Dimension



Material	Operating Temperature
POM	5°C - 80°C (41°F - 176°F)
PBT	-40°C - 120°C (-40°F - 248°F)
PPS	-40°C - 220°C (-40°F - 428°F)

Lead Screw Diameter (A) mm (inch)	6 (0.24)	6.35 (1/4)	8 (0.315)	9.5 (3/8)	10 (0.394)
Nut Diameter (B) mm (inch)	12 (0.47)	12 (0.47)	12 (0.47)	15.8 (0.62)	15.8 (0.62)
Nut Length (C) mm (inch)	13.3 (0.52)	13.3 (0.52)	13.3 (0.52)	25.25 (0.99)	25.25 (0.99)
Flange Diameter (D) mm (inch)	24.4 (0.96)	24.4 (0.96)	24.4 (0.96)	31.8 (1.25)	31.8 (1.25)
Flange Thickness (E) mm (inch)	3.8 (0.15)	3.8 (0.15)	3.8 (0.15)	4.7 (0.185)	4.7 (0.185)
Mounting Hole Diameter (F) mm (inch)	3.25 (0.13)	3.25 (0.13)	3.25 (0.13)	4.2 (0.165)	4.2 (0.165)
Bolt Circle Diameter (G) mm (inch)	19.05 (0.75)	19.05 (0.75)	19.05 (0.75)	22.22 (0.87)	22.22 (0.87)
Mounting Hole Spacing (L) mm (inch)	9.45 (0.37)	9.45 (0.37)	9.45 (0.37)	11.05 (0.435)	11.05 (0.435)
Maximum Dynamic Load Capacity Kg (lbs)	20 (44)	20 (44)	20 (44)	35 (75)	35 (75)
Maximum Resistance Torque N-m (oz-in)	No torque	No torque	No torque	No torque	No torque

[CTC] Circular flange trimming compression spring anti-backlash nut

Part Number Construction

Example L CTC M1 G R - 014AB 0150.00 N - 001
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Lead Screw Type
L = Sliding Screw

② Nut Model
S = Without Nut
CS = Circular flange standard nut
CTS = Circular flange trimming standard nut
CTC = Circular flange trimming compression spring anti-backlash nut
CTA = Circular flange trimming torsion spring anti-backlash nut A
TTA = Triangle flange torsion spring anti-backlash nut A
TTB = Triangle flange torsion spring anti-backlash nut B
TC = Triangle flange compression spring anti-backlash nut
NS = Non-standard customization nut

③ Nut Material
M1 = POM
M5 = PA66

④ Screw Surface Treatment
G = Standard lubrication grease
T = PTFE coating
S = No oil, No coating
D = Non-standard customization

⑤ Thread Direction
R = Right hand thread
L = Left hand thread
C = Non-standard customization

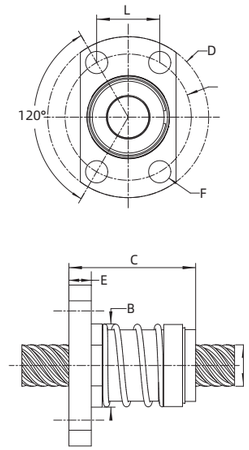
⑥ Lead Screw Specification
014 = Diameter code
AB = Lead code
(Refer to the lead screw dimension table for details)

⑦ Lead Screw Length
Metric (mm) : 0000

⑧ End Type
M = Metric thread
S = Smooth shaft
B = Non-standard customization
N = No machining

⑨ Customization Serial Number

Mechanical Dimension



Material	Operating Temperature
POM	5°C - 80°C (41°F - 176°F)
PA66	-5°C - 100°C (-23°F - 212°F)

Lead Screw Diameter (A) mm (inch)	6 (0.24)	6.35 (1/4)	8 (0.315)	9.5 (3/8)	10 (0.394)
Nut Diameter (B) mm (inch)	15.9 (0.625)	15.9 (0.625)	15.9 (0.625)	19.15 (0.75)	19.15 (0.75)
Nut Length (C) mm (inch)	25 (0.98)	25 (0.98)	25 (0.98)	30 (1.18)	30 (1.18)
Flange Diameter (D) mm (inch)	31 (1.22)	31 (1.22)	31 (1.22)	37 (1.46)	37 (1.46)
Flange Thickness (E) mm (inch)	4.1 (0.16)	4.1 (0.16)	4.1 (0.16)	5.15 (0.20)	5.15 (0.20)
Mounting Hole Diameter (F) mm (inch)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)	5.1 (0.2)	5.1 (0.2)
Bolt Circle Diameter (G) mm (inch)	25 (0.98)	25 (0.98)	25 (0.98)	29 (1.14)	29 (1.14)
Mounting Hole Spacing (L) mm (inch)	12.5 (0.49)	12.5 (0.49)	12.5 (0.49)	14.5 (0.57)	14.5 (0.57)
Maximum Dynamic Load Capacity Kg (lbs)	2.3 (5)	2.3 (5)	3.6 (8)	3.6 (8)	3.6 (8)
Maximum Resistance Torque N-m (oz-in)	0.03 (4)	0.03 (4)	0.04 (5)	0.04 (5)	0.04 (5)

[CTA] Circular flange cut-edge torsion spring anti-backlash nut A

Part Number Construction

Example L CTA M1 G R - 014AB 0150.00 N - 001
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Lead Screw Type
L = Sliding Screw

② Nut Model
S = Without Nut
CS = Circular flange standard nut
CTS = Circular flange trimming standard nut
CTC = Circular flange trimming compression spring anti-backlash nut
CTA = Circular flange trimming torsion spring anti-backlash nut A
TTA = Triangle flange torsion spring anti-backlash nut A
TTB = Triangle flange torsion spring anti-backlash nut B
TC = Triangle flange compression spring anti-backlash nut
NS = Non-standard customization nut

③ Nut Material
M1 = POM
M5 = PA66

④ Screw Surface Treatment
G = Standard lubrication grease
T = PTFE coating
S = No oil, No coating
D = Non-standard customization

⑤ Thread Direction
R = Right hand thread
L = Left hand thread
C = Non-standard customization

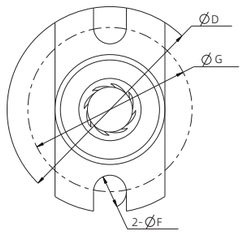
⑥ Lead Screw Specification
014 = Diameter code
AB = Lead code
(Refer to the lead screw dimension table for details)

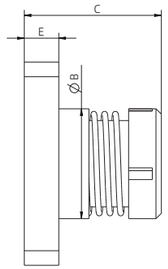
⑦ Lead Screw Length
Metric (mm) : 0000

⑧ End Type
M = Metric thread
S = Smooth shaft
B = Non-standard customization
N = No machining

⑨ Customization Serial Number

Mechanical Dimension





Material	Operating Temperature
POM	5°C - 80°C (41°F - 176°F)
PA66	-5°C - 100°C (-23°F - 212°F)

Lead Screw Diameter (A) mm (inch)	3.5 (9/64)	4.77 (3/16)
Nut Diameter (B) mm (inch)	10.2 (0.4)	10.2 (0.4)
Nut Length (C) mm (inch)	12.72 (0.5)	12.72 (0.5)
Flange Diameter (D) mm (inch)	19.1 (0.75)	19.1 (0.75)
Flange Thickness (E) mm (inch)	3.2 (0.13)	3.2 (0.13)
Mounting Hole Diameter (F) mm (inch)	3.05 (0.12)	3.05 (0.12)
Bolt Circle Diameter (G) mm (inch)	15.24 (0.6)	15.24 (0.6)
Maximum Dynamic Load Capacity Kg (lbs)	2.3 (5)	2.3 (5)
Maximum Resistance Torque N-m (oz-in)	0.004 (0.5)	0.004 (0.5)

[TTA] Triangular flange torsion spring anti-backlash nut A

Part Number Construction

Example L TTA M1 G R - 014AB 0150.00 N - 001
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Lead Screw Type
L = Sliding Screw

② Nut Model
S = Without Nut
CS = Circular flange standard nut
CTS = Circular flange trimming standard nut
CTC = Circular flange trimming compression spring anti-backlash nut
CTA = Circular flange trimming torsion spring anti-backlash nut A
TTA = Triangle flange torsion spring anti-backlash nut A
TTB = Triangle flange torsion spring anti-backlash nut B
TC = Triangle flange compression spring anti-backlash nut
NS = Non-standard customization nut

③ Nut Material
M1 = POM
M5 = PA66

④ Screw Surface Treatment
G = Standard lubrication grease
T = PTFE coating
S = No oil, No coating
D = Non-standard customization

⑤ Thread Direction
R = Right hand thread
L = Left hand thread
C = Non-standard customization

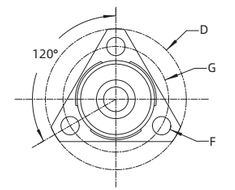
⑥ Lead Screw Specification
014 = Diameter code
AB = Lead code
(Refer to the lead screw dimension table for details)

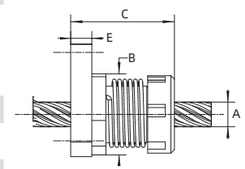
⑦ Lead Screw Length
Metric (mm) : 0000

⑧ End Type
M = Metric thread
S = Smooth shaft
B = Non-standard customization
N = No machining

⑨ Customization Serial Number

Mechanical Dimension





Material	Operating Temperature
POM	5°C - 80°C (41°F - 176°F)
PA66	-5°C - 100°C (-23°F - 212°F)

Lead Screw Diameter (A) mm (inch)	3.5 (9/64)	4.77 (3/16)
Nut Diameter (B) mm (inch)	11.5 (0.45)	11.5 (0.45)
Nut Length (C) mm (inch)	14.5 (0.57)	14.5 (0.58)
Flange Diameter (D) mm (inch)	20 (0.79)	20 (0.79)
Flange Thickness (E) mm (inch)	3 (0.12)	3 (0.12)
Mounting Hole Diameter (F) mm (inch)	2.6 (0.1)	2.6 (0.1)
Bolt Circle Diameter (G) mm (inch)	15 (0.59)	15 (0.59)
Maximum Dynamic Load Capacity Kg (lbs)	2.3 (5)	2.3 (5)
Maximum Resistance Torque N-m (oz-in)	0.004 (0.5)	0.004 (0.5)

[TTB] Triangular flange torsion spring anti-backlash nut B

Part Number Construction

Example L TTB M1 G R - 014AB 0150.00 N - 001
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Lead Screw Type
L = Sliding Screw

② Nut Model
S = Without Nut
CS = Circular flange standard nut
CTS = Circular flange trimming standard nut
CTC = Circular flange trimming compression spring anti-backlash nut
CTA = Circular flange trimming torsion spring anti-backlash nut A
TTA = Triangle flange torsion spring anti-backlash nut A
TTB = Triangle flange torsion spring anti-backlash nut B
TC = Triangle flange compression spring anti-backlash nut
NS = Non-standard customization nut

③ Nut Material
M1 = POM
M2 = PBT
M3 = PPS

④ Screw Surface Treatment
G = Standard lubrication grease
T = PTFE coating
S = No oil, No coating
D = Non-standard customization

⑤ Thread Direction
R = Right hand thread
L = Left hand thread
C = Non-standard customization

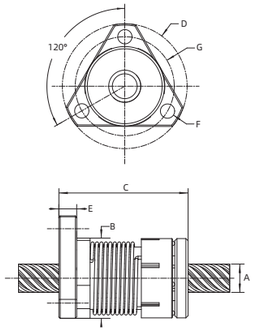
⑥ Lead Screw Specification
014 = Diameter code
AB = Lead code
(Refer to the lead screw dimension table for details)

⑦ Lead Screw Length
Metric (mm) : 0000

⑧ End Type
M = Metric thread
S = Smooth shaft
B = Non-standard customization
N = No machining

⑨ Customization Serial Number

Mechanical Dimension



Material	Operating Temperature
POM	5°C - 80°C (41°F - 176°F)
PBT	-40°C - 120°C (-40°F - 248°F)
PPS	-40°C - 220°C (-40°F - 428°F)

Lead Screw Diameter (A) mm (inch)	6 (0.24)	6.35 (1/4)	8 (0.315)	9.5 (3/8)	10 (0.394)
Nut Diameter (B) mm (inch)	18 (0.7)	18 (0.7)	18 (0.7)	20 (0.79)	20 (0.79)
Nut Length (C) mm (inch)	30 (1.18)	30 (1.18)	30 (1.18)	40 (1.57)	40 (1.57)
Flange Diameter (D) mm (inch)	28 (1.1)	28 (1.1)	28 (1.1)	38.1 (1.5)	38.1 (1.5)
Flange Thickness (E) mm (inch)	4 (0.157)	4 (0.157)	4 (0.157)	7 (0.276)	7 (0.276)
Mounting Hole Diameter (F) mm (inch)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)	5.1 (0.2)	5.1 (0.2)
Bolt Circle Diameter (G) mm (inch)	22.22 (0.87)	22.22 (0.87)	22.22 (0.87)	28.6 (1.125)	28.6 (1.125)
Maximum Dynamic Load Capacity Kg (lbs)	5 (11)	5 (11)	10 (20)	10 (20)	10 (20)
Maximum Resistance Torque N-m (oz-in)	0.004-0.014 (0.5-2)	0.004-0.014 (0.5-2)	0.007-0.020 (1-3)	0.007-0.020 (1-3)	0.007-0.020 (1-3)

[TC] Triangular flange compression spring anti-backlash nut

Part Number Construction

Example L TC M1 G R - 014AB 0150.00 N - 001
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Lead Screw Type
L = Sliding Screw

② Nut Model
S = Without Nut
CS = Circular flange standard nut
CTS = Circular flange trimming standard nut
CTC = Circular flange trimming compression spring anti-backlash nut
CTA = Circular flange trimming torsion spring anti-backlash nut A
TTA = Triangle flange torsion spring anti-backlash nut A
TTB = Triangle flange torsion spring anti-backlash nut B
TC = Triangle flange compression spring anti-backlash nut
NS = Non-standard customization nut

③ Nut Material
M1 = POM
M5 = PA66

④ Screw Surface Treatment
G = Standard lubrication grease
T = PTFE coating
S = No oil, No coating
D = Non-standard customization

⑤ Thread Direction
R = Right hand thread
L = Left hand thread
C = Non-standard customization

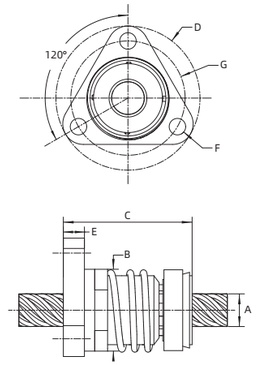
⑥ Lead Screw Specification
014 = Diameter code
AB = Lead code
(Refer to the lead screw dimension table for details)

⑦ Lead Screw Length
Metric (mm) : 0000

⑧ End Type
M = Metric thread
S = Smooth shaft
B = Non-standard customization
N = No machining

⑨ Customization Serial Number

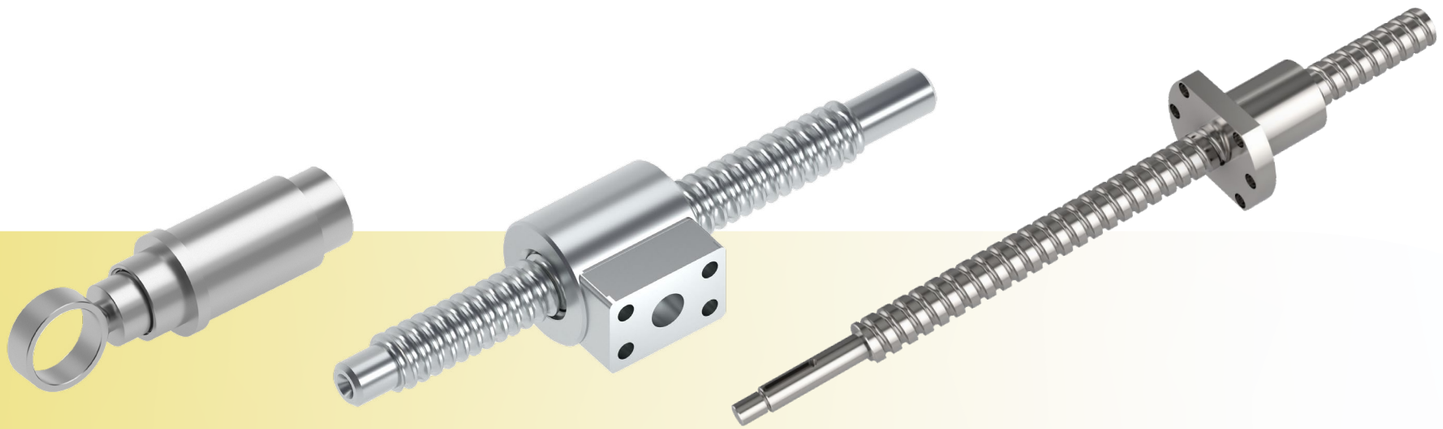
Mechanical Dimension



Material	Operating Temperature
POM	5°C - 80°C (41°F - 176°F)
PA66	-5°C - 100°C (-23°F - 212°F)

Lead Screw Diameter (A) mm (inch)	6 (0.24)	6.35 (1/4)	8 (0.315)	9.5 (3/8)	10 (0.394)
Nut Diameter (B) mm (inch)	15.9 (0.625)	15.9 (0.625)	15.9 (0.625)	19.15 (0.75)	19.15 (0.75)
Nut Length (C) mm (inch)	25 (0.98)	25 (0.98)	25 (0.98)	30 (1.18)	30 (1.18)
Flange Diameter (D) mm (inch)	28 (1.1)	28 (1.1)	28 (1.1)	38.3 (1.5)	38.3 (1.5)
Flange Thickness (E) mm (inch)	4.1 (0.16)	4.1 (0.16)	4.1 (0.16)	5.15 (0.2)	5.15 (0.2)
Mounting Hole Diameter (F) mm (inch)	3.2 (0.126)	3.2 (0.126)	3.2 (0.126)	5.1 (0.2)	5.1 (0.2)
Bolt Circle Diameter (G) mm (inch)	22.22 (0.87)	22.22 (0.87)	22.22 (0.87)	28.4 (1.12)	28.4 (1.12)
Maximum Dynamic Load Capacity Kg (lbs)	2.3 (5)	2.3 (5)	3.6 (8)	3.6 (8)	3.6 (8)
Maximum Resistance Torque N-m (oz-in)	0.03 (4)	0.03 (4)	0.04 (5)	0.04 (5)	0.04 (5)

BALL SCREW ASSEMBLY



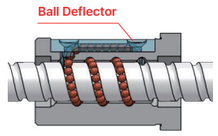
DINGS
Precision Motion Specialist

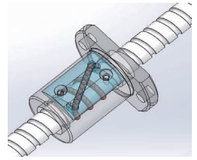
Technical Overview

1. Ball Screw Structure

Deflector Type

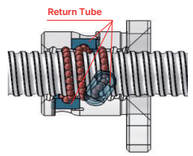
The deflector type uses a deflector or an integrated guide structure installed inside the nut to redirect the ball path and achieve recirculation. Compared with the return tube type, the nut outer diameter can be designed smaller. With a single-circuit design, it provides high load capacity and smooth operation.

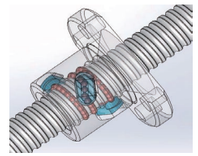




Return Tube Type

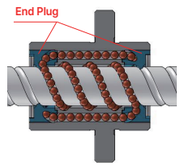
In the return tube type, the balls travel along the raceway between the screw shaft and the nut while carrying the axial load. They then move to an adjacent raceway through the return tube and re-enter the load zone, forming a continuous circulation path.

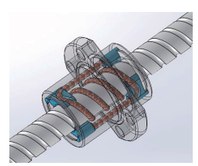




End Deflector Type

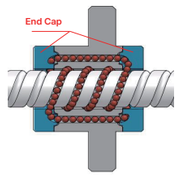
The end deflector type uses an end deflector installed inside the nut to guide the balls into the nut body, allowing them to circulate continuously along raceways in the same direction. Compared with the deflector type, the nut can be designed with a more compact radial dimension, making it particularly suitable for medium lead applications.

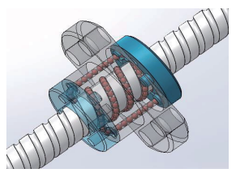




End Cap Type

In the end cap type, the balls move along the raceway between the screw shaft and the nut.They are then guided through end caps installed at both ends of the nut and return to the starting point through an internal passage inside the nut body, forming a closed-loop circulation system.





2. Production Range of Ball Screws

DINGS' ball screws are available in nominal screw shaft diameters from Ø4 mm to Ø25 mm. The table below shows the reference maximum shaft lengths by accuracy grade. Actual lengths may vary depending on shaft-end configuration, material, and series. For details, please contact our sales engineers.

Maximum Overall Length of Precision Ball Screws

Unit: mm

Nominal Dia. \ Accuracy Grade	C3 (Ground)	C5 (Ground)	C7 (Rolled)	C10 (Rolled)
4	160	170	400	400
6	240	250	600	600
8	330	400	600	600
10	420	450	600	600
12	510	550	600	600
14	600	700	600	600

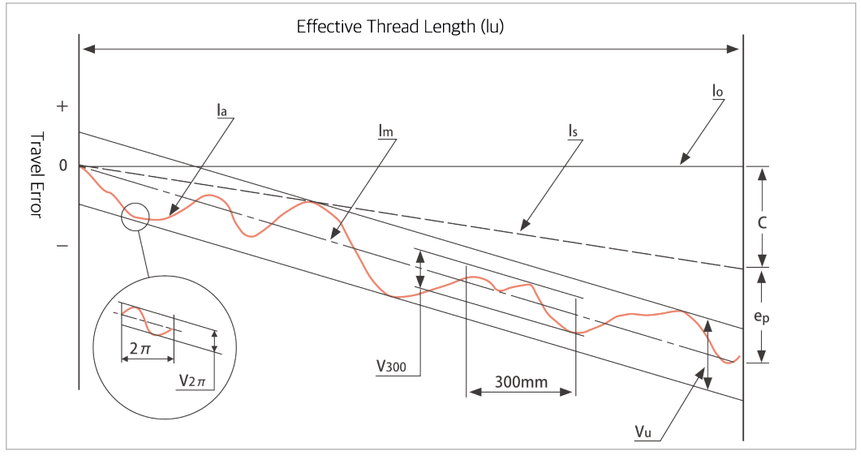
Notes

For lengths exceeding the maximum production limit, please contact our sales engineers.
For rolled ball screws, the maximum length includes 25 mm of incomplete thread at each end.

Technical Overview

3. Lead Accuracy of Ball Screws

The lead accuracy of a ball screw refers to the representative deviation and variation of the travel error relative to the effective nut travel or the effective threaded length of the screw shaft. It also includes the variation measured over any 300 mm length of the effective thread and over one revolution (2π rad).



[Travel Error Diagram]

Nominal Travel (l_o) The axial travel for any number of revolutions based on the nominal lead.

Standard Lead (Phs) A lead compensated from the nominal lead to account for predicted deformation due to temperature rise and applied load.

Target Value of Representative Travel (c) The target value obtained by presetting the standard travel with a positive or negative offset.

Standard Travel (l_s) The travel for any number of revolutions based on the standard lead.

Actual Travel (l_a) The actual axial displacement of the nut relative to an arbitrary rotation angle of the screw shaft.

Representative Travel (l_m) A straight line representing the trend of the actual travel, determined from the actual travel curve using the least-squares method or a similar approximation.

Representative Travel Error (e_p) The difference between the representative travel and the standard travel corresponding to the effective travel or effective threaded length.

Variation (V_u) The max. amplitude of the actual travel between two lines parallel to the representative travel line.

Variation over 300 mm (V_{300}) The maximum amplitude of the actual travel over any 300 mm of the effective threaded section.

Variation over One Revolution ($V_2\pi$) The max. amplitude of the actual travel over one revolution (2π rad) of the effective threaded section.

Allowable Representative Travel Error ($\pm e_p$) and Variation (V_u)

Unit: mm

Accuracy Grade			C3		C5	
Effective Threaded Length (mm)	Over	Up to	$\pm e_p$	V_u	$\pm e_p$	V_u
	-	100	8	8	18	18
	100	200	10	8	20	18
	200	315	12	8	23	18
	315	400	13	10	25	20
	400	500	15	10	27	20
	500	630	16	12	30	23
	630	800	18	13	35	25
	800	1000	21	13	40	27

Permissible Variation (V_{300}) and ($V_{2\pi}$) per 300 mm and One Revolution for Precision Ball Screws

Unit : μm

Precision Grade	C3		C5	
Item	V_{300}	$V_{2\pi}$	V_{300}	$V_{2\pi}$
Permissible Value	8	6	18	8

Variation (V_{300}) for C7 and C10 over 300 mm

Unit : μm

Precision Grade	C7	C10
V_{300}	52	210

The representative travel error (e_p) for C7 and C10 is calculated using the following formula:

$$e_p = \pm \frac{lu}{300} \times V_{300}$$

lu : Effective thread length (mm)

4. Material, Heat Treatment, and Hardness

The standard material, heat treatment, and hardness of DINGS' ball screws are shown in the table below. Values may vary slightly depending on the series and model; please refer to the specifications provided by DINGS'.

Component	Material	Heat Treatment	Thread Surface Hardness
Screw Shaft	SUJ2 (JIS G 4105)	Induction hardening	HRC 58–62
	S55C (JIS G 4105)	Induction hardening	HRC ≥58
	SUS440C	Quenched and tempered	HRC ≥55
Ball Nut	SCM420H (JIS G 4105)	Carburized and hardened	HRC 58–62
	SUS440C	Quenched and tempered	HRC ≥55

Note: S55C material is used for rolled ball screws, while SUJ2 material is used for ground ball screws.

5. Axial Clearance and Preload

Axial Clearance

In general, a standard single-nut ball screw has a small axial clearance between the screw shaft and the nut. When an axial load is applied, the sum of this axial clearance and the elastic displacement caused by the load increases the clearance, resulting in backlash.

To eliminate such backlash, the axial clearance of the ball screw must be made negative by applying elastic deformation in advance between the screw shaft and the nut—this method is referred to as preload.

The combinations of axial clearance and accuracy grades for DINGS' ball screws are shown in the table below.

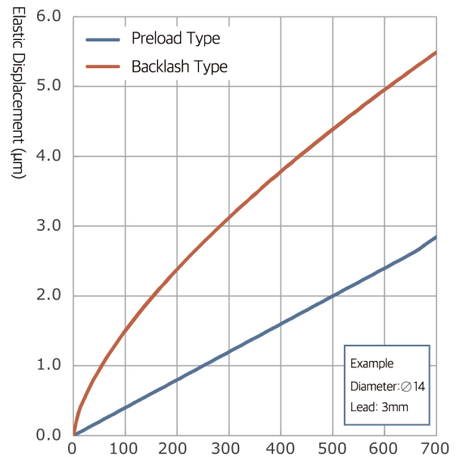
Axial Clearance / Accuracy Grade	Z (Preload)	T (≤0.005 mm)	S (≤0.02 mm)	N (≤0.05 mm)
C3	●	●	●	●
C5		●	●	●
C7			●	●
C10			●	●

Effect of Preload

Applying preload not only eliminates axial clearance in ball screws, but also reduces axial displacement caused by axial loads, thereby increasing stiffness.

The figure below illustrates the difference in elastic displacement under axial load between a clearance-type ball screw and a preloaded (zero-clearance) ball screw (theoretical values). As shown, preload reduces elastic displacement, resulting in improved stiffness.

Elastic Displacement Curves for Clearance-Type and Preloaded Specifications



Appropriate Preload Amount

The preload amount should be determined based on the required stiffness or allowable backlash. However, applying preload may result in the following effects:

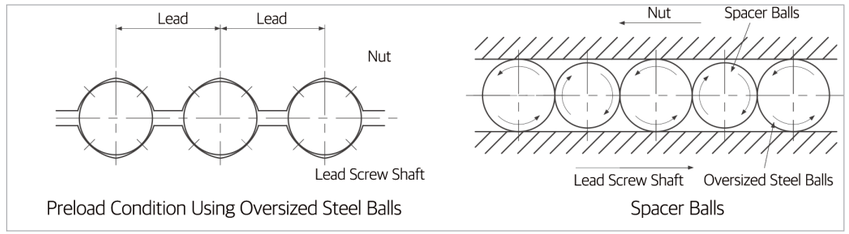
1. Increased dynamic torque
2. Reduced positioning accuracy due to heat generation and temperature rise
3. Shortened service life

Therefore, the preload amount should be set as low as possible while meeting performance requirements.

Technical Overview

Preload Methods

Ball screws are generally preloaded using the double-nut preload method, in which spacers (shims) are inserted between two nuts. Leveraging the characteristics of miniature ball screws, DINGS' ball screws adopt a large-ball preload method, where steel balls slightly larger than the clearance between the screw shaft and the nut are inserted. This method completely eliminates clearance using only a single nut, maintaining a compact structure. In addition, spacer balls slightly smaller than the preload balls are alternately used to prevent deterioration of motion performance.

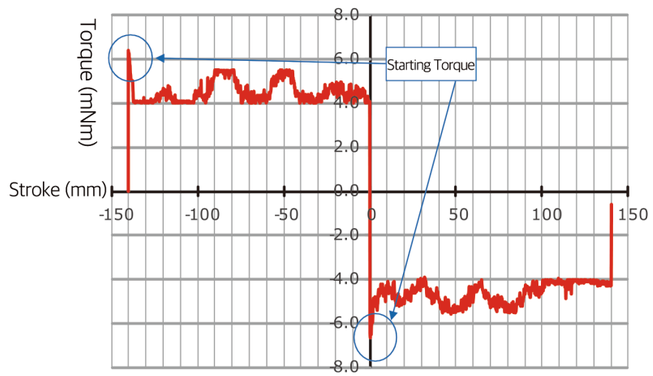


Preload Management

Direct measurement and control of ball screw preload are difficult. Therefore, preload is typically managed by converting it to preload running torque and controlling it through torque measurement. The preload running torque value is specified in the specification drawing.

To ensure proper preload (zero axial clearance), running torque is always measured under defined conditions. As a result, differences in lubrication and operating conditions may cause variations in measured torque. Please also note that starting torque (the torque required to initiate motion) is slightly higher than the running torque.

Torque Measurement Example



Note: The torque variation illustrated is intentionally exaggerated for explanatory purposes.

6. Rust Prevention and Lubrication

Rust Prevention

DINGS' ball screws are coated with rust-preventive oil for long-term storage. Before use, remove the oil with clean refined kerosene and apply lubricating oil or grease. Grease can be applied prior to shipment upon request; however, long-term storage with grease may cause rust.

Note: The rust-preventive oil is for corrosion protection only and provides no lubrication. Using the ball screw without removing this oil may reduce service life and cause increased torque or abnormal heat generation.

Lubrication

Lubrication is essential when using ball screws. Insufficient lubrication may cause increased torque and shortened service life. Proper lubrication suppresses temperature rise due to friction, loss of mechanical efficiency, and accuracy degradation caused by wear. Ball screws can be lubricated with grease or oil. Grease lubrication: Lithium soap–based grease is generally recommended. Oil lubrication: ISO VG 32–68 (turbine oil) is recommended.

Selecting the appropriate lubricant according to the application is particularly important. For miniature ball screws, grease churning resistance may increase torque. DINGS' provides proprietary greases optimized for ball screw performance: MSG No.1 (NLGI No.1) for low-speed positioning applications requiring smooth motion, and MSG No.2 (NLGI No.2) for high-speed and general-purpose applications.

Recommended Lubricants

Lubricant Type	Category	Product Name
Grease	Lithium-based grease	AFG Grease
Lubricating Oil	Slideway oil or turbine oil	Super Multi 68

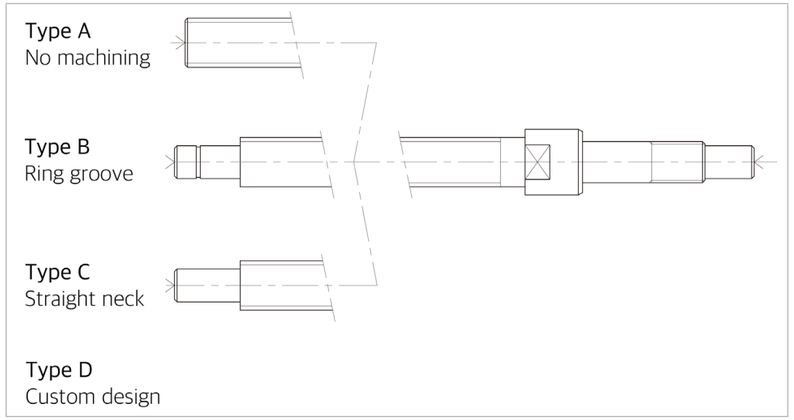
Inspection and Replenishment

When using grease lubrication, inspections should be conducted every 2–3 months; when using oil lubrication, inspections should be conducted weekly. During inspection, check the lubricant quantity and contamination, and replenish as necessary. When adding new grease, remove old and discolored grease as thoroughly as possible.

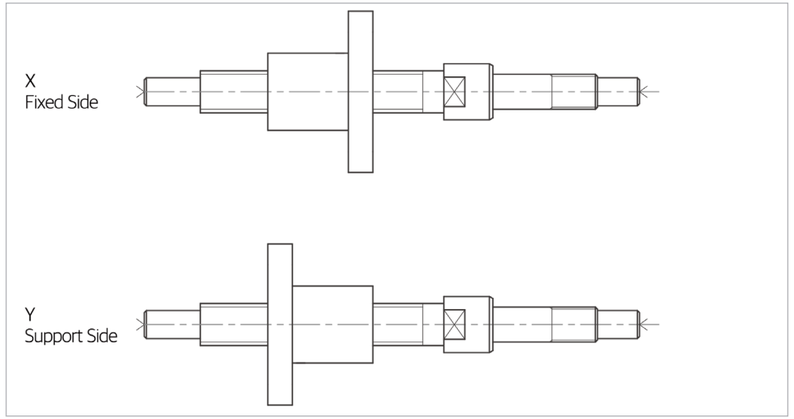
Lubrication Method	Inspection Interval	Inspection Items	Replenishment / Replacement Interval
Automatic Intermittent Lubrication	Weekly	Oil quantity, contamination	Replenish appropriately at each inspection based on reservoir capacity
Grease	Initial operation: 2–3 months	Contamination, chips, foreign matter	Typically replenished once per year; adjust based on inspection results and remove discolored old grease
Oil Bath	Before daily operation	Oil level	Adjust appropriately according to consumption

Technical Overview

7. Support-side Shaft End Machining Type



8. Nut Flange Orientation



Operating Instructions & Precaution

Instructions for Use

During storage, keep the product in its original packaging. Do not open or damage the internal packaging, as this may allow foreign matter to enter or cause corrosion, resulting in degraded performance.

Operating Instructions

1. Do not disassemble the product. Disassembly may cause foreign matter intrusion, loss of accuracy, or accidents.
2. Do not attempt reassembly. Incorrect reassembly may damage the ball screw. Please return the product to DINGS' for paid repair and reassembly.
3. Handle with care. The screw shaft or nut may detach due to their own weight, posing a risk of injury. If detachment occurs, circulation components may be damaged, affecting performance. In such cases, we recommend sending the product to DINGS' for professional inspection and paid repair.
4. Avoid dropping the product. Dropping may cause scratches or damage to circulation components, shaft outer diameter, or steel balls, potentially resulting in impaired operation such as rough or uneven motion.

Precautions for Use

Warning – Risk of Personal Injury
Failure to follow these warnings may result in serious injury or death.

Disassembly Prohibited

Do not disassemble the ball screw shaft, ball nut, or any internal components. Disassembly may cause the internal balls or circulation components to unexpectedly fall out or be ejected. This may result in serious personal injury, contamination, loss of functionality, or damage to the circulation components.

Ball Nut Removal Prohibited

Do not remove the ball nut from the ball screw shaft. Removing the nut may cause the balls to fall out or be ejected, creating a potential hazard that may result in serious personal injury or product damage. If disassembly is required, please contact DINGS' for the proper procedure.

Overtravel

Excessive movement of the ball nut (overtravel) may cause ball dropout, damage to circulation components, or indentation of the ball raceway, resulting in poor operation. Continued use under such conditions may lead to premature wear or component failure. Overtravel must be avoided.

If overtravel occurs, immediately stop operation and contact DINGS' for inspection (paid service).

Abnormal Operation

If abnormal noise, vibration, increased resistance, jamming, or irregular otion is observed during operation, stop the system immediately. Continued operation under such conditions may cause sudden failure, loss of control, or unsafe motion, which may lead to serious injury.

Ball or Rolling Element Dropout

If any ball or rolling element falls out of the ball screw, stop using the product immediately. Do not operate the product under this condition. Contact DINGS' for inspection and repair.

Warning – Equipment Damage / Reduced Service Life
Failure to follow these precautions may result in product damage, malfunction, or reduced service life.

Handling and Impact

The ball screw and ball nut are heavy and precision-machined components. Avoid dropping the product or applying impact loads. Dropping or impact may cause serious personal injury and internal damage that may not be visible externally.

Operating Instructions & Precaution

- **Dust Protection**

  The ball screw can be used in contaminated environments if appropriate protection measures are applied. Install protective covers or equivalent measures to prevent foreign matter or chips from entering the ball screw. For information on improving contamination resistance in your operating environment, please contact the DINGS' sales team.

- **Lubrication**

  Check the lubrication condition before use. Insufficient lubrication may cause the ball screw to lose functionality in a short time. Rust-preventive oil is not a lubricant. Before operation, remove the rust-preventive oil with refined kerosene or an equivalent cleaner, then apply lubricant (grease or oil). Under normal operating conditions, inspect the grease every 2–3 months. If the grease becomes contaminated during operation, remove the old grease and apply new grease.

- **Allowable Speed and Axial Load**

  Allowable axial load and rotational speed vary depending on the size, material, ccuracy grade, mounting method, and operating conditions of the ball screw. Exceeding the allowable limits may result in abnormal wear, excessive heat generation, or premature failure. It is recommended to consult DINGS' regarding the operating conditions during the design stage.

- **Operating Temperature**

  The maximum operating temperature is typically below 80 °C.
  Operation above this temperature may result in the following:

  1. Degradation of ball circulation performance
  2. Damage or failure of circulation components
  3. Reduction in hardness of heat-treated parts

  For applications requiring operation above 80 °C, please contact a DINGS' sales engineer in advance.

- **Eccentric Load**

  The ball screw is designed to generate axial thrust and cannot withstand radial loads or moment loads. If radial, bending, or moment loads are applied to the ball nut, the load acting on the balls becomes uneven, which may significantly reduce service life. Eccentricity between the bearing support and the nut housing during installation may also result in eccentric loading. Proper alignment must be ensured during installation.

- **Reciprocating (Short Stroke) Motion**

  When repeated forward and reverse motion occurs within a short stroke range, dynamic torque may increase due to ball compression and elastic deformation. This may lead to increased friction, heat generation, and accelerated wear. To mitigate these effects, it is recommended to periodically operate the ball screw over the full stroke range.

Notice
To prevent ball nut overtravel or disengagement from the threaded section, O-rings may be installed during transportation or handling.
Be sure to remove the O-rings before operating the product.

BALL SCREW SERIES OVERVIEW

Ball Screw Dimension Table

Nominal Diameter		Lead		Lead Code	Outer Diameter (Reference)		Root Diameter (Reference)		Left-hand Thread Option		Standard Stock	
Imperial (inch)	Metric (mm)	Imperial (inch)	Metric (mm)		Imperial (inch)	Metric (mm)	Imperial (inch)	Metric (mm)	C5	C7	Ground[1] (mm)	Rolled[2] (mm)
0.157	4	0.039	1	0401	0.157	4	0.13	3.3	YES	-	55R80 65R80 72R90 100R120	400max
		0.079	2	0402	0.157	4	0.13	3.3	YES	-	35R60 50R70 95R120	400max
0.236	6	0.039	1	0601	0.236	6	0.209	5.3	YES	-	50R80 70R100 90R120 110R140 150R180	400max
		0.079	2	0602	0.236	6	0.193	4.9	YES	-	90R120 130R160 150R180	400max
		0.236	6	0606	0.236	6	0.197	5	YES	-	50R80 70R100 120R150 130R160 160R190 220R250	400max
		0.394	10	0610	0.236	6	0.197	5	YES	-	160R190	400max

1. Effective stroke / screw length notation
Example: 55R80 indicates an effective stroke of 55 mm and a total screw length of 80 mm.

2. Rolled C7 shaft-end limitation
For rolled C7 ball screws, the shaft-end diameter must not exceed the root diameter of the screw.

Notes
For lengths exceeding the maximum production limit, please contact our sales engineers.

DINGS
Precision Motion Specialist

Ball Screw Dimension Table

Nominal Diameter		Lead		Lead Code	Outer Diameter (Reference)		Root Diameter (Reference)		Left-hand Thread Option		Standard Stock	
Imperial (inch)	Metric (mm)	Imperial (inch)	Metric (mm)		Imperial (inch)	Metric (mm)	Imperial (inch)	Metric (mm)	C5	C7	Ground[1] (mm)	Rolled[2] (mm)
0.315	8	0.039	1	0801	0.315	8	0.287	7.3	YES	-	90R120 93R140 130R160 210R240	600max
		0.079	2	0802	0.315	8	0.28	7.1	YES	-	90R120 130R160 140R170 210R240 270R305	600max
		0.197	5	0805	0.315	8	0.264	6.7	YES	-	90R120 110R140 140R170 170R200 210R240 400R450	600max
		0.315	8	0808	0.315	8	0.264	6.7	YES	-	90R120 140R170 160R190 217R247 260R305 315R345	600max
		0.394	10	0810	0.315	8	0.264	6.7	YES	-	140R170 200R240 200R300 210R240 275R305 320R350	600max
		0.472	12	0812	0.315	8	0.264	6.7	YES	-	100R130 160R190	600max
0.394	10	0.079	2	1002	0.394	10	0.354	9	YES	-	110R130 110R140 210R240	600max
0.472	12	0.079	2	1202	0.472	12	0.437	11.1	YES	-	140R180 150R180 190R220	600max
		0.079	5	1205	0.472	12	0.402	10.2	YES	-	140R180 150R180 190R220 300R350	600max

1. Effective stroke / screw length notation
Example: 55R80 indicates an effective stroke of 55 mm and a total screw length of 80 mm.

2. Rolled C7 shaft-end limitation
For rolled C7 ball screws, the shaft-end diameter must not exceed the root diameter of the screw.

Notes
For lengths exceeding the maximum production limit, please contact our sales engineers.

[FBG · FBR] Flanged Single Nut - type 2

Part Number Construction

Example FBG 06 01 D X - 60 R 90 C3 Z - 001

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series
- FBG = Flanged single nut (ground)
- FBR = Flanged single nut (rolled)

② Screw Diameter (mm)
- 06 = 6mm

③ Lead (mm)
- 01 = Standard ball lead, 1 mm
- 01K = Non-standard ball lead, 1 mm

④ Ball Return Type
- D = Deflector Type
- S = End Deflector type
- T = Return Tube type
- C = End-cap type

⑤ Custom Option (Non-standard)

⑥ Threaded Section Length (mm)

Decimal point is indicated by "_"

⑦ Thread Direction
- R = Right-hand
- L = Left-hand
- LR = Right- & Left-hand

⑧ Total Screw Length (mm)

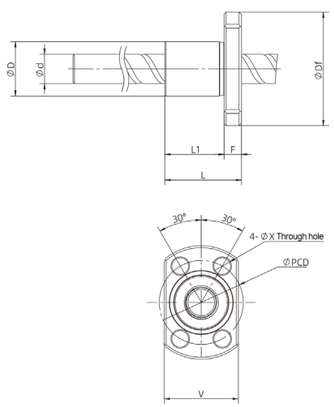
Decimal point is indicated by "_"

⑨ Accuracy Grade
- C3 = JIS Standard C3
- C5 = JIS Standard C5
- C7 = JIS Standard C7
- C10 = JIS Standard C10

⑩ Axial Clearance
- Z = Preload
- T = ≤ 0.005 mm
- S = ≤ 0.02 mm
- N = ≤ 0.05 mm

⑪ Custom Serial Number

Mechanical Dimension



Nut Type	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Screw Diameter D (mm / inch)	4 (0.16)	4 (0.16)	4 (0.16)	6 (0.24)	6 (0.24)	6 (0.24)	6 (0.24)	6 (0.24)	6 (0.24)	6 (0.24)	8 (0.31)	8 (0.31)	8 (0.31)	8 (0.31)	8 (0.31)	10 (0.394)	10 (0.394)	12 (0.47)	12 (0.47)
Lead (mm / inch)	1 (0.04)	1 (0.04)	2 (0.08)	1 (0.04)	1 (0.04)	1 (0.04)	2 (0.08)	2 (0.08)	2 (0.08)	6 (0.24)	1 (0.04)	1 (0.04)	2 (0.08)	2 (0.08)	5 (0.2)	2 (0.08)	2 (0.08)	2 (0.08)	2 (0.08)
Nut Diameter D (mm / inch)	9 (0.354)	10 (0.394)	11 (0.433)	11 (0.433)	12 (0.472)	12 (0.472)	15 (0.591)	12 (0.472)	15 (0.591)	12 (0.472)	13 (0.511)	14 (0.551)	15 (0.591)	14 (0.551)	18 (0.709)	17 (0.669)	18 (0.709)	19 (0.748)	20 (0.787)
Nut Overall Length L (mm / inch)	13 (0.511)	12 (0.472)	19 (0.748)	15.5 (0.610)	15 (0.591)	15 (0.591)	17 (0.669)	16 (0.63)	17 (0.669)	22 (0.866)	16 (0.63)	16 (0.63)	18 (0.709)	16 (0.63)	28 (1.102)	19 (0.748)	28 (1.102)	19 (0.748)	28 (1.102)
Mounting Length L1 (mm / inch)	10 (0.394)	9 (0.354)	15 (0.591)	12 (0.472)	11.5 (0.453)	11.5 (0.453)	13 (0.512)	12.5 (0.492)	13 (0.512)	18 (0.709)	12 (0.472)	12 (0.472)	14 (0.551)	12 (0.472)	24 (0.945)	14 (0.551)	23 (0.906)	14 (0.551)	23 (0.906)
Flange Diameter Df (mm / inch)	19 (0.748)	20 (0.787)	23 (0.906)	23 (0.906)	24 (0.945)	24.5 (0.965)	29 (1.142)	24 (0.945)	29 (1.142)	24 (0.945)	26 (1.024)	27 (1.063)	28 (1.102)	27 (1.063)	31 (1.22)	33 (1.299)	34.5 (1.358)	36 (1.417)	37 (1.457)
Flange Thickness F (mm / inch)	3 (0.118)	3 (0.118)	4 (0.157)	3.5 (0.138)	3.5 (0.138)	3.5 (0.138)	4 (0.157)	3.5 (0.138)	4 (0.157)	4 (0.157)	4 (0.157)	4 (0.157)	4 (0.157)	4 (0.157)	4 (0.157)	5 (0.197)	5 (0.197)	5 (0.197)	5 (0.197)
Mounting Hole Diameter X (mm / inch)	2.9 (0.114)	2.9 (0.114)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	4.5 (0.177)	4.5 (0.177)	4.5 (0.177)	4.5 (0.177)
Bolt Circle Diameter (PCD) (mm / inch)	14 (0.551)	15 (0.591)	17 (0.669)	17 (0.669)	18 (0.709)	20 (0.787)	22 (0.866)	18 (0.709)	23 (0.906)	18 (0.709)	20 (0.787)	21 (0.827)	22 (0.866)	21 (0.827)	25 (0.984)	26 (1.024)	27 (1.063)	28 (1.102)	29 (1.142)
Nut Flat Width V (mm / inch)	13 (0.512)	14 (0.551)	15 (0.591)	15 (0.591)	16 (0.63)	16 (0.63)	19 (0.748)	16 (0.63)	19 (0.748)	16 (0.63)	17 (0.669)	18 (0.709)	19 (0.748)	18 (0.709)	20 (0.787)	22 (0.866)	22 (0.866)	23 (0.906)	24 (0.945)
Basic Dynamic Load Rating Ca (N)	560	560	420	680	680	680	880	880	880	870	780	780	1300	1300	1850	1450	1450	1600	1600
Basic Static Load Rating Coa (N)	790	790	570	1200	1200	1200	1500	1500	1500	1450	1650	1650	2300	2300	3000	3000	3000	3700	3700

[FBG · FBR] Flanged Single Nut - type 2

[FBG · FBR] Flanged Single Nut - type 1

Part Number Construction

Example	FBG	06	01	D	X	-	60	R	90	C3	Z	-	001
	①	②	③	④	⑤		⑥	⑦	⑧	⑨	⑩		⑪

① Series

FBG	=	Flanged single nut (ground)
FBR	=	Flanged single nut (rolled)

② Screw Diameter (mm)

06	=	6mm

③ Lead (mm)

01	=	Standard ball lead, 1 mm
01K	=	Non-standard ball lead, 1 mm

④ Ball Return Type

D	=	Deflector Type
S	=	End Deflector type
T	=	Return Tube type
C	=	End-cap type

⑤ Custom Option (Non-standard)

⑥ Threaded Section Length (mm)

Decimal point is indicated by "_"

⑦ Thread Direction

R	=	Right-hand
L	=	Left-hand
LR	=	Right- & Left-hand

⑧ Total Screw Length (mm)

Decimal point is indicated by "_"

⑨ Accuracy Grade

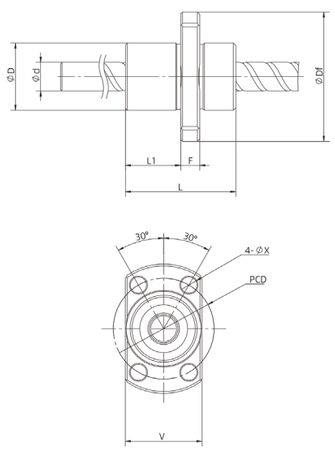
C3	=	JIS Standard C3
C5	=	JIS Standard C5
C7	=	JIS Standard C7
C10	=	JIS Standard C10

⑩ Axial Clearance

Z	=	Preload
T	=	≤ 0.005 mm
S	=	≤ 0.02 mm
N	=	≤ 0.05 mm

⑪ Custom Serial Number

Mechanical Dimension



Nut Type	1	1	1	1	1	1
Screw Diameter D (mm / inch)	6 (0.24)	6 (0.24)	8 (0.31)	8 (0.31)	8 (0.31)	12 (0.472)
Lead (mm / inch)	6 (0.24)	10 (0.39)	8 (0.31)	10 (0.39)	12 (0.47)	5 (0.197)
Nut Diameter D (mm / inch)	14 (0.551)	14 (0.551)	18 (0.709)	18 (0.709)	18 (0.709)	24 (0.945)
Nut Overall Length L (mm / inch)	17.2 (0.677)	23 (0.906)	21.5 (0.846)	24 (0.945)	28 (1.102)	30 (1.181)
Mounting Length L1 (mm / inch)	8 (0.315)	11.5 (0.453)	11.5 (0.453)	13 (0.512)	18 (0.709)	15 (0.591)
Flange Diameter Df (mm / inch)	27 (1.063)	27 (1.063)	31 (1.22)	31 (1.22)	31 (1.22)	40 (1.575)
Flange Thickness F (mm / inch)	4 (0.157)	4 (0.157)	4 (0.157)	4 (0.157)	4 (0.157)	10 (0.39)
Mounting Hole Diameter X (mm / inch)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	3.4 (0.134)	4.5 (0.177)
Bolt Circle Diameter (PCD) (mm / inch)	21 (0.827)	21 (0.827)	25 (0.984)	25 (0.984)	25 (0.984)	32 (1.260)
Nut Flat Width V (mm / inch)	16 (0.63)	16 (0.63)	20 (0.787)	20 (0.787)	20 (0.787)	30 (1.181)
Basic Dynamic Load Rating Ca (N)	870	950	2200	2200	2200	4100
Basic Static Load Rating Coa (N)	1450	1600	3800	3900	4000	7400

[CBG · CBR] Cylindrical Single Nut

Part Number Construction

Example	CBG	06	01	D	X	-	60	R	90	C3	Z	-	001
	①	②	③	④	⑤		⑥	⑦	⑧	⑨	⑩		⑪

① Series

CBG	=	Cylindrical single nut (ground)
CBR	=	Cylindrical single nut (rolled)

② Screw Diameter (mm)

06	=	6mm

③ Lead (mm)

01	=	Standard ball lead, 1 mm
01K	=	Non-standard ball lead, 1 mm

④ Ball Return Type

D	=	Deflector Type
S	=	End Deflector type
T	=	Return Tube type
C	=	End-cap type

⑤ Custom Option (Non-standard)

⑥ Threaded Section Length (mm)

Decimal point is indicated by "_"

⑦ Thread Direction

R	=	Right-hand
L	=	Left-hand
LR	=	Right- & Left-hand

⑧ Total Screw Length (mm)

Decimal point is indicated by "_"

⑨ Accuracy Grade

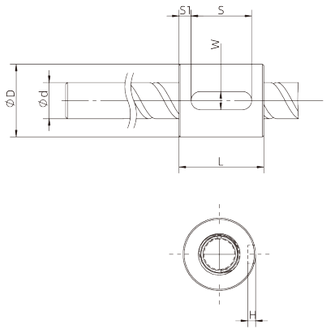
C3	=	JIS Standard C3
C5	=	JIS Standard C5
C7	=	JIS Standard C7
C10	=	JIS Standard C10

⑩ Axial Clearance

Z	=	Preload
T	=	≤ 0.005 mm
S	=	≤ 0.02 mm
N	=	≤ 0.05 mm

⑪ Custom Serial Number

Mechanical Dimension



Screw Diameter D (mm / inch)	4 (0.157)	6 (0.236)
Lead (mm / inch)	1 (0.039)	1 (0.039)
Nut Diameter D (mm / inch)	9 (0.354)	13 (0.512)
Nut Overall Length L (mm / inch)	10 (0.394)	14 (0.551)
Keyway Position Dimension (S1) (mm / inch)	-	2 (0.079)
Keyway Length (S) (mm / inch)	-	10 (0.394)
Keyway Width (W) (mm / inch)	-	3 (0.118)
Keyway Depth (H) (mm / inch)	-	1.8 (0.071)
Basic Dynamic Load Rating Ca (N)	560	680
Basic Static Load Rating Coa (N)	790	1200

[MBG · MBR] Metric Thread Single Nut

Part Number Construction

Example: MBG 06 01 D X - 60 R 90 C3 Z - 001

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series
- MBG = Metric threaded single nut (ground)
- MBR = Metric threaded single nut (rolled)

② Screw Diameter (mm)
- 06 = 6mm

③ Lead (mm)
- 01 = Standard ball lead, 1 mm
- 01K = Non-standard ball lead, 1 mm

④ Ball Return Type
- D = Deflector Type
- S = End Deflector type
- T = Return Tube type
- C = End-cap type

⑤ Custom Option (Non-standard)

⑥ Threaded Section Length (mm)

Decimal point is indicated by "_"

⑦ Thread Direction
- R = Right-hand
- L = Left-hand
- LR = Right- & Left-hand

⑧ Total Screw Length (mm)

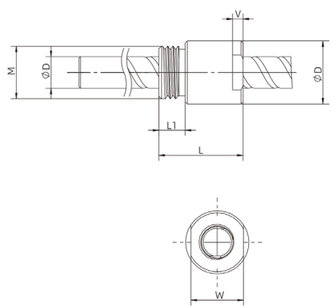
Decimal point is indicated by "_"

⑨ Accuracy Grade
- C3 = JIS Standard C3
- C5 = JIS Standard C5
- C7 = JIS Standard C7
- C10 = JIS Standard C10

⑩ Axial Clearance
- Z = Preload
- T = ≤ 0.005 mm
- S = ≤ 0.02 mm
- N = ≤ 0.05 mm

⑪ Custom Serial Number

Mechanical Dimension



Screw Diameter D (mm / inch)	4 (0.157)	6 (0.236)	6 (0.236)	8 (0.315)	10 (0.394)
Lead (mm / inch)	1 (0.039)	1 (0.039)	2 (0.079)	2 (0.079)	2 (0.079)
Nut Diameter D (mm / inch)	10 (0.394)	12 (0.472)	12 (0.472)	16 (0.63)	19.5 (0.768)
Nut Overall Length L (mm / inch)	16.5 (0.65)	16 (0.63)	16 (0.63)	27 (1.063)	22 (0.866)
Thread Size M (mm)	M8X0.75	M10×0.75	M10X1	M14X0.75	M17X1
Thread Length L1 (mm / inch)	5 (0.197)	5 (0.197)	5 (0.197)	5 (0.197)	8.2 (0.323)
Wrench Flat Width W (mm / inch)	9 (0.354)	10 (0.394)	10 (0.394)	14 (0.551)	-
Wrench Flat Depth V (mm / inch)	1.5 (0.059)	2 (0.079)	2 (0.079)	4 (0.157)	-
Basic Dynamic Load Rating Ca (N)	560	680	880	1300	1500
Basic Static Load Rating Coa (N)	790	1200	1500	2300	2900

[KBG · KBR] Square Single Nut

Part Number Construction

Example: KBG 06 01 D X - 60 R 90 C3 Z - 001

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① Series
- KBG = Square-type single nut (ground)
- KBR = Square-type single nut (rolled)

② Screw Diameter (mm)
- 06 = 6mm

③ Lead (mm)
- 01 = Standard ball lead, 1 mm
- 01K = Non-standard ball lead, 1 mm

④ Ball Return Type
- D = Deflector Type
- S = End Deflector type
- T = Return Tube type
- C = End-cap type

⑤ Custom Option (Non-standard)

⑥ Threaded Section Length (mm)

Decimal point is indicated by "_"

⑦ Thread Direction
- R = Right-hand
- L = Left-hand
- LR = Right- & Left-hand

⑧ Total Screw Length (mm)

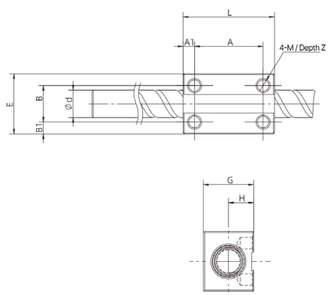
Decimal point is indicated by "_"

⑨ Accuracy Grade
- C3 = JIS Standard C3
- C5 = JIS Standard C5
- C7 = JIS Standard C7
- C10 = JIS Standard C10

⑩ Axial Clearance
- Z = Preload
- T = ≤ 0.005 mm
- S = ≤ 0.02 mm
- N = ≤ 0.05 mm

⑪ Custom Serial Number

Mechanical Dimension



Screw Diameter D (mm / inch)	6 (0.236)	8 (0.315)	8 (0.315)
Lead (mm / inch)	1 (0.039)	1 (0.039)	1 (0.039)
Nut Overall Length L (mm / inch)	20 (0.787)	20 (0.787)	22 (0.866)
Nut Width E (mm / inch)	13 (0.512)	14 (0.551)	15 (0.591)
Nut Height G (mm / inch)	11 (0.433)	13 (0.512)	13 (0.512)
Mounting Hole Size B1 (mm / inch)	2.5 (0.098)	3 (0.118)	1.5 (0.059)
Mounting Hole Pitch B (mm / inch)	8 (0.315)	8 (0.315)	12 (0.472)
Mounting Hole Size A1 (mm / inch)	2.5 (0.098)	2.5 (0.098)	2.5 (0.098)
Mounting Hole Pitch A (mm / inch)	15 (0.591)	15 (0.591)	17 (0.669)
Tapped Hole M / Depth Z	M3 / Depth3.5	M2.5×0.45 / Depth 3	M2.5×0.45 / Depth 3
Basic Dynamic Load Rating Ca (N)	680	780	780
Basic Static Load Rating Coa (N)	1200	1650	1650

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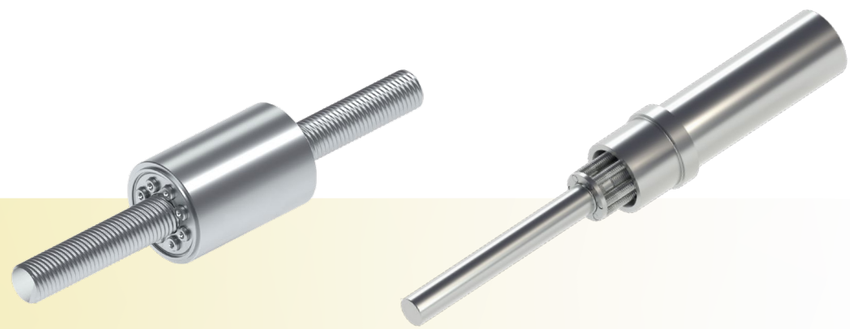
PLANETARY ROLLER SCREW ASSEMBLY



Technical Overview

1. Introduction to Planetary Roller Screws

Planetary roller screws convert rotary motion into linear motion, combining thread transmission and rolling screw characteristics. The load transfers from the screw shaft to the nut via multiple threaded rollers in planetary motion. Their unique design prevents relative axial displacement, enabling continuous rolling within a closed system using rolling/sliding friction for power transmission.

Built with bearing technology, they use high-strength bearing steel for durability and fatigue resistance, ensuring longevity in heavy-load applications.

Standard Planetary Roller Screws

1. Ground roller screws conforming to ISO 3408-3 precision grades 3, 5, and 7
2. Suitable for high-speed and long-stroke linear motion applications
3. Extremely quiet operation, ideal for low-interference and low-noise applications
4. Robust design, suited for heavy loads, vibrations, and harsh environments

Inverted Planetary Roller Screws

1. Ground roller screws conforming to ISO 3408-3 precision grades 3, 5, and 7
2. Same high-speed capability as standard planetary roller screws but optimized for short linear strokes
3. Robust design, suitable for medium loads and demanding environments
4. Highly customized shaft and nut design
5. Direct load application on the push tube
6. Integrated motorized design: The nut functions as the motor rotor, enabling a compact, lightweight, and easily mountable electromechanical actuator system

2. Assembly Recommendations

Handling

Planetary roller screw assemblies are precision components that require careful handling to avoid impact, contamination, or corrosion. After cleaning, do not touch the screw with bare hands, as uncoated bearing steel is highly sensitive to corrosion.

Storage

1. Store planetary roller screws away from contaminants, vibrations, impacts, humidity, and other harmful conditions.
2. Vacuum packaging or storage in a clean oil bath is recommended to prevent contamination.
3. Avoid placing planetary roller screws on workbenches or racks without proper support. Unsupported long-term storage can cause bending and loss of precision.
4. Standard rust inhibitors provide protection for 12–18 months. The recommended storage temperature is -10°C to +50°C. For long-term storage, special packaging such as PVC sleeves can be used.

Nut Removal

If the nut must be removed from the shaft (e.g., for end machining), check the nut's orientation before removal.

To maintain the correct axial clearance and starting torque, the nut and shaft are precision-matched. During removal, mark the positions of the nut, shaft, and mounting direction to ensure proper reassembly. Keep all components free from contamination during removal and reinstallation.

Caution: Planetary roller screws are precision components—handle with extra care during disassembly and reassembly.

3. Lubrication Recommendations

Main Purposes of Lubrication

1. Prevent metal-to-metal contact between rolling surfaces and minimize metal fatigue
2. Prevent corrosion
3. Reduce wear
4. Extend the service life of the roller screw
5. Ensure performance under specific operating conditions (temperature, humidity, vacuum, corrosive environments, etc.)

DINGS
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Planetary roller screws have similar friction conditions to ball screws, so lubricants recommended for gears and ball screws are also suitable.

By default, they are pre-lubricated at the factory. If customers request no lubrication, a rust inhibitor is added before shipping. Before applying grease, remove the rust inhibitor to prevaent compatibility issues.

Lubrication Recommendations

1. Lubrication Process

   Add grease in multiple stages. Between applications, rotate the screw shaft or nut several times to ensure full coverage within the operating length.
2. Pre-Use Inspection

   Before initial operation, verify that the components are properly lubricated.
3. First Lubrication Interval

   Reapply grease after 100,000 rotations to remove aged or contaminated grease, extending service life.

After initial and first re-lubrication, follow a lubrication maintenance plan to optimize performance and longevity. This applies to industrial environments with no external contaminants and temperatures below 40°C. For applications where standard grease is insufficient, shorten re-lubrication intervals. Always use the same grease type to avoid compatibility issues. If switching, check miscibility and thoroughly clean the nut and screw shaft. For lubrication plans based on speed, load, and temperature conditions, consult our sales engineers.

4. Initial Operation of the Screw

After cleaning, installation, and lubrication, run the nut at low speed (<50 r/min) and light load (<5% of dynamic load capacity) for several full strokes to check the position of limit switches and reversing mechanisms. After verification, normal load and speed can be applied.

During the first few hours of operation, the roller screw will undergo a break-in process. Once the break-in period is complete, inject half the standard grease volume to replace any grease contaminated by wear particles.

At the end of the screw's lifespan, the following signs may appear:

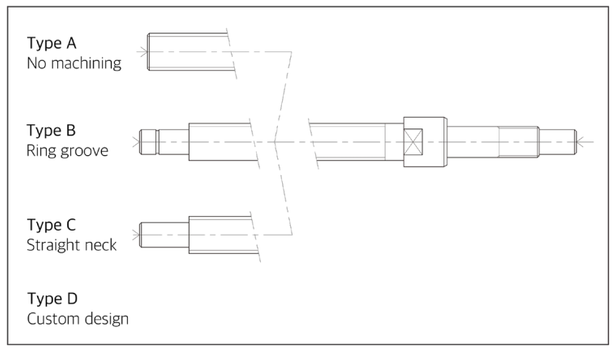
1. Fatigue flaking
2. Increased axial clearance
3. Deteriorated performance, higher driving torque, and elevated operating temperature

These signs are key indicators for monitoring the operational condition of the roller screw. Additionally, visibly contaminated grease suggests that the screw has reached the end of its lifespan. Immediate replacement is recommended to prevent equipment damage.

Important Notes:

Poor grease quality, insufficient lubrication, excessive stress, misalignment, tilting, or exceeding operational limits can increase the roller screw's working temperature. Monitoring temperature changes helps detect potential issues early.

5. Shaft End Types



Part Number Construction

PS	1	FC	09	0	-	105	02	4	R	C7	110	A	-	8	T50	0	N	-001
①	②	③	④	⑤		⑥	⑦	⑧	⑨	⑩	⑪	⑫		⑬	⑭	⑮	⑯	⑰

① Series Type
- PS = Precision standard planetary roller screw
- PI = Precision inverted planetary roller screw

② Nut Type
- 1 = Single nut

③ Nut Configuration
- C = Cylindrical nut
- SFF = Single-flange nut (fixed end)
- SFS = Single-flange nut (support end)
- SCFF = Cut-edge flange nut (fixed end)
- SCFS = Cut-edge flange nut (support end)
- MF = Center flange nut
- NS = Non-standard nut
- FC = Custom nut

④ Nut Length
- 09 = 90mm
- 13 = 124mm

⑤ Sealing
- 0 = No seal
- 1 = With seal

⑥ Central Screw Diameter (mm)

⑦ Lead (mm)

⑧ Number of Thread Starts

⑨ Central Screw Thread Direction
- R = Right-hand thread
- L = Left-hand thread

⑩ Screw/Nut Precision Grade
- C3 = JIS Standard C3
- C5 = JIS Standard C5
- C7 = JIS Standard C7

⑪ Total Screw Length
- 09 = 90mm
- 13 = 124mm

⑫ Shaft End Type
- A = No machining
- B = Ring groove
- C = Straight neck
- D = Others

⑬ Number of Circumferential Rollers

⑭ Axial Clearance
- T50 = ≤ 0.05mm

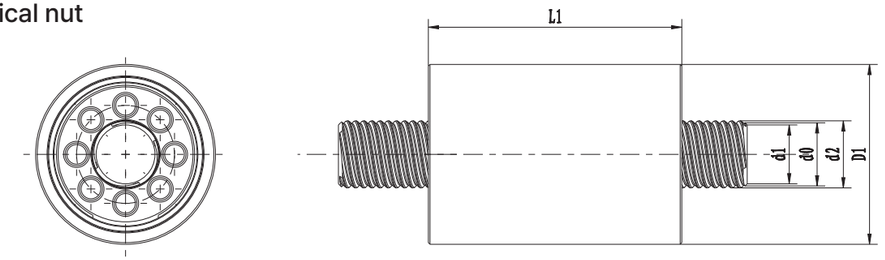
⑮ Grease Type
- 0 = Lubricating grease
- 1 = Rust prevention oil
- 2 = Others

⑯ Surface Treatment
- N = None

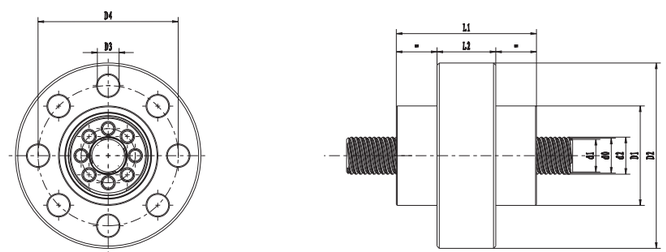
⑰ Custom Serial Number

Standard Planetary Roller Screw Nut

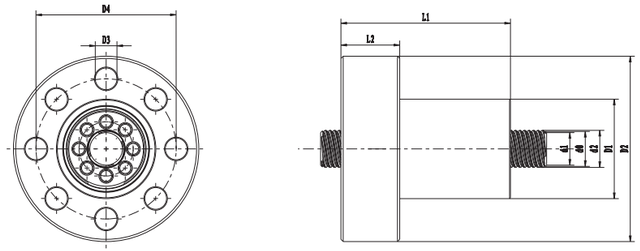
C = Cylindrical nut



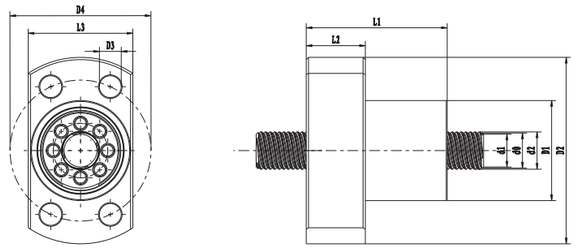
MF = Center flange nut



SFF/SFS = Single-flange nut



SCFF/SCFS = Cut-edge single-flange nut



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Standard Planetary Roller Screw Nut Specification Table

Central screw dia. (mm)		8	8	9	10	10	12	12	15	15	18	18	20	20	21	21	23	23	25	25	25
Lead (mm)		3	4	4.5	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	5
Number of thread starts		4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	5	5
Screw (mm)	Helix angle	6.81	9.04	9.04	5.2	6.91	4.55	6.06	3.64	4.85	3.04	4.05	2.8	3.74	2.6	3.47	2.43	3.24	2.28	3.04	3.79
	d1	8.28	8.38	9.3	10.73	10.8	12.23	12.3	15.23	15.3	18.23	18.3	19.73	19.8	21.23	21.3	22.73	22.8	24.19	24.3	24.38
	d0	8	8	9	10.5	10.5	12	12	15	15	18	18	19.5	19.5	21	21	22.5	22.5	24	24	24
	d2	7.74	7.65	8.54	10.29	10.22	11.79	11.72	14.79	14.72	17.79	17.72	19.29	19.22	20.79	20.72	22.29	22.22	23.82	23.72	23.65
Nut (mm)	D1	21	21	23	24	24	26	26	34	34	40	40	42	42	45	45	45	45	48	53	53
	D2	41	41	44	46	46	46	46	56	56	62	62	64	64	67	67	68	68	71	84	84
	D3	4.5	4.5	4.5	4.5	4.5	4.5	4.5	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	6.3	6.3	6.3	6.3	6.3
		M5	M5	M5	M5	M5	M5	M5	M6	M6	M6	M6	M6	M6	M6	M6	M7	M7	M7	M7	M7
	D4	31	31	36	36	36	36	36	45	45	51	51	53	53	56	56	56	56	59	70	70
	L1	31	31	37	31	31	31	31	40	40	48	48	55	55	55	55	55	55	48	64	64
	L2	13	13	13	13	13	13	13	18	18	18	18	20	20	18	18	20	20	20	20	20
	L3	23	23	23	26	26	28	28	36	36	42	42	44	44	47	47	47	47	50	55	55
Dynamic load Ca	KN	7.92	8.56	9.41	11.44	12.48	12.56	13.76	20.4	21.44	28	30	34.16	36.56	42.32	45.36	44.4	47.6	35.52	61.6	65.04
Static load C0a	KN	14	14.4	15.44	19.28	20.08	20.88	21.76	40.4	39.6	60.88	61.04	80.48	80.64	84.24	84.4	87.76	87.92	71.92	66.48	129.2
Stiffness coefficient Fk	$N^{2/3}/\mu m$	21.36	18.72	18.1	29.52	26.08	30.32	26.64	40.72	34.64	49.44	42.56	56.08	48.32	56.72	49.04	57.44	49.68	60.8	59.28	52.8
Axial clearance	mm	0.04	0.05	0.05	0.03	0.04	0.02	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03
Forward efficiency	%	85	84	82	85	85	84	85	83	84	82	84	81	83	80	83	80	82	79	82	83
Reverse efficiency	%	84	83	80	83	84	83	84	81	83	79	82	78	81	77	81	76	80	75	79	81

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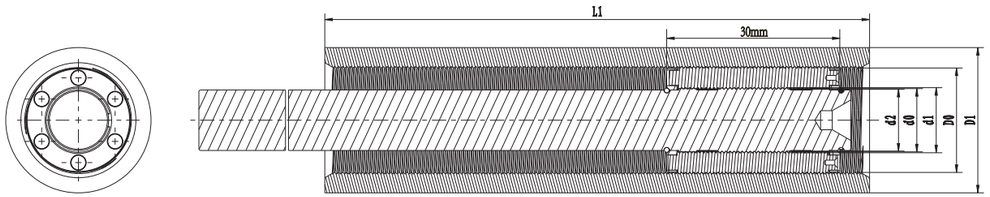
Inverted Planetary Roller Screw Nut Specification Table

Inverted planetary roller screw nut



Central screw dia. (mm)		10.5	10.5	10.5	12	12	13.5	15	18	18	21	21	24	24
Lead (mm)		2	3	3.5	2	3	2	2	2	3	2	3	2	3
D0 (mm)		17	17	17	20	20	-	-	-	-	-	-	-	-
Number of thread starts		3	3	3	3	3	3	3	3	3	3	3	3	3
	Helix angle	3.47	5.2	6.06	3.04	4.55	2.7	2.43	2.03	3.04	1.74	2.6	1.52	2.28
Screw (mm)	d1	10.75	10.875	10.75	12.25	12.38	13.75	15.25	18.25	18.375	21.25	21.375	24.25	24.375
	d0	10.5	10.5	10.5	12	12	13.5	15	18	18	21	21	24	24
	d2	10.26	10.15	10.1	11.765	11.65	13.264	14.764	17.764	17.646	20.764	20.646	23.764	23.646
Nut (mm)	D1 min	24	24	24	26	26	30	32	38	38	45	45	50	50
	L1 max	140	140	140	160	160	180	200	240	240	280	280	280	280
Dynamic load Ca	KN	10.72	11.44	12.11	13.2	14.16	14.32	22.16	28.96	31.28	43.6	47.68	59.04	65.12
Static load C0a	KN	16.64	12.8	10.02	21.68	18.79	23.12	44.16	61.76	59.92	84.8	83.84	128.8	129.2
Stiffness coefficient Fk	$N^{2/3}/\mu m$	26.08	18	11.53	29.2	20.78	29.76	40.8	47.2	37.52	54	43.36	64.96	52.8
Axial clearance	mm	0.03	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.03	0.04	0.03	0.04
Forward efficiency	%	83	85	87	82	84	81	80	78	82	76	80	74	79
Reverse efficiency	%	81	83	84	79	81	78	76	73	79	71	77	67	75

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