NOOK™

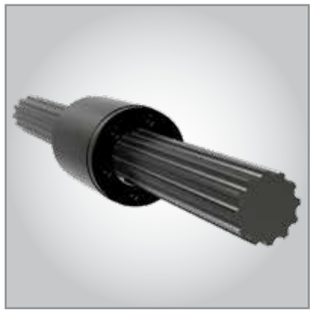
PRECISION METRIC & MINIATURE BALL SCREW ASSEMBLIES

Version 1.04.04

MADE IN USA

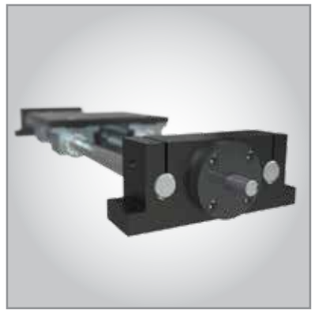
www.nookindustries.com

Precision Ball Screws



Ball Splines

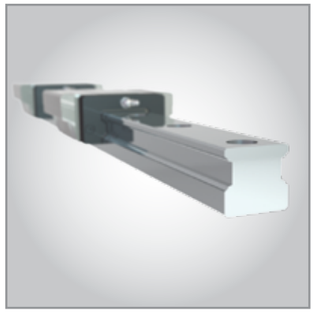
CC™ Cylinders



Linear Slides

Electric Cylinders

Worm Gear Screw Jacks



Profile Rails

Planetary Roller Screws

EZZE Mounts™

Modular Linear Actuators

NOOK™ HISTORY

In 1969, Joseph H. Nook Jr. founded Nook Industries, Inc., intent on becoming a global supplier of Linear Motion products. Ball screws, both rolled and ground, were the cornerstone products in the early 1970's, putting Nook Industries on the map as a successful business and a trusted company.

Through the years, Nook Industries has served as a leading manufacturer of engineered products. From the first ball screws to the latest technologies, Nook Industries strives to provide customers with high quality products and engineered solutions.

Companies around the world depend on the quality products provided by Nook Industries to ensure their success. Nook Industries offers a complete line of linear motion products, serving a wide range of market segments.

MARKET SEGMENTS SERVED

- Aerospace
- Packaging
- Automotive
- Electronics
- Transportation
- Tire Manufacture
- Entertainment
- Semiconductor
- Military and Defense
- Factory Automation
- Pulp & Paper
- Steel
- Chemical
- Medical & Diagnostic

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NOOK™ PARTNER

Rockwell Automation Encompass Product Partner Americas

NOOK™ DISTRIBUTORS

PTDA Member

bca Certified Bearing Specialist

Association for High Technology Distribution AHTD

NOOK™ TRADE ASSOCIATIONS

Proud member of AMT Manufacturing Technology

mca Motion Control Association Member

INTRODUCTION

Nook Industries has always been a leader in developing high-quality linear motion components and systems to meet the ever-increasing demand for precision linear motion. Precision-rolled ball screws have long been a hallmark of Nook Industries, and the latest innovations from Nook Industries are Precision Metric Ball Screws (PMBS™). They are manufactured in the United States to meet the increasing demand for metric ball screws in the global market.

The PMBS™ product line offers linear lead accuracy classes of T10, T7, T5, and T3, which comply with the ISO 3408 ball screw standard. All ball nuts are precision ground and engineered to operate with precision rolled ball screws or precision ground (T3) ball screws.

Nook offers both preloaded and non-preloaded ball nuts in multiple configurations; Flanged, V-Threaded, and Cylindrical Keyed mounting options are able to satisfy virtually all applications. The flanged ball nuts are manufactured to the DIN 69 051. Non-preloaded ball nuts are available from stock and can easily be mounted in the field for ease of assembly.

Consult factory or Nook website to design end machining and bearing mounts for ease of applications. Check engineering section of the catalog to verify application data to assure product performance.

FEATURES:

- Utilizing precision thread-rolling technology
- Wide range of diameters and leads
- T3, T5, T7, and T10 lead accuracy per ISO 3408-3
- DIN-style flanges
- Preloaded and clearance nuts
- State-of-the-art ball return mechanisms
- 3 different styles available: Integral-flange, V-thread, and Cylindrical keyed.
- Integral wipers

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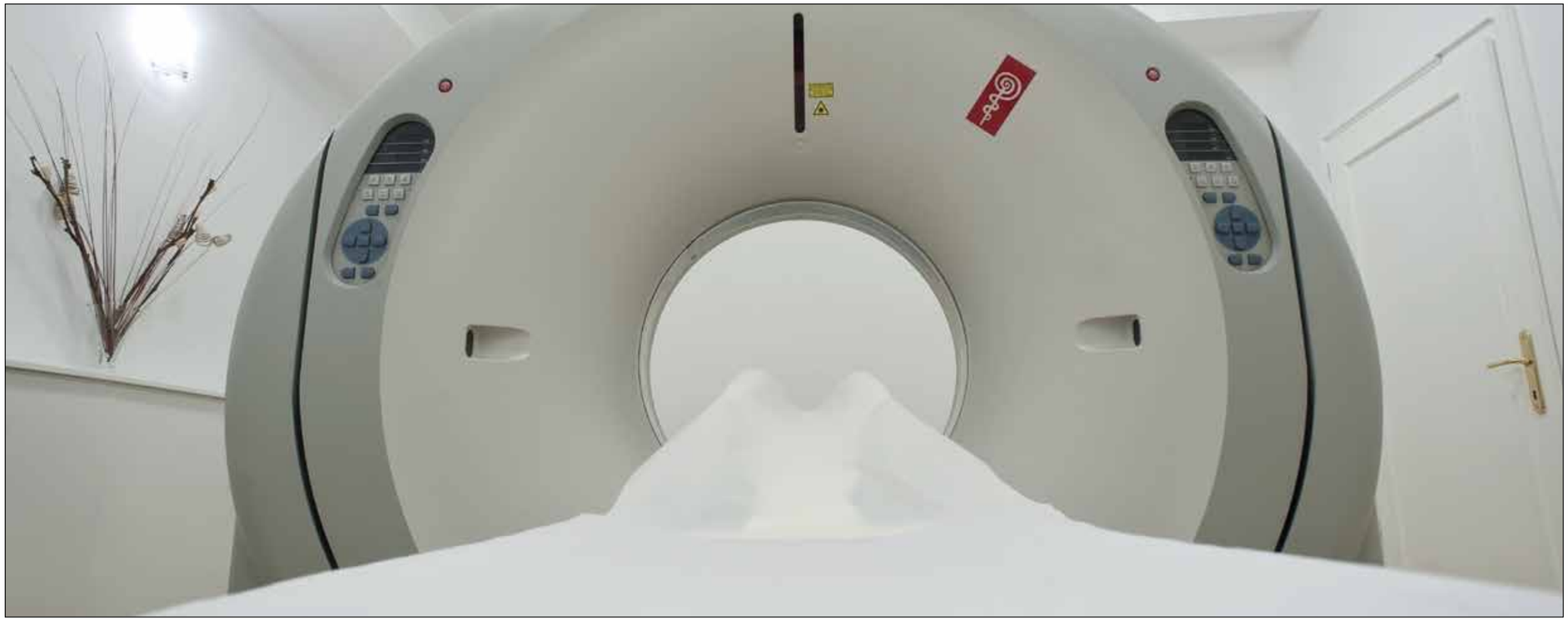
TECHNICAL DATA



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TECHNICAL DATA

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TECHNICAL DEFINITIONS

BALL SCREW SELECTION

The selection of the correct ball screw and nut for a particular application involves five interrelated factors. Before attempting to determine the ball screw and nut combination, the following values must be known:

- Load measured in newtons
- Speed measured in millimeters per minute
- Length between bearings measured in millimeters
- Life expectancy
- End fixity type

LOAD - The loads that need to be considered are the static loads, dynamic loads, reaction forces and any external forces affecting the screw. See next column for details.

SPEED - The travel rate (linear speed) is the rpm at which the screw or nut is rotating multiplied by the lead of the screw.

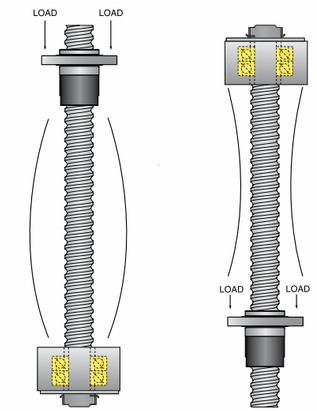
LENGTH - Unsupported length of the screw.

STATIC LOAD - The maximum thrust load – including shock – that can be applied to the ball nut without damaging the assembly.

DYNAMIC LOAD - Metric screw designs are per ISO 3408 and show the load ratings in newtons for 1 million revolutions.

TENSION LOAD - A load that tends to "stretch" the screw.

COMPRESSION LOAD - A load that tends to "squeeze" the screw.

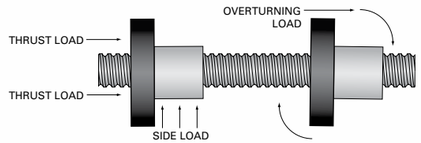


Compression Load Tension Load

OVERTURNING LOAD - A load that tends to rotate the nut radially around the longitudinal axis of the screw.

SIDE LOAD - A load that is applied radially to the nut.

CAUTION - Although a side load will not prevent the ball screw from operating, the nut is not designed to operate with a side load, such as those generated from pulleys, drive belts, misalignment, etc.



Thrust Load - A load parallel to and concentric with the axis of the screw.

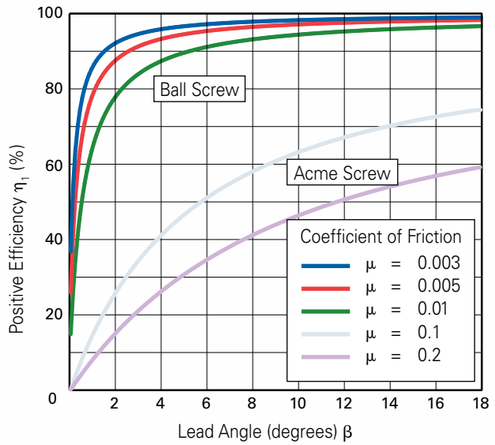
ACCURACY GRADE

The grade of accuracy of Nook Precision Metric Ball Screws conforms to ISO 3408 and is prescribed by ISO Standard Tolerance Grades for Positioning (0, 1, 3, 5) and Transport (0, 1, 3, 5, 7, 10).

EFFICIENCY

The low coefficient of friction of the rolling elements of Precision Metric Ball Screws and Nuts results in an operating efficiency greater than 90% - significantly higher than conventional acme screws. Typical coefficient of friction ranges between 0.003 and 0.01. (See chart.)

DRIVING EFFICIENCY



$$\beta = \tan^{-1}\left(\frac{P_h}{\pi \times B.C.D.}\right)$$

LEAD ACCURACY

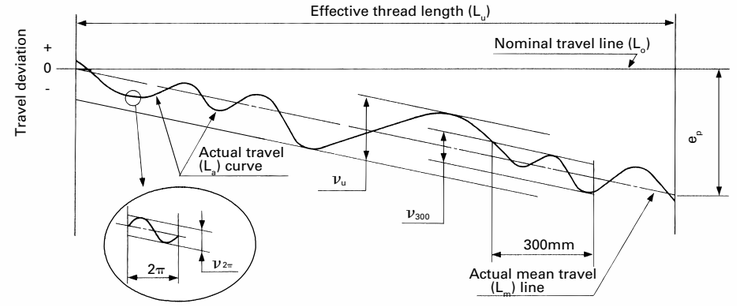
Lead Accuracy for Nook Precision Metric Ball Screws conforms to ISO 3408. ISO 3408 prescribes the tolerance on specified travel and travel variation in respect to the effective length of travel of nut or to the effective length of the threaded portion of the screw shaft. It also prescribes travel variation in respect to a length of 300mm taken arbitrarily within the effective length of the screw shaft and on travel variation in respect to arbitrary one revolution (2π rad) within the effective length of threaded portion.

ISO LEAD ACCURACY

ν_{300}	T3	T5	T7	T10
PERMISSIBLE VALUE	12μm*	23μm	52μm	210μm

Travel variation in respect to 300mm taken arbitrarily within the effective length of threaded portion of screw shaft.

* Precision ground ball screws



L_o = NOMINAL TRAVEL

Nominal Travel is the product of the nominal lead times the number of revolutions.

L_a = ACTUAL TRAVEL

Actual Travel is the actual displacement of the ball nut relative to the ball screw shaft, or vice versa, for a given number of revolutions.

L_m = ACTUAL MEAN TRAVEL

Actual mean travel is the straight line which gives the minimum straightness deviation determined for the actual travel.

L_u = USEFUL TRAVEL

Useful travel is the portion of the travel to which the specified accuracy (stroke plus ball nut body length) is applicable.

e_p = TOLERANCE ON NOMINAL TRAVEL

The tolerance on nominal travel is half the difference between the maximum and minimum value of the permissible actual mean travel, $2e_p$.

STANDARD TOLERANCE GRADE	T3	T5	T7	T10
Permissible value	$e_p = \pm \frac{L_U}{300} \times \nu_{300}$			

Travel variation in respect to the effective travelling distance of nut or to the effective length of threaded portion of screw shaft.

ν = TRAVEL VARIATION

Travel variation is the corresponding band width of the travel deviation parallel to the actual mean travel for a specified travel interval.

ν_u : Corresponds to the effective travel distance of nut or effective length of threaded portion of the screw shaft. (For positioning screws only. Please contact factory for availability.)

ν_{300} : Corresponds to a length of 300mm which is arbitrarily taken within the effective threaded portion of the screw shaft.

$\nu_{2\pi}$: Corresponds to one arbitrary revolution (2π rad) within the effective threaded portion of screw shaft. For positioning screw only. Contact factory for availability.

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TORQUE CALCULATIONS

When considering the total torque required for a given screw assembly, you must consider several factors. If Preload is applied to the ball screw assembly, Drag Torque is added to either the Driving Torque or Backdriving Torque.

$$T_{\text{total driving torque}} = T_d + T_p$$
$$T_{\text{total backdriving torque}} = T_b + T_p$$
$$T_{\text{total holding torque}} = T_b - T_p$$

WHERE:

T_d = Driving torque (N·m)
T_p = Drag torque (N·m)
T_b = Backdriving torque (N·m)

NOTE: When determining Total Torque Required, consideration needs to be made for additional motor load such as wipers or seal drag, linear guide drag, proper inertia matching, etc.

DRAG TORQUE (WHEN PRELOAD IS APPLIED)

Dynamic drag torque is the torque required to rotate the preloaded ball nut relative to the ball screw shaft, or vice versa, in the absence of an external load and any friction torque of the end wipers.

$$T_p = \frac{0.05}{\sqrt{\tan \beta}} \times \frac{F_{pr} \times P_h}{2\pi} \times 10^{-3}$$

WHERE:

T_p = Preload drag torque (N·m)

$$\beta = \tan^{-1}\left(\frac{P_h}{\pi \times \text{B.C.D.}}\right)$$

P_h = Lead (mm)
F_{pr} = Preload Force (N)
β = Lead Angle (deg)
B.C.D. = Ball Circle Diameter

PRELOAD FORCE (F_{pr})

Preload is an internal force introduced between a ball nut and screw assembly that eliminates free axial and radial lash. Preloaded assemblies provide excellent repeatability and increased system stiffness.

When considering Preload as a percentage of Dynamic Capacity, multiply preload percentage by C_a from the ball nut data tables.

DRAG TORQUE VARIATION ($T_{p\ variation}$)

Because of natural lead variation and ball thread form tolerancing, Drag Torque can vary significantly and should be considered when preload is applied to a ball nut assembly. The chart below illustrates the expected variation in Drag Torque.

To use the chart below first calculate the S-ratio of the ball screw assembly:

$$S_{ratio} = \frac{\text{Length}}{\text{Diameter}}$$

$T_{p\ variation}$ Per ISO 3408 E12

	$S_{Ratio} \le 40$			$40 < S_{Ratio} \le 60$			$S_{Ratio} > 60$		
T_p (N·m)	T3	T5	T7	T3	T5	T7	T3	T5	T7
< 0.2	-	-	-	-	-	-	-	-	-
0.2 to 0.4	±40%	±50%	-	±50%	±60%	-	-	-	-
0.4 to 0.6	±35%	±40%	-	±40%	±45%	-	-	-	-
0.6 to 1	±30%	±35%	±40%	±35%	±40%	±45%	±40%	±45%	±50%
1 to 2.5	±25%	±30%	±35%	±30%	±35%	±40%	±35%	±40%	±45%
2.5 to 6.3	±20%	±25%	±30%	±25%	±30%	±35%	±30%	±35%	±40%
6.3 to 10	±15%	±20%	±30%	±20%	±25%	±35%	±25%	±30%	±35%

DRIVING TORQUE

When rotation is converted into linear motion (Normal Operation), the torque can be obtained from the following formula:

$$T_d = \frac{F \times P_h}{2\pi \times \eta_1} \times 10^{-3}$$

WHERE:

T_d = Driving torque (N·m)
F = Axial load (N)
P_h = Lead (mm)
η_1 = Normal efficiency (90%)

BACKDRIVING TORQUE

When linear motion is converted into rotation (Reverse operation), the torque can be obtained from the following formula:

$$T_b = \frac{F \times P_h \times \eta_2}{2\pi} \times 10^{-3}$$

WHERE:

T_b = Backdriving torque (N·m)
F = Axial Load (N)
P_h = Lead (mm)
η_2 = Reverse efficiency (80%)

EXAMPLE: PMBS32×10R-4FW/5/T5/EK/4N/1550/1/S

Preload = 5%
P_h = 10mm Lead
C_a = 36,222 N
B.C.D. = 32mm
Load = 12,000 N

Lead Angle

$$\beta = \tan^{-1}\left(\frac{10mm}{\pi \times 32mm}\right) = 5.7°$$

Drag Torque

$$T_p = T_p = \frac{0.05}{\sqrt{\tan \beta}} \times \frac{F_{pr} \times P_h}{2\pi} \times 10^{-3} = 0.457\ \text{N·m}$$

Drag Torque Variation ($T_{p\ variation}$)

$$S_{ratio} = \frac{1550\ mm}{32mm} = 48.4$$

$T_{p\ Variation}$ = ±45%

T_p = .206 N·m to .663 N·m

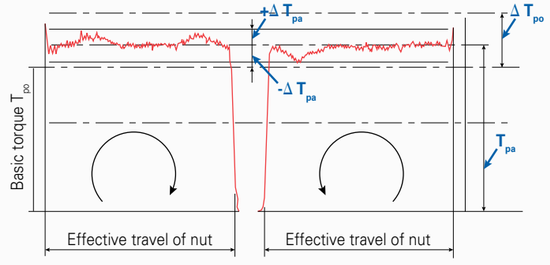
Driving Torque

$$T_d = \frac{12{,}000N \times 10mm}{2\pi \times 90\%} \times 10^{-3} = 21.221\ \text{N·m}$$

Total Torque = 21.427 N·m to 21.884N·m

ACTUAL TORQUE CURVE

The dynamic torque curve as measured and recorded on the actual preloaded ball screw



MEAN ACTUAL TORQUE T_{pa}

The mean actual torque is the average of the maximum value and mininum value of actual torque (excluding starting torque).

FLUCTUATION VALUE OF ACTUAL TORQUE ΔT_{pa}

The maximum fluctuation value of the actual torque curve (excluding starting torque). It is taken as the positive and negative in respect to mean actual torque.

FLUCTUATION VALUE OF BASIC TORQUE ΔT_{po}

The maximum allowable fluctuation value of the basic torque (excluding starting torque). It is taken as the positive and negative in respect to basic torque.

TOTAL DYNAMIC DRAG TORQUE T_t

Total dynamic drag torque is the total torque required to rotate the preloaded ball nut relative to the ball screw shaft, or vice versa, in the absence of an external load but including the friction torque of the end wipers.

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LIFE EXPECTANCY

DEFINITIONS - The dynamic load ratings shown on the product specification pages indicate the load that can be carried for 1 million revolutions based on 90% reliability.

The charts on pages 11 relate life to load. In applications where the load and rotational speed is relatively constant over the entire stroke, use the highest load in selecting a ball screw to provide a factor of extra life. For applications where the loads and/or rotational speed vary significantly, an equivalent load can be calculated using the following formula:

$$F_m = \sqrt[3]{\sum_{j=1}^{n} F_j^3 \times \frac{n_j}{n_m} \times \frac{q_j}{100}}$$

WHERE:

F_m = equivalent axial load (N)

F_j = each increment of axial load (N)

q_j = percent of stroke at load F_j

n_j = rotational speed at load F_j (rpm)

n_m = equivalent rotational speed (rpm) and is given by the following equation:

$$n_m = \sum_{j=1}^{n} \frac{q_j}{100} \times n_j$$

LIFE (REVS)

The life required in revolutions is determined by multiplying the total stroke in millimeters by the total number of strokes required for the designed life of the equipment and then dividing by the lead of the ball nut. Ball nut life is greatly influenced by the operating condition, including speed and vibration the assembly may see. A fatigue factor must be considered when calculating life. To calculate the life for a ball nut use the following formula:

$$L = \left(\frac{C_a}{F_m \times f_w}\right)^3 \times 10^6$$

WHERE:

L = Life measured in revolutions

C_a = Basic Dynamic Load Rating

F_m = equivalent axial load (N)

f_w = Fatigue Factor

OPERATION CONDITION	f_w (FATIGUE FACTOR)
No External Vibration	1.0 - 1.2
Indirect Vibration	1.2 - 1.5
Direct Vibration OR High Cyclical Impact	1.5 – 2.5
Direct Vibration AND High Cyclical Impact	2.5– 3.5

INDIRECT VIBRATION - Any vibration associated near the screw mounting which influences the stability of the assembly.

DIRECT VIBRATION - Any vibration directly linked to the screw assembly which influences the stability of the assembly.

HIGH CYCLICAL IMPACT - Any repetitive impact or high deceleration of the ball screw assembly.

LIFE (ADJUST TO RELIABILITY)

If operation reliability higher than 90% is required, then the theoretical life must be corrected by using a reliability factor (f_{ar}) according to the table.

$$L_{ar} = L \times f_{ar}$$

RELIABILITY (%)	f_{ar}
90	1
95	0.62
96	0.53
97	0.44
98	0.33
99	0.21

LIFE (HOURS)

If total time is needed, the following equation can be used to find the life measured in hours:

$$L_h = \frac{L}{60 \times n_m}$$

EXAMPLE:

Given that a MBN12x2R-3FW ball nut will be used with 98% reliability with smooth operation under the following conditions

F_1 = 250 N ; q_1 = 45% ; n_1 = 150 rpm

F_2 = 1525 N ; q_2 = 55% ; n_2 = 350 rpm

The life of the ball nut will be as follows:

$$n_m = \frac{45}{100} \times (150) + \frac{55}{100} \times (350)$$

This will bring n_m to a value of 260.

$$F_m = \sqrt[3]{(250)^3 \times \left(\frac{150}{260}\right) \times \left(\frac{45}{100}\right) + (1525)^3 \times \left(\frac{350}{260}\right) \times \left(\frac{55}{100}\right)}$$

Which results in a F_m value of 1412 N.

Taking the 12x2 (MBN12x2R-3FW) where C_a = 2811 N

$$L = \left(\frac{2811}{1412 \times 1.0}\right)^3 \times 10^6$$

$$L = 7.89 \times 10^6 \text{ revs}$$

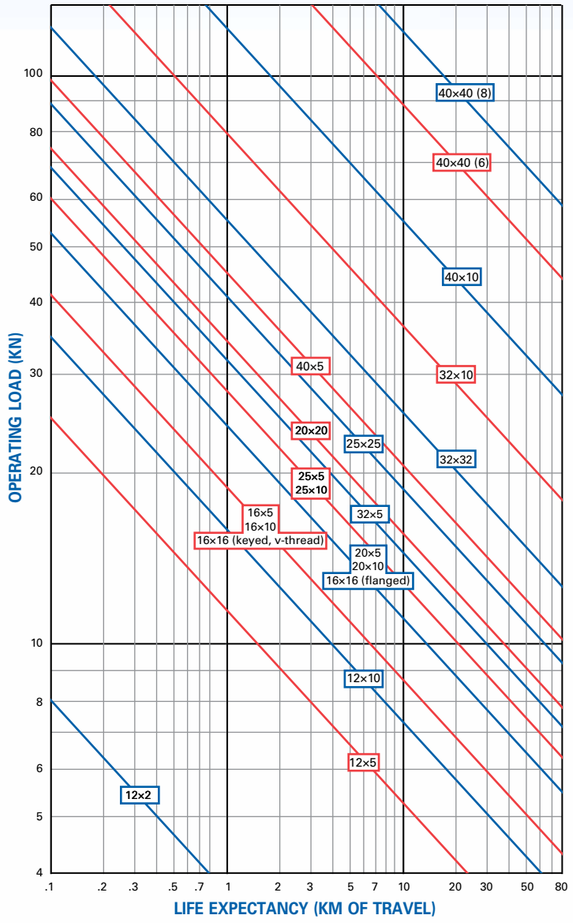
Adjusting for 98% Reliability:

$$L_{ar} = 7.89 \times 10^6 \text{ revs } (0.33)$$

$$L_{ar} = 2.600 \times 10^6 \text{ revs}$$

$$L_h = \frac{2.600 \times 10^6}{(60) \times (260)}$$

The variable L_h then equals 166.9 hours.



NOTE: Life chart is shown in kilometers of travel, converted from revolutions.

For the Life Expectancy values of miniature ball screws, contact Nook Industries.

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COLUMN STRENGTH AND CRITICAL SPEED

END FIXITY - End fixity refers to the method by which the ends of the screw are supported. The degree of end fixity is related to the amount of restraint of the ends of the screw. It is important to determine the proper end fixity in order to determine the appropriate screw size for a give application.

When determining if an end is fixed, it is not sufficient to just restrain the bearing axially. In order to be truly fixed a dual bearing, separated by 1.5 the journal diameter, or a multiple bearing set is needed.

COLUMN STRENGTH - When a screw is loaded in compression (see compression load definition on page 6), its limit of elastic stability can be exceeded and the screw will fail through bending or buckling. Use the following formula in determining the column strength of a given screw.

$$F_c = \frac{C \times \pi^2 \times E \times I}{L^2}$$

WHERE:

F_c = Permissible axial load to buckling (N)

L = Distance between loading points (mm)

E = Modulus of longitudinal elasticity (2.05×10^5 N/mm^2)

I = Minimum secondary moment of screw shaft cross section (mm^4)

$$I = \frac{\pi}{64} d_r^4$$

d_r = Screw shaft root diameter (mm) (See Dimension Table.)

C = Factor determined by supporting method of ball screws

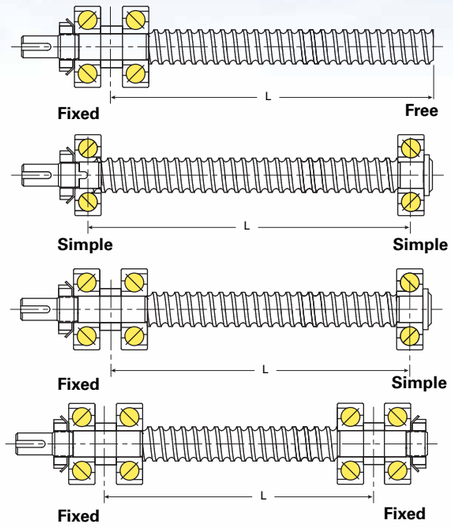
One end fixed other end free	n=0.25
Both ends simply supported	n=1
One end fixed other end simply supported	n=2
Both ends fixed	n=4

NOTE: No safety factor incorporated into above equation. Nook recommends using a safety factor of at least $F_c \times 0.5$.

CRITICAL SPEED - The speed that excites the natural frequency of the screw is referred to as the critical speed. Resonance at the natural frequency of the screw will occur regardless of the screw orientation (vertical, horizontal etc.) or if the system is designed such that the nut rotates about the screw.

The critical speed will vary with the diameter, unsupported length, end fixity and rpm. Since critical speed can also be affected by shaft straightness and assembly alignment, it is recommended that the maximum speed be limited to 80% of the calculated critical speed. The theoretical formula to calculate critical speed in rpm is:

$$n_{cr} = \frac{\lambda^2}{L^2}\sqrt{\frac{E \times I \times g}{\gamma \times A}}\left(\frac{60\frac{sec}{min}}{2\pi\frac{rad}{rev}}\right)$$



WHERE:

n_{cr} = Permissible operating speed for critical speed (rpm)

L = Distance between supports (mm)

E = Modulus of longitudinal elasticity (2.05×10^5 N/mm^2)

I = Minimum second area moment of Inertia of Screw shaft cross section (mm^4)

$$I = \frac{\pi}{64} d_r^4$$

d_r = Screw shaft root diameter (mm) (See Dimension Table.)

g = Acceleration of gravity (9.81×10^3 mm/sec^2)

γ = Specific weight (7.71×10^{-5} N/mm^3)

A = Minimum Cross sectional Area of Screw Shaft (mm^2)

$$A = \frac{\pi}{4} d_r^2$$

λ = Factor determined by supporting method of ball screws

One end fixed other end free	$\lambda = 0.59\ \pi$
Both ends simply supported	$\lambda = \pi$
One end fixed other end simply supported	$\lambda = 1.25\ \pi$
Both ends fixed	$\lambda = 1.49\ \pi$

NOTE: When using Nook EZZE MOUNTS™, refer to pages 46-47.

CAUTION: When using fixed bearing mounts on both ends, contact Nook Engineering to determine the mount-to-mount length tolerance of the final assembly.

Assuming Earth gravity at Sea Level, a simplified formula for calculating critical speed is available:

$$n_{cr} = \frac{d \times (12.09 \times 10^7) \times C_s}{L^2}$$

Where d and L are both measured in millimeters and C_s is from the following table:

One end fixed other end free	$C_s = 0.36$
Both ends simply supported	$C_s = 1.00$
One end fixed other end simply supported	$C_s = 1.56$
Both ends fixed	$C_s = 2.23$

NOTE: No safety factor incorporated into above equations. Nook recommends using a safety factor of at least $n_{cr} \times 0.8$.

D × N VALUE

The critical speed is also limited by the ball circle diameter × rpm value. This value is not to exceed 70,000.

$$D \times N \leq 70{,}000$$

WHERE:

D: Ball circle diameter - BCD (mm)

N : Number of revolutions per minute (rpm)

LUBRICATION

E-1000SP BALL SCREW LUBRICANT

E-1000SP Ball Screw Supreme Performance Lubricant may be used on both rolled and precision ground thread ball screws. E-1000SP will provide outstanding protection of equipment, long oil life, and problem-free operation.

Scientifically engineered oils are formulated from base materials with an inherently high viscosity index. Additives enable E-1000SP to provide outstanding performance in extreme service at high and low temperatures and are resistant to shear in rolling bearing applications without loss of viscosity at both high and low speed.

E-1000SP SPRAY CAN	
Part Name	E-1000SP
Net Contents	12 oz. per can
NLU-1007	1 CAN - 1 lb
NLU-2007	1 CASE - with 12 cans - total weight of 14 lb
E-1000SPL LIQUID	
Part Name	E-1000SPL
NLU-1008	1 BOTTLE - weight of 32 oz.
NLU-2008	1 CASE - with 12 quarts - total weight of 32 lb oz.
VISCOCITY	
@ 40° C	97
@ 100° C	13.7

E-900 BALL SCREW LUBRICANT

E-900 Ball Screw Lubricant may be used on both rolled and ground thread ball screws. E-900 will provide a lasting film for wear protection and resistance to corrosion. With an operating range of -65° to +375°F, E-900 has low starting torque characteristics and helps reduce inter-ball friction in ball screw assemblies. For optimum results the ball screw should be in good repair and free of dirt and grease. Used regularly, E-900 will extend the life of ball screw assemblies. It should be applied generously on the entire length of the screw. In addition, E-900 will prolong the useful life of ball bearing splines, bearings, anti-friction bearings, and other rolling element products.

E-900 SPRAY CAN	
Part Name	E-900
Net Contents	12 oz. per can
NLU-1003	1 CAN -1 lb
NLU-2003	1 CASE - with 12 cans - total weight of 13 lb
E-900L LIQUID	
Part Name	E-900L
NLU-1004	1 BOTTLE - 32 oz.
NLU-2004	1 CASE - with 12 quarts - total weight of 25 lb 5 oz.
VISCOCITY	
@ 40° C	13.3
@ 100° C	3.3

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PRECISION METRIC BALL SCREWS

PRECISION METRIC BALL SCREWS

PRECISION METRIC BALL SCREW SIZES **16-17**

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PRECISION METRIC BALL SCREW SIZES

Nook Precision Metric Ball Screw Assemblies are available in four separate classes of accuracy determined by the manufacturing techniques used to produce the screws. the precision rolled (T5, T7, T10) accuracies are a product of state-of-the-art thread rolling and heat-treat technology.

Very precise rolled thread screws offer the design engineer the option of obtaining high accuracy at reduced costs. High-lead precision rolled ball screws acheive maximum travel rates with repeatable positioning accuracy.

Nook also offers PMBS™ ball nuts with precision ground ball screws (T3) to acheive the ultimate in repeatability and lead accuracy using preloaded ball nuts. The ground product is available from the factory (lead times masy vary).

BALL NUT SELECTION AND PART NUMBER

	FLANGED	V-THREAD	CYLINDRICAL KEYED
12×2	MBN12×2R-3FW	MBN12×2R-3VW	MBN12×2R-3CW
12×5	MBN12×5R-3FW	MBN12×5R-3VW	MBN12×5R-3CW
12×10	MBN12×10R-3FW	MBN12×10R-3VW	MBN12×10R-3CW
16×5	MBN16×5R-4FW	MBN16×5R-4VW	MBN16×5R-4CW
16×10	MBN16×10R-3FW	MBN16×10R-3VW	MBN16×10R-3CW
16×16	MBN16×16R-4FW	MBN16×16R-4VW	MBN16×16R-3CW
20×5	MBN20×5R-4FW	MBN20×5R-4VW	MBN20×5R-4CW
20×10	MBN20×10R-4FW	MBN20×10R-4VW	MBN20×10R-4CW
20×20	MBN20×20R-4FW	MBN20×20R-4VW	MBN20×20R-4CW
25×5	MBN25×5R-4FW	MBN25×5R-4VW	MBN25×5R-4CW
25×10	MBN25×10R-4FW	MBN25×10R-4VW	MBN25×10R-4CW
25×25	MBN25×25R-4FW	MBN25×25R-4VW	MBN25×25R-4CW
32×5	MBN32×5R-4FW	MBN32×5R-4VW	MBN32×5R-4CW
32×10	MBN32×10R-4FW	MBN32×10R-4VW	MBN32×10R-4CW
32×32	MBN32×32R-4FW	MBN32×32R-4VW	MBN32×32R-4CW
40×5	MBN40×5R-5FW	MBN40×5R-5VW	MBN40×5R-5CW
40×10	MBN40×10R-4FW	MBN40×10R-4VW	MBN40×10R-4CW
40×40	MBN40×40R-6FW	—	—
40×40	MBN40×40R-8FW	MBN40×40R-8VW	MBN40×40R-8CW

Induction heat treater

PRECISION ROLLED BALLSCREW SIZES AND LENGTHS

	T10			T7			T5*		
	1,000 mm	2,000 mm	3,000 mm	1,000 mm	2,000 mm	3,000 mm	1,000 mm	2,000 mm	3,000 mm
12×2	PMBS1220-1	PMBS1220-2	PMBS1220-3	PMBS1227-1	PMBS1227-2	PMBS1227-3	PMBS1225-1	—	—
12×5	PMBS1250-1	PMBS1250-2	PMBS1250-3	PMBS1257-1	PMBS1257-2	PMBS1257-3	PMBS1255-1	—	—
12×10	PMBS1210-1	PMBS1210-2	PMBS1210-3	PMBS1217-1	PMBS1217-2	PMBS1217-3	PMBS1215-1	—	—
16×5	PMBS1650-1	PMBS1650-2	PMBS1650-3	PMBS1657-1	PMBS1657-2	PMBS1657-3	PMBS1655-1	PMBS1655-2	—
16×10	PMBS1610-1	PMBS1610-2	PMBS1610-3	PMBS1617-1	PMBS1617-2	PMBS1617-3	PMBS1615-1	PMBS1615-2	—
16×16	PMBS1660-1	PMBS1660-2	PMBS1660-3	PMBS1667-1	PMBS1667-2	PMBS1667-3	PMBS1665-1	PMBS1665-2	—
20×5	PMBS2050-1	PMBS2050-2	PMBS2050-3	PMBS2057-1	PMBS2057-2	PMBS2057-3	PMBS2055-1	PMBS2055-2	PMBS2055-3
20×10	PMBS2010-1	PMBS2010-2	PMBS2010-3	PMBS2017-1	PMBS2017-2	PMBS2017-3	PMBS2015-1	PMBS2015-2	PMBS2015-3
20×20	PMBS2020-1	PMBS2020-2	PMBS2020-3	PMBS2027-1	PMBS2027-2	PMBS2027-3	PMBS2025-1	PMBS2025-2	PMBS2025-3
25×5	PMBS2550-1	PMBS2550-2	PMBS2550-3	PMBS2557-1	PMBS2557-2	PMBS2557-3	PMBS2555-1	PMBS2555-2	PMBS2555-3
25×10	PMBS2510-1	PMBS2510-2	PMBS2510-3	PMBS2517-1	PMBS2517-2	PMBS2517-3	PMBS2515-1	PMBS2515-2	PMBS2515-3
25×25	PMBS2520-1	PMBS2520-2	PMBS2520-3	PMBS2527-1	PMBS2527-2	PMBS2527-3	PMBS2525-1	PMBS2525-2	PMBS2525-3
32×5	PMBS3250-1	PMBS3250-2	PMBS3250-3	PMBS3257-1	PMBS3257-2	PMBS3257-3	PMBS3255-1	PMBS3255-2	PMBS3255-3
32×10	PMBS2110-1	PMBS2110-2	PMBS2110-3	PMBS2117-1	PMBS2117-2	PMBS2117-3	PMBS2115-1	PMBS2115-2	PMBS2115-3
32×32	PMBS3230-1	PMBS3230-2	PMBS3230-3	PMBS3237-1	PMBS3237-2	PMBS3237-3	PMBS3235-1	PMBS3235-2	PMBS3235-3
40×5	PMBS4050-1	PMBS4050-2	PMBS4050-3	PMBS4057-1	PMBS4057-2	PMBS4057-3	PMBS4055-1	PMBS4055-2	PMBS4055-3
40×10	PMBS4010-1	PMBS4010-2	PMBS4010-3	PMBS4017-1	PMBS4017-2	PMBS4017-3	PMBS4015-1	PMBS4015-2	PMBS4015-3
40×40	PMBS4040-1	PMBS4040-2	PMBS4040-3	PMBS4047-1	PMBS4047-2	PMBS4047-3	PMBS4045-1	PMBS4045-2	PMBS4045-3

* Contact Nook Industries for T5 lengths and availability.

PRECISION GROUND BALLSCREW SIZES AND LENGTHS

Nook Precision Ground Metric Ball Screws are the highest precision product offered by Nook Industries. They are available in a wide range of diameters and leads to satisfy most popular size requirements.

Precision ground ball screws are manufactured to DIN 69051 Standard with T3 or better precision class threads to meet the demands of machine tool, automation, medical, wood working, electronic assembly, and special purpose machines.

Standard precision ground PMBS™ ball nuts are fitted to Nook precision ground ball screws with a variety of ball nut configurations and have wipers at both ends for protection against dust, dirt, and chips.

	T5	T3
	1000 mm	1000 mm
12×2	PMBSG1225-1	PMBSG1223-1
12×5	PMBSG1255-1	PMBSG1253-1
12×10	PMBSG1215-1	PMBSG1213-1

	T5		T3	
	1000 mm	2000 mm	1000 mm	2000 mm
16×5	PMBSG1655-1	PMBSG1655-2	PMBSG1653-1	PMBSG1653-2
16×10	PMBSG1615-1	PMBSG1615-2	PMBSG1613-1	PMBSG1613-2
16×16	PMBSG1665-1	PMBSG1665-2	PMBSG1663-1	PMBSG1663-2
20×5	PMBSG2055-1	PMBSG2055-2	PMBSG2053-1	PMBSG2053-2
20×10	PMBSG2015-1	PMBSG2015-2	PMBSG2013-1	PMBSG2013-2
20×20	PMBSG2025-1	PMBSG2025-2	PMBSG2023-1	PMBSG2023-2
25×5	PMBSG2555-1	PMBSG2555-2	PMBSG2553-1	PMBSG2553-2
25×10	PMBSG2515-1	PMBSG2515-2	PMBSG2513-1	PMBSG2513-2
25×25	PMBSG2525-1	PMBSG2525-2	PMBSG2523-1	PMBSG2523-2
32×5	PMBSG3255-1	PMBSG3255-2	PMBSG3253-1	PMBSG3253-2
32×10	PMBSG3215-1	PMBSG3215-2	PMBSG3213-1	PMBSG3213-2
32×32	PMBSG3235-1	PMBSG3235-2	PMBSG3233-1	PMBSG3233-2
40×5	PMBSG4055-1	PMBSG4055-2	PMBSG4053-1	PMBSG4053-2
40×10	PMBSG4015-1	PMBSG4015-2	PMBSG4013-1	PMBSG4013-2
40×40	PMBSG4045-1	PMBSG4045-2	PMBSG4043-1	PMBSG4043-2

For longer lengths, contact Nook Industries.

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REFERENCE NUMBER SYSTEM
PRECISION METRIC BALL SCREW ASSEMBLIES

PMBS20×5R - 4FW / 2 / T5 / EK / 4N / 1550 / 1 / S

MATERIAL
PMBS = Rolled Thread
PMBSG = Ground Thread

DIAMETER × LEAD (mm)

12×2	20×5	32×5
12×5	20×10	32×10
12×10	20×20	32×32
16×5	25×5	40×5
16×10	25×10	40×10
16×16	25×25	40×40

HELIX
R = Right Hand Thread

ACTIVE TURNS
Number of Active Turns

NUT BODY TYPE
F = Flanged
V = V-Thread
C = Cylindrical
0 = No Nut

WIPERS
W = Wipers
0 = None

PRELOAD
0 = Clearance Ball Nut
1 = Reduced Clearance Ball Nut
2 = 1% - 2% Preload
5 = 3% - 5% Preload

NOTE: Preload percentage value as measured without wipers

ISO LEAD ACCURACY GRADE
T10
T7
T5
(T3 is available upon request for limited sizes and lengths)

FIRST END CONFIGURATION
See next page for configuration codes.
NOTE: Both Ends must be specified.

SECOND END CONFIGURATION
See next page for configuration codes.
NOTE: Both Ends must be specified.

OVER-ALL-LENGTH (OAL)
Length in millimeters

DOCUMENTATION
0 = Standard
1 = Lead Test Report Provided
2 = Torque Test Report Provided
3 = Lead and Torque Test Reports Provided

NOTE: Torque test report provided with 3%-5% Preloaded Nuts only

STANDARD/MODIFIED
S = Standard
M = Modified

NOTE: Nut will be installed with flange or threaded end toward first end designation.

END CONFIGURATIONS
PRECISION METRIC BALL SCREW ASSEMBLIES

EZZE-MOUNT™ / End Machining — **EK**

1 = Type 1
2 = Type 2
3 = Type 3
4 = Type 4
5 = Type 5
6 = Type 6
7 = Type 7

EK= Universal Double Bearing Support, with Keyway

Shaft Extension
K = Shaft Extension with Keyway
L = Shaft Extension without Keyway
N = No Shaft

Single Bearing Supports are used in conjunction with Type 1N end machining.

Double Bearing Supports are used in conjunction with Type 3K, 3L, or 3N end machining.

Compact Universal Double Bearing Mounts are used in conjunction with Type 6 end machining.

Compact Universal Single Bearing Mounts are used in conjunction with Type 7 end machining.

Flanged Fixed Bearing Mounts are used in conjunction with Type 5 end machining.

B = Universal Double Bearing Support End Cap Facing Screw Thread

C = Universal Single Bearing Support

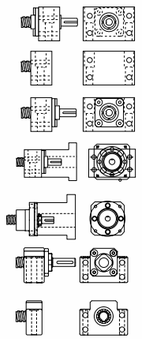
E = Universal Double Bearing Support End Cap Facing Away From Screw Thread

U = Universal Double Bearing Support with Motor Mount

Y = Flanged Double Bearing Support with Motor Mount

M= Compact Universal Double Bearing Support End Cap Facing Away From Screw Thread

P = Compact Universal Single Bearing Support

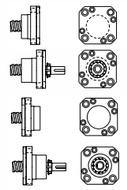


D = Flanged Single Bearing Support Flange Facing Screw Thread

F = Flanged Double Bearing Support Flange Facing Screw Thread

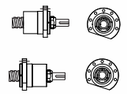
G = Flanged Single Bearing Support Flange Facing Away From Screw Thread

H = Flanged Double Bearing Support Flange Facing Away From Screw Thread



R = Flanged Fixed Bearing Support Flange Facing Screw Thread

V = Flanged Fixed Bearing Support Flange Facing Away From Screw Thread



00 = No End Machining (Screw will be cut to desired length).

XX = Custom Machining (Print or specified data must be provided).

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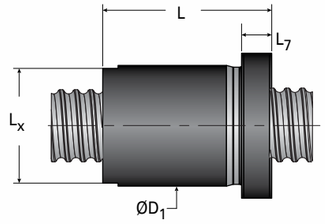
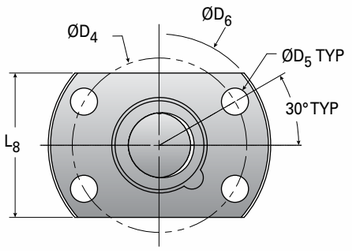
SINGLE NUT WITH FLANGE (12MM DIA)
FOUR-HOLE FLANGE

- Complies with ISO 3408
- Ball nuts are provided clearance or preloaded fit
- To be used with all accuracy classes (precision rolled T10, T7, T5 and precision ground T3)
- Mounting dimensions per DIN69 051 Part 5 Type C





	Size	Part Number	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed* (mm/min)	Size	Screw Dimensions (mm) d_0	d_1	d_2	Screw weight (kg/m)	Ball Nut Dimensions (mm) D_1 (g6)	L	L_x	L_z	L_7	L_8	D_4	D_5	D_6	Nut Wt. (kg)
12mm Dia.	**12x2**	**MBN12X2R-3FW**	2	3	RH	2820	4730	1.588	11700	**12x2**	12	11.44	10.32	0.72	20	28	19	2.5	5	24	29	4 × 4.5	37	0.05
	12x5	**MBN12X5R-3FW**	5	3	RH	6850	8830	3.175	29200	**12x5**	12	11.33	8.72	0.64	26	36	22.5	2.5	8	26	32	4 × 4.5	40	0.09
	12x10	**MBN12X10R-3FW**	10	3	RH	7050	9440	3.175	58400	**12x10**	12	11.33	8.72	0.64	28	36	26	3.8	8	30	36	4 × 4.5	44	0.13

* Based on DN values

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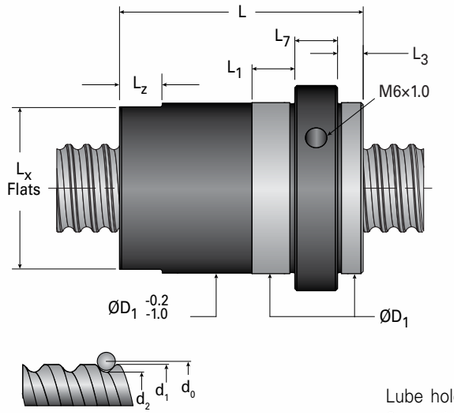
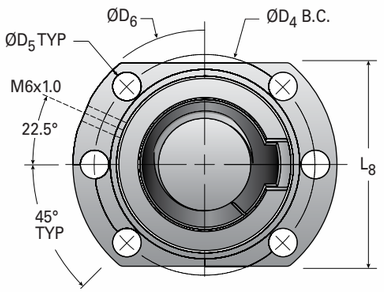
SINGLE NUT WITH FLANGE (16-32MM DIA)
SIX-HOLE FLANGE

- Complies with ISO 3408
- With wipers at both ends
- Ball nuts are provided clearance or preloaded fit
- To be used with all accuracy classes (precision rolled T10, T7, T5 and precision ground T3)
- Mounting dimensions per DIN69 051 Part 5 Type c





Lube hole can be on either side of nut depending on size.
See table below for lube hole location.

	Size	Part Number	Lead (mm)	Active Turns	Helix	Dynamic Load C_a (N)	Static Load C_{0a} (N)	Nominal Ball Dia. (mm)	Linear Speed* (mm/min)	Size	Lube Hole Location	Screw Dimensions (mm)			Screw weight (kg/m)	Ball Nut Dimensions (mm)											Nut Wt. (kg)
												d_0	d_1	d_2		D_1 (g6)	L	L_1 (min)	L_x	L_z	L_3	L_7	L_8	D_4	D_5	D_6	
16mm Dia.	16x5	MBN16X5R-4FW	5	4	RH	12150	18400	3.500	21900	16x5	R	16	15.26	12.38	1.18	28	57	10	27	10	6	10	40	38	6 × 5.5	48	0.22
	16x10	MBN16X10R-3FW	10	3	RH	8590	14290	3.000	43800	16x10	R	16	14.98	12.90	1.24	28	45	16	27	10	–	12	40	42	6 × 5.5	52	0.22
	16x16	MBN16X16R-4FW	16	4	RH	9470	15710	3.175	70000	16x16	L	16	15.33	12.72	1.17	32	33	10	30	5	4	10	40	42	6 × 5.5	52	0.19
20mm Dia.	20x5	MBN20X5R-4FW	5	4	RH	14560	25580	3.500	17500	20x5	L	20	19.26	16.38	1.96	36	57	10	34	8	5.5	10	44	47	6 × 6.6	58	0.35
	20x10	MBN20X10R-4FW	10	4	RH	12550	24600	3.000	35000	20x10	R	20	18.98	16.90	2.04	33	60	16	31	10	–	12	44	47	6 × 6.6	58	0.35
	20x20	MBN20X20R-4FW	20	4	RH	12110	22010	3.500	70000	20x20	L	20	19.26	16.38	1.94	36	36	10	35	5	4	10	44	47	6 × 6.6	58	0.24
25mm Dia.	25x5	MBN25X5R-4FW	5	4	RH	16380	32880	3.500	14000	25x5	R	25	24.26	21.38	3.21	40	57	10	34	8	6	10	48	51	6 × 6.6	62	0.38
	25x10	MBN25X10R-4FW	10	4	RH	13880	30940	3.000	28000	25x10	R	25	23.98	21.90	3.32	38	64	16	36	10	–	12	48	51	6 × 6.6	62	0.38
	25x25	MBN25X25R-4FW	25	4	RH	13680	28500	3.500	70000	25x25	L	25	24.26	21.38	3.28	40	40	10	39	5	4	10	48	51	6 × 6.6	62	0.27
32mm Dia.	32x5	MBN32X5R-4FW	5	4	RH	18630	43790	3.500	11000	32x5	R	32	31.26	28.38	5.48	50	57	10	48	10	6	12	62	65	6 × 9	80	0.65
	32x10	MBN32X10R-4FW	10	4	RH	36230	63880	6.350	21900	32x10	L	32	30.49	25.45	4.93	50	81	20	48	10	5	12	62	65	6 × 9	80	0.82
	32x32	MBN32X32R-4FW	32	4	RH	18020	41150	3.969	70000	32x32	L	32	31.17	27.90	5.54	56	50	20	54	5	5	14	65	71	6 × 9	86	0.81

* Based on DN values

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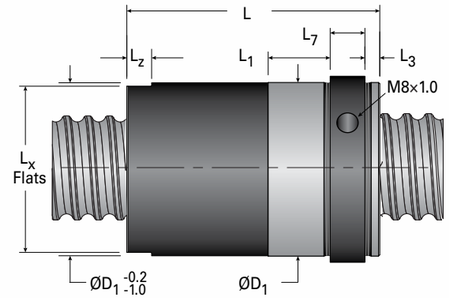
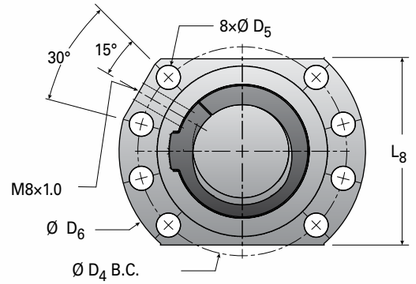
SINGLE NUT WITH FLANGE (40MM DIA)
EIGHT-HOLE FLANGE

- Complies with ISO 3408
- With wipers at both ends
- Ball nuts are provided clearance or preloaded fit
- To be used with all accuracy classes (precision rolled T10, T7, T5 and precision ground T3)
- Mounting dimensions per DIN69 051 Part 5 Type c





	Size	Part Number	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed* (mm/min)	Size	Screw Dimensions (mm) d_0	d_1	d_2	Screw weight (kg/m)	Ball Nut Dimensions (mm) D_1 (g6)	L	L_1 (min)	L_x	L_z	L_3	L_7	L_8	D_4	D_5	D_6	Nut Wt. (kg)
40mm Dia.	**40x5**	**MBN40X5R-5FW**	5	5	RH	25170	70660	3.500	8800	**40x5**	40.0	39.26	36.38	8.82	63	72	20	60	10	5	14	70	78	8 × 9	93	1.16
	40x10	**MBN40X10R-4FW**	10	4	RH	56770	116070	7.144	16700	**40x10**	42.1	40.00	34.81	8.65	63	93	20	60	10	8.5	14	70	78	8 × 9	93	1.31
	40x40	**MBN40X40R-6FW**	40	6	RH	56490	129520	6.350	70000	**40x40**	40.0	38.49	33.45	8.06	70	82	25	67	10	6	14	75	85	8 × 9	100	1.71
	40x40	**MBN40X40R-8FW**	40	8	RH	75440	181330	6.350	70000	**40x40**	40.0	38.49	33.45	8.06	70	102	25	67	10	6	14	75	85	8 × 9	100	2.11

* Based on DN values

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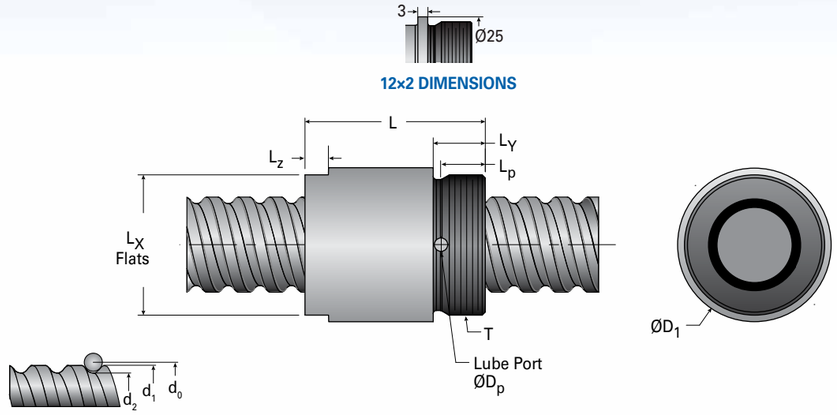
SINGLE NUT WITH V-THREAD

- With wipers at both ends
- Complies with ISO 3408
- The V-Thread mounting provides a compact connection. Two flats offer ease of mounting.
- Lube port provided.
- Ball nuts are provided clearance or preloaded fit
- To be used with all accuracy classes (precision rolled T10, T7, T5 and precision ground T3)
- Mounting dimensions per DIN69 051 Part 5 Type C



	Size	Part Number	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed* (mm/min)	Size	Screw Dimensions (mm) d_0	d_1	d_2	Screw weight (kg/m)	Ball Nut Dimensions (mm) D_1 (h8)	L	L_x	L_y	L_z	L_p	D_p	T (6g)	Nut Wt. (kg)
12mm Dia.	**12x2**	**MBN12X2R-3VW**	2	3	RH	2820	4730	1.588	11700	**12x2**	12.0	11.44	10.32	0.72	20	37	19	13	2.5	—	—	M22 × 1.5	0.06
	12x5	**MBN12X5R-3VW**	5	3	RH	6850	8830	3.175	29200	**12x5**	12.0	11.33	8.72	0.64	26	39	24	8	5	6.5	2.7	M20 × 1.0	0.09
	12x10	**MBN12X10R-3VW**	10	3	RH	7050	9440	3.175	58400	**12x10**	12.0	11.33	8.72	0.64	28	38	26	10	4	8.5	2.7	M20 × 1.0	0.09
16mm Dia.	**16x5**	**MBN16X5R-4VW**	5	4	RH	12150	18400	3.500	21900	**16x5**	16.0	15.26	12.38	1.18	33	57	30	16.5	8	14.0	2.7	M30 × 1.5	0.23
	16x10	**MBN16X10R-3VW**	10	3	RH	8590	14290	3.000	43800	**16x10**	16.0	14.98	12.90	1.24	38	45	35	13	32	11.0	2.7	M35 × 1.5	0.28
	16x16	**MBN16X16R-3VW**	16	3	RH	7400	11780	3.175	70000	**16x16**	16.0	15.33	12.72	1.17	38	33	35	13	20	11.0	2.7	M35 × 1.5	0.18
20mm Dia.	**20x5**	**MBN20X5R-4VW**	5	4	RH	14560	25580	3.500	17500	**20x5**	20.0	19.26	16.38	1.96	38	57	36	17	8	15.0	2.7	M35 × 1.5	0.30
	20x10	**MBN20X10R-4VW**	10	4	RH	12550	24600	3.000	35000	**20x10**	20.0	18.98	16.90	2.04	43	60	40	17	43	8.5	2.7	M40 × 1.5	0.45
	20x20	**MBN20X20R-4VW**	20	4	RH	12110	22010	3.500	70000	**20x20**	20.0	19.26	16.38	1.94	43	36	40	17	19	15.5	1.2	M40 × 1.5	0.25
25mm Dia.	**25x5**	**MBN25X5R-4VW**	5	4	RH	16380	32880	3.500	14000	**25x5**	25.0	24.26	21.38	3.21	43	63	40	17	10	15.0	2.7	M40 × 1.5	0.38
	25x10	**MBN25X10R-4VW**	10	4	RH	13880	30940	3.000	28000	**25x10**	25.0	23.98	21.90	3.32	48	64	45	17	47	15.0	2.7	M45 × 1.5	0.56
	25x25	**MBN25X25R-4VW**	25	4	RH	13680	28500	3.500	70000	**25x25**	25.0	24.26	21.38	3.28	48	40	45	17	23	16.0	1.6	M45 × 1.5	0.32
32mm Dia.	**32x5**	**MBN32X5R-4VW**	5	4	RH	18630	43790	3.500	11000	**32x5**	32.0	31.26	28.38	5.48	53	57	51	19	10	17.0	3.5	M50 × 1.5	0.53
	32x10	**MBN32X10R-4VW**	10	4	RH	36230	63880	6.350	21900	**32x10**	32.0	30.49	25.45	4.93	53	81	48	19	10	17.0	3.5	M50 × 1.5	0.74
	32x32	**MBN32X32R-4VW**	32	4	RH	18020	41150	3.969	70000	**32x32**	32.0	31.17	27.90	5.54	58	50	55	19	31	17.0	2.5	M55 × 2.0	0.59
40mm Dia.	**40x5**	**MBN40X5R-5VW**	5	5	RH	25170	70660	3.500	8800	**40x5**	40.0	39.26	36.38	8.82	63	66	55	19	8	17.0	3.5	M55 × 2.0	0.58
	40x10	**MBN40X10R-4VW**	10	4	RH	56770	116070	7.144	16700	**40x10**	42.1	40.00	34.81	8.65	63	93	60	26	10	24.0	3.5	M60 × 2.0	1.03
	40x40	**MBN40X40R-8VW**	40	8	RH	75440	181330	6.350	70000	**40x40**	40.0	38.49	33.45	8.06	73	102	70	30	72	28.5	2.4	M70 × 2.0	2.02

* Based on DN values

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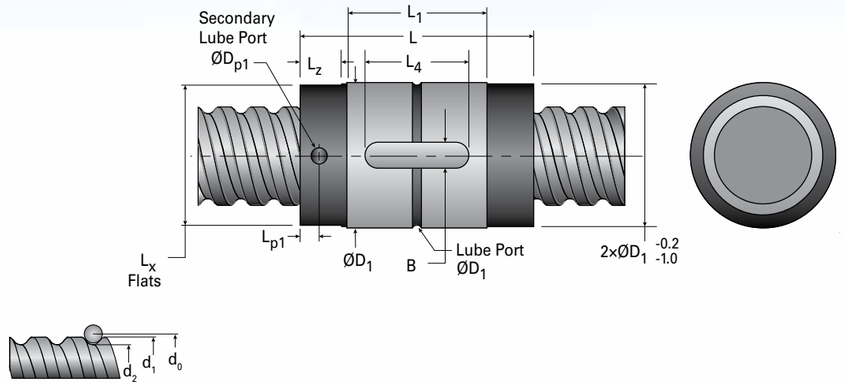
CYLINDRICAL SINGLE NUT WITH KEYWAY

- The Cylindrical nut offers a solution for mounting in a housing.
- With wipers at both ends
- Complies with ISO 3408
- Lube port provided.
- Ball nuts are provided clearance or preloaded fit
- To be used with all accuracy classes (precision rolled T10, T7, T5 and precision ground T3)
- Mounting dimensions per DIN69 051 Part 5 Type c



	Size	Part Number	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed* (mm/min)	Size	Screw Dimensions (mm) d_0	d_1	d_2	Screw weight (kg/m)	Ball Nut Dimensions (mm) D_1 (g6)	L_1	D_p	L_{p1}	D_{p1}	L	L_x	L_z	L_4	B (P9)	Nut Wt. (kg)
12mm Dia.	12x2	MBN12X2R-3CW	2	3	RH	2820	4730	1.588	11700	12x2	12.0	11.44	10.32	0.72	20	28	-	4	2	28	19	2.5	10	3	0.04
	12x5	MBN12X5R-3CW	5	3	RH	6850	8830	3.175	29200	12x5	12.0	11.33	8.72	0.64	26	30	1.5	4	2	30	24	2.5	12	3	0.09
	12x10	MBN12X10R-3CW	10	3	RH	7050	9440	3.175	58400	12x10	12.0	11.33	8.72	0.64	28	28	-	3.2	3	28	26	3.81	12	3	0.07
16mm Dia.	16x5	MBN16X5R-4CW	5	4	RH	12150	18400	3.500	21900	16x5	16.0	15.26	12.38	1.18	28	25	1.5	-	-	45	26	8	20	5	0.11
	16x10	MBN16X10R-3CW	10	3	RH	8590	14290	3.000	43800	16x10	16.0	14.98	12.90	1.24	28	45	1.5	9.5	4	45	27	8	20	5	0.12
	16x16	MBN16X16R-3CW	16	3	RH	7400	11780	3.175	70000	16x16	16.0	15.33	12.72	1.17	33	33	1.5	-	-	33	32	5	20	5	0.13
20mm Dia.	20x5	MBN20X5R-4CW	5	4	RH	14560	25580	3.500	17500	20x5	20.0	19.26	16.38	1.96	33	25	1.5	6	4	45	31	8	20	5	0.15
	20x10	MBN20X10R-4CW	10	4	RH	12550	24600	3.000	35000	20x10	20.0	18.98	16.90	2.04	33	60	1.5	9.5	4	60	31	10	20	5	0.20
	20x20	MBN20X20R-4CW	20	4	RH	12110	22010	3.500	70000	20x20	20.0	19.26	16.38	1.94	36	36	1.2	-	-	36	35	5	20	5	0.15
25mm Dia.	25x5	MBN25X5R-4CW	5	4	RH	16380	32880	3.500	14000	25x5	25.0	24.26	21.38	3.21	38	25	1.5	-	-	46	36	7	20	5	0.19
	25x10	MBN25X10R-4CW	10	4	RH	13880	30940	3.000	28000	25x10	25.0	23.98	21.90	3.32	38	64	1	12	4	64	36	10	20	5	0.26
	25x25	MBN25X25R-4CW	25	4	RH	13680	28500	3.500	70000	25x25	25.0	24.26	21.38	3.28	40	40	1.5	-	-	40	39	5	20	5	0.18
32mm Dia.	32x5	MBN32X5R-4CW	5	4	RH	18630	43790	3.500	11000	32x5	32.0	31.26	28.38	5.48	48	28	1.5	-	-	48	46	8	20	5	0.33
	32x10	MBN32X10R-4CW	10	4	RH	36230	63880	6.350	21900	32x10	32.0	30.49	25.45	4.93	50	53	1.5	9.5	4	77	46	10	20	5	0.52
	32x32	MBN32X32R-4CW	32	4	RH	18020	41150	3.969	70000	32x32	32.0	31.17	27.90	5.54	56	30	2.4	-	-	50	54	5	25	5	0.57
40mm Dia.	40x5	MBN40X5R-5CW	5	5	RH	25170	70660	3.500	8800	40x5	40.0	39.26	36.38	8.82	56	34	3	-	-	54	54	8	20	5	0.42
	40x10	MBN40X10R-4CW	10	4	RH	56770	116070	7.144	16700	40x10	42.1	40.00	34.81	8.65	63	51	3	-	-	75	60	10	30	5	0.89
	40x40	MBN40X40R-8CW	40	8	RH	75440	181330	6.350	70000	40x40	40.0	38.49	33.45	8.06	70	60	2.4	-	-	102	67	10	40	5	1.85

* Based on DN values

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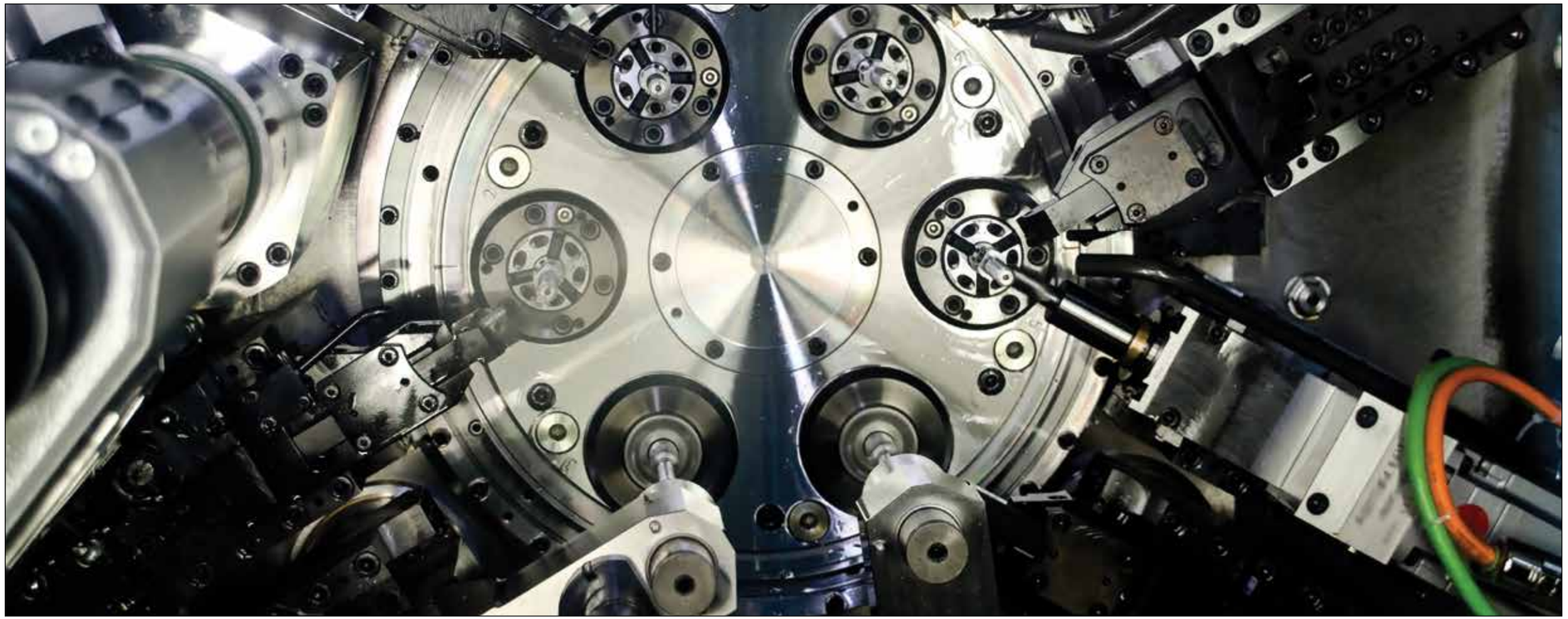
MINIATURE BALL SCREWS



MINIATURE BALL SCREWS

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MINIATURE BALL SCREW SIZES

Nook Industries is a leading producer of miniature ball screws, offering a wide variety of sizes and configurations. The miniature product line is supplied as a complete assembly form only. Screw ends can be machined to customer requirements in nearly any diameter and length configuration.

Some sizes of miniature ball screws are supplies with EZZE MOUNT™ bearing supports to make complete assemblies. Smaller size screw diameters can be enlarged by fitting a sleeve to the screw to allow mating with an EZZE MOUNT™.

BALL NUT SELECTION AND PART NUMBER

	MATERIAL	V-THREAD	CYLINDRICAL KEYED
6x2	SS	MBN10922	-
6x1.25	SS	MBN10636	MBN10727
8x2.5	4140	MBN10830	MBN10828
8x2.5	SS	MBN10731	MBN10729
8x6	4140	MBN10961	-
8x6	SS	MBN10924	-
10x2	4140	MBN10834	MBN10832
10x2	SS	MBN10757	MBN10733
12x2.5	4140	MBN11112	-
14x3	4140	MBN11123	MBN11125
14x6	4140	MBN11177	-

STANDARD SCREW SIZES AND LENGTH

	MATERIAL	LENGTH (mm)	PART NUMBER
6x2	SS	1,000	MMSS0620
6x1.25	SS	1,000	MMSS0612
8x2.5	4140	1,000	MMBS0825
8x2.5	SS	1,000	MMSS0825
8x6	4140	1,000	MMBS0860
8x6	SS	1,000	MMSS0860
10x2	4140	1,000	MMBS1020
10x2	SS	1,000	MMSS1020
12x2.5	4140	1,000	MMBS1225
14x3	4140	1,000	MMBS1430
14x6	4140	1,000	MMBS1460

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REFERENCE NUMBER SYSTEM
MINIATURE BALL SCREW ASSEMBLIES

MRT 10×2 RA / EK / 4N / 1063 / MBN10436 / S

BALL SCREW
Thread Form Codes

MRT 6×1.25	= 6 × 1.25
MRT 6×2	= 6 × 2
MRT 8×2.5	= 8 × 2.5
MRT 8×6	= 8 × 6
MRT 10×2	= 10 × 2
MRT 12×2.5	= 12 × 2.5
MRT 14×3	= 14 × 3
MRT 14×6	= 14 × 6

MATERIAL
R A

R =Right Hand Thread
A = Alloy
S = Stainless Steel

Note: Not all materials are available for all sizes.

FIRST END CONFIGURATION
See next page for configuration codes
Note: Both Ends must be specified.

SECOND END CONFIGURATION
See next page for configuration codes
Note: Both Ends must be specified.

OVERALL LENGTH (OAL)
Length in mm.

TRAVEL NUT
MBN Nut
Use standard part number found in the Technical Data Section for Miniature Ball Screws

Example:
MBN 10824 = 6 × 1.25 Keyed MRT Nut

Nut will be installed with keyway or threaded end toward first end designation.

00000 = No Nut

MODIFIER LIST
S or M Required
S = Standard, not additional description required
M = Modified, additional description required

END CONFIGURATIONS
MINIATURE BALL SCREW ASSEMBLIES

EZZE-MOUNT™ / End Machining

1	= Type 1	4	= Type 4
2	= Type 2	6	= Type 6
3	= Type 3	7	= Type 7

EK

EK= Universal Double Bearing Support, with Keyway

Shaft Extension
K = Shaft Extension with Keyway
L = Shaft Extension without Keyway
N = No Shaft

Single Bearing Supports are used in conjunction with Type 1N end machining.

Double Bearing Supports are used in conjunction with Type 3K, 3L, or 3N end machining.

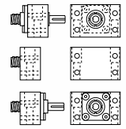
Compact Universal Double Bearing Mounts are used in conjunction with Type 6 end machining.

Compact Universal Single Bearing Mounts are used in conjunction with Type 7 end machining.

B = Universal Double Bearing Support End Cap Facing Screw Thread

C = Universal Single Bearing Support

E = Universal Double Bearing Support End Cap Facing Away From Screw Thread

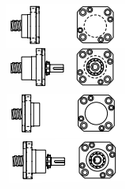


D = Flanged Single Bearing Support Flange Facing Screw Thread

F = Flanged Double Bearing Support Flange Facing Screw Thread

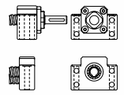
G = Flanged Single Bearing Support Flange Facing Away From Screw Thread

H = Flanged Double Bearing Support Flange Facing Away From Screw Thread



M= Compact Universal Double Bearing Support End Cap Facing Away From Screw Thread

P = Universal Single Bearing Support



00 = No End Machining (Screw will be cut to desired length).

XX = Custom Machining (Print or specified data must be provided).

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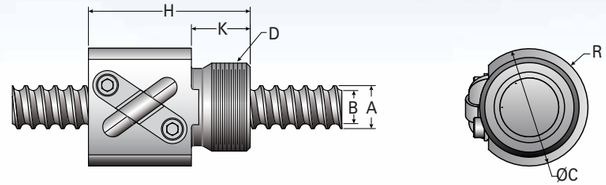
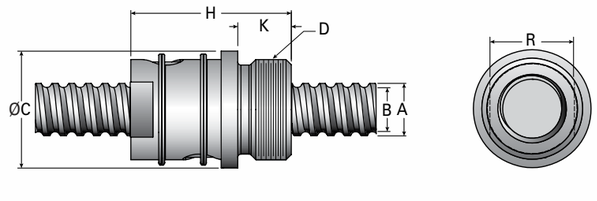
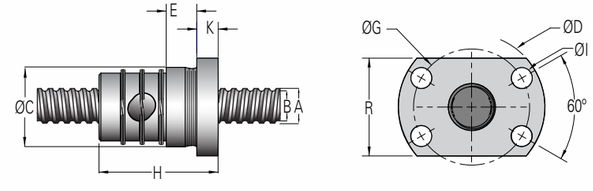


EXTERNAL RETURNS	Size	Ball Nut Number	Screw Material	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed (mm/min)	Size	Lash (mm)	Torque to Raise 1 kN (N·m)	Screw Dimensions (mm) A	B	Screw weight (g/m)	Ball Nut Dimensions (mm) C	D	H	K	R	Nut Wt. (g)
6mm Dia.	**6x2**	**MBN10922**	SS	2	3.5	RH	751	719	1.5875	23400	**6x2**	0.076	0.354	5.80	4.5	161	16.0	M12 × 1	22.0	8.0	8.5	18.0
8mm Dia.	**8x6**	**MBN10961**	4150	6	1.5	RH	1,343	1,632	1.5875	52500	**8x6**	0.076	1.060	7.80	6.6	329	17.5	M15x1	24.0	8.0	9.7	25.4
	8x6	**MBN10924**	SS	6	1.5	RH	592	480	1.5875	52500	**8x6**	0.076	1.060	7.80	6.6	329	17.5	M15x1	24.0	8.0	9.7	25.4



INTERNAL RETURNS	Size	Ball Nut Number	Screw Material	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed (mm/min)	Size	Lash (mm)	Torque to Raise 1 kN (N·m)	Screw Dimensions (mm) A	B	Screw weight (g/m)	Ball Nut Dimensions (mm) C	D	H	K	R	Nut Wt. (g)
6mm Dia.	**6x1.25**	**MBN10636**	SS	1.25	2	RH	258	253	0.8000	14600	**6x1.25**	0.038	0.221	6.20	5.6	215	14.5	M12×1	17.2	6.1	9.32	8.6
8mm Dia.	**8x2.5**	**MBN10830**	4150	2.5	2	RH	1,407	1,638	1.5875	21900	**8x2.5**	0.038	0.443	7.80	6.6	338	17.5	M15×1	24.0	8.0	12.3	20.0
	8x2.5	**MBN10731**	SS	2.5	2	RH	480	623	1.5875	21900	**8x2.5**	0.038	0.443	7.80	6.6	338	17.5	M15×1	24.0	8.0	12.3	20.0
10mm Dia.	**10x2**	**MBN10834**	4150	2	2	RH	1,259	1,514	1.5875	14000	**10x2**	0.038	0.354	9.50	8.2	464	19.5	M17×1	22.0	8.0	15.7	21.7
	10x2	**MBN10757**	SS	2	2	RH	560	444	1.5875	14000	**10x2**	0.038	0.354	9.50	8.2	464	19.5	M17×1	22.0	8.0	15.7	21.7



FLANGED MINIATURES	Size	Ball Nut Number	Screw Material	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed (mm/min)	Size	Lash (mm)	Torque to Raise 1 kN (N·m)	Screw Dimensions (mm) A	B	Screw weight (g/m)	Ball Nut Dimensions (mm) øC (g6)	øD	E	øG	H	øI	K	R	Nut Wt. (g)
6mm Dia.	**6 X 1.25**	**MBN11179**	SS	1.25	3	RH	330	305	0.8000	14600	**6 X 1.25**	0.038	0.221	6.20	5.6	215	13	24	5	19	19.5	3.4	3.5	16	16
8mm Dia.	**8 X 2.5**	**MBN11181**	SS	2.5	3	RH	880	725	1.5875	21900	**8 X 2.5**	0.038	0.442	7.80	6.6	388	18	30	7	24	30	3.4	5	19	41
	8 X 2.5	**MBN11185**	4150	2.5	3	RH	1995	2460	1.5875	21900	**8 X 2.5**	0.038	0.442	7.80	6.6	388	18	30	7	24	30	3.4	5	19	41
10mm Dia.	**10 X 2**	**MBN11183**	SS	2	3	RH	790	665	1.5875	14000	**10 X 2**	0.038	0.354	9.50	8.2	464	20	36	5.5	28	26	4.5	5	23	48
	10 X 2	**MBN11187**	4150	2	3	RH	1785	2270	1.5875	14000	**10 X 2**	0.038	0.354	9.50	8.2	464	20	36	5.5	28	26	4.5	5	23	48

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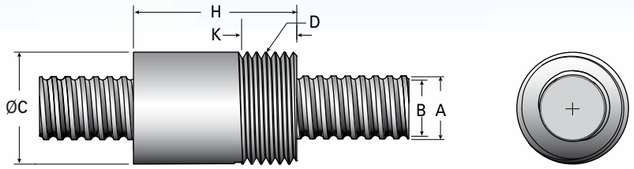
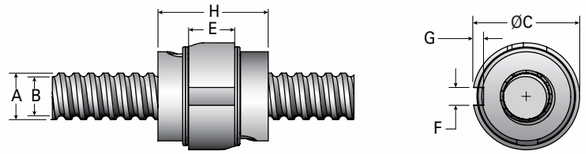
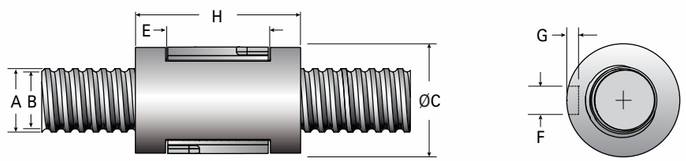
MINIATURE CYLINDRICAL KEYED NUT



CYLINDRICAL BODY	Size	Ball Nut Number	Screw Material	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed (mm/min)	Size	Lash (mm)	Torque to Raise 1 kN (N·m)	Screw Dimensions (mm) A	Screw Dimensions (mm) B	Screw weight (g/m)	Ball Nut Dimensions (mm) C	Ball Nut Dimensions (mm) D	Ball Nut Dimensions (mm) H	Ball Nut Dimensions (mm) K	Nut Wt. (g)
12mm Dia.	**12x2.5**	**MBN11112**	4150	2.5	5	RH	2,980	4,960	1.5875	14600	**12x2.5**	0.076	0.443	11.75	10.2	215	25.5	M20×1.5	39.0	8.0	8.6
14mm Dia.	**14x3**	**MBN11123**	4150	3	5	RH	5,812	10,340	2.0000	15000	**14x3**	0.076	0.478	13.50	11.9	338	24.0	M24×2	35.0	12.0	20.0
	14x6	**MBN11177**	4150	6	5	RH	6,894	13,081	2.0000	30000	**14x6**	0.076	0.991	13.50	11.9	329	30.0	M30×2	40.0	13.5	25.4



INTERNAL RETURNS	Size	Ball Nut Number	Screw Material	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed (mm/min)	Size	Lash (mm)	Torque to Raise 1 kN (N·m)	Screw Dimensions (mm) A (mm)	Screw Dimensions (mm) B (mm)	Screw weight (g/m)	Ball Nut Dimensions (mm) C (mm)	Ball Nut Dimensions (mm) H (mm)	Ball Nut Dimensions (mm) E (mm)	Ball Nut Dimensions (mm) F (mm)	Ball Nut Dimensions (mm) G (mm)	Nut Wt. (g)
6mm Dia.	**6x1.25**	**MBN10727**	SS	1.25	2	RH	258	253	0.8000	14600	**6x1.25**	0.038	0.221	6.2	5.6	215	13.0	17.2	8.61	2.0	1.20	9.5
8mm Dia.	**8x2.5**	**MBN10828**	4150	2.5	2	RH	1,407	1,638	1.5875	21900	**8x2.5**	0.038	0.443	7.8	6.6	321	18.0	18.6	7.7	3.0	1.80	20
	8x2.5	**MBN10729**	SS	2.5	2	RH	480	623	1.5875	21900	**8x2.5**	0.038	0.443	7.8	6.6	321	18.0	18.6	7.7	3.0	1.80	20
	10x2	**MBN10832**	4150	2	2	RH	1,259	1,514	1.5875	14000	**10x2**	0.038	0.354	9.5	8.2	464	20.0	22.0	12.0	3.0	1.80	29
	10x2	**MBN10733**	SS	2	2	RH	560	444	1.5875	14000	**10x2**	0.038	0.354	9.5	8.2	464	20.0	22.0	12.0	3.0	1.80	29



INTERNAL RETURNS	Size	Ball Nut Number	Screw Material	Lead (mm)	Active Turns	Helix	Dynamic Load C_a(N)	Static Load C_{0a}(N)	Nominal Ball Dia. (mm)	Linear Speed (mm/min)	Size	Lash (mm)	Torque to Raise 1 kN (N·m)	Screw Dimensions (mm) A (mm)	Screw Dimensions (mm) B (mm)	Screw weight (g/m)	Ball Nut Dimensions (mm) C (mm)	Ball Nut Dimensions (mm) H (mm)	Ball Nut Dimensions (mm) E (mm)	Ball Nut Dimensions (mm) F (mm)	Ball Nut Dimensions (mm) G (mm)	Nut Wt. (g)
14mm Dia.	**14x3**	**MBN11125**	4150	3	5	RH	5,812	10,340	2.0000	15000	**14x3**	0.076	0.472	13.5	11.9	1,021	24.0	40	20.0	5.0	3.00	110
	14x6	**MBN11175**	4150	6	5	RH	6,894	13,081	2.0000	30000	**14x6**	0.076	0.991	13.5	11.9	1,008	30.0	40	20.0	5.0	3.00	65

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EZZE-MOUNT™
BEARING MOUNTS

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BEARING MOUNTS & END MACHINING

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PRECISION SCREW MOUNTS

COMPACT UNIVERSAL MOUNTS (EZBK/EZBF)

Double Bearing

Compact Universal Double Bearing Mounts use a pair of angular contact bearings, which supports the linear screw axially and radially. They are ideal for most mounting applications. When used with a Compact Single Bearing Mount allow the linear screw to flex naturally maximizing the life of the travel nut and screw.

Single Bearing

Compact Universal Single Bearing Mounts use a single radial bearing, which supports the linear screw radially. They are ideal for most mounting applications and allow the linear screw to flex naturally maximizing the life of the travel nut and screw. Compact Universal Single Bearing Mounts require use in combination with Compact Double Bearing.

Compact Universal Mounts are smaller than the standard Universal Mounts, and have a smaller bearing capacity. Compact Universal Bearing Mounts can me mounted from either the front face, or the bottom surface. They are available in alloy and nickel plating.

UNIVERSAL MOUNTS (EZM)

Double Bearing

Universal Double Bearing Mounts use a pair of angular contact bearing, which supports the linear screw axially and radially. They are ideal for most mounting applications and when used with a Single Bearing Mount allow the linear screw to flex naturally maximizing the life of the travel nut and screw.

Single Bearing

Universal Single Bearing Mounts use a single radial bearing, which supports the linear screw radially. They are ideal for most mounting applications and allow the linear screw to flex naturally maximizing the life of the travel nut and screw. Universal Single Bearing Mounts require use with either the Double Bearing or the High Capacity Fixed Bearing Mounts.

Universal Bearing Mounts can me mounted from either the front or back face, and the bottom surface. They are available in alloy and nickel plating.

FLANGED MOUNTS (EZF)

Double Bearing

Flanged Double Bearing Mounts use a pair of angular contact bearing, which supports the linear screw axially and radially. Flanged Double Bearing Mounts are ideal for most mounting applications and when used with a Single Bearing Mount allow the linear screw to flex naturally maximizing the life of the travel nut and screw.

Single Bearing

Flanged Single Bearing Mounts use a single radial bearing, which supports the linear screw radially. Flanged Single Bearing Mounts are ideal for most mounting applications and allow the linear screw to flex naturally maximizing the life of the travel nut and screw. Flanged Single Bearing Mounts require use with either the Double Bearing or the High Capacity Fixed Bearing Mounts.

Flanged Bearing Mounts are mounted using the back face and come with a machined piloted surface for ease of mounting and alignment. They are available in alloy and nickel plating.

FIXED FLANGED MOUNTS (EZRF)

Quadruple Bearing

Applications with extreme performance characteristics place large demands on end support units. Nook Industries has developed support units capable of handling these demands.

Nook series EZRF end support units are matched to the ball screw and are designed to provide high load carrying capacity, precision, speed, rigidity, low friction, and ease of maintenance and installation. EZRF supports include a SFZ locknut.

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INTRODUCTION

Nook Industries offers EZZE-MOUNT™ precision bearing blocks, that can be assembled to precision machined screws, providing a complete solution for most linear motion applications.

Linear motion applications utilizing a ball screw require the screw end machining to be mounted with precision bearing mounts. Nook Industries, Inc. offers both the bearing mounts and end machining as a complete assembly.

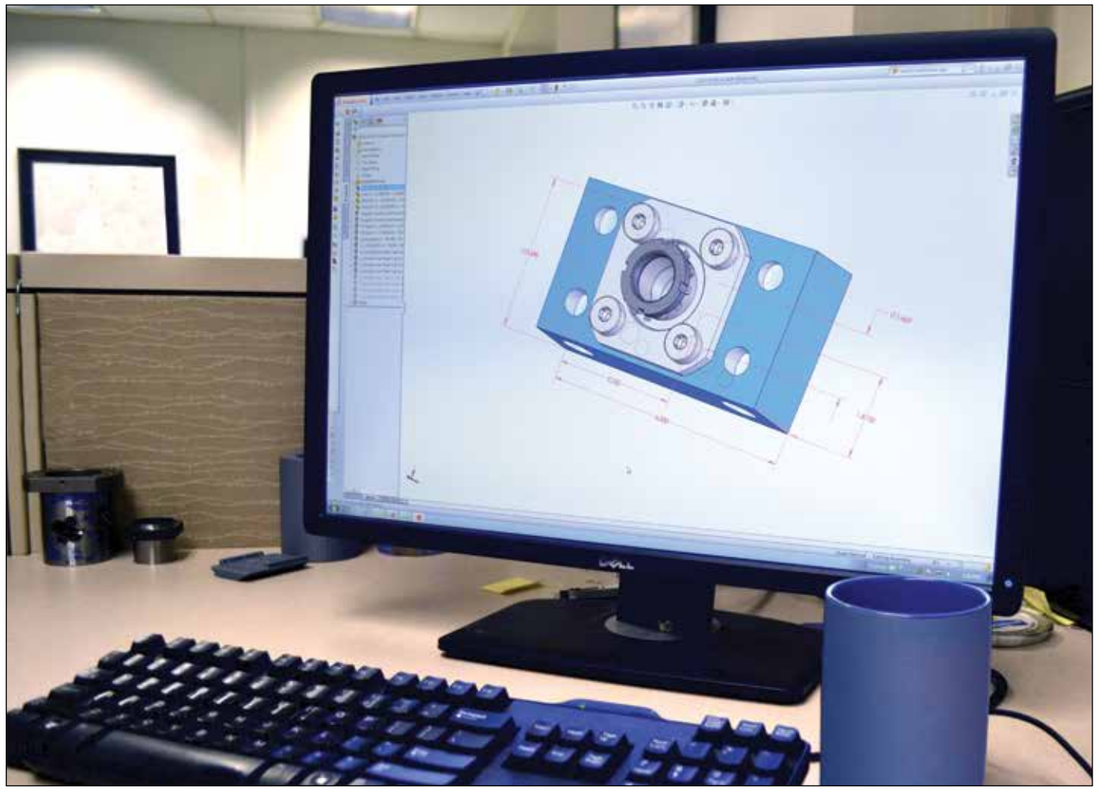
Nook Industries can provide the following end machining services:

- Screws cut to length
- Annealing
- Straightening
- CNC turning and milling
- Grinding
- Assembly of bearing mounts
- Inspection
- Specialized material handling and packaging

Bearing mounts must be designed to withstand both radial and thrust loads generated by the application.

EZZE-MOUNT™ bearing mounts are available with integral motor mounts to offer complete motorized systems.

Motor mounts are available for standard (17, 23, 34, 42), as well as IEC frames for servo and stepper motor applications. (See pages 66-73)



GLOSSARY AND DEFINITIONS

EZZE-MOUNT™

EZZE-MOUNT™ bearing blocks contain precision anti-friction bearings and are designed to be used with both ball screws. Single and double bearing base mount and flange mount versions of EZZE-MOUNT™ bearing blocks are available.

STANDARD ENDS

For each screw size, Nook industries has designed a family of standard machined ends applicable to a variety of bearing arrangements.

The use of standard machined end designs offer quick deliveries.

LAND DIAMETER

The land diameter is the outside diameter of the screw. The difference between the land diameter and the bearing journal is the resulting bearing shoulder.

ROOT DIAMETER

The root diameter is the screw diameter measured at the bottom of the thread. This diameter is used for determining maximum journal sizes. If the bearing journal diameter is larger than the root diameter, thread tracings may be visible. Generally, these tracings do not have an effect on bearing performance.

JOURNAL

A smooth diameter machined on the end of screw used as a mounting surface for bearings, couplings, pulleys, gears, etc.

STRAIGHTNESS

Although Nook Industries screws are manufactured from straight, cylindrical material, internal stresses may cause the material to yield. When ordering random lengths or cut material without end machining, straightening is recommended. Handling or machining of screws can also cause the material to bend. Before, during and after machining, additional straightening is required.

ANNEALING

Annealing is a process which softens the steel to allow for easier end machining. Annealing is usually required to machine the ends of ball screws.

Annealing rolled ball screws with T5 or ground ball screws with T3 lead accuracies will have a distortional effect; therefore it is not recommended for these products. Hard turning will allow the screw hardened thread to be removed.

END FIXITY

End fixity refers to the method by which the ends of the screw are supported. The degree of end fixity is related to the amount of restraint of the ends of the screw.

The three basic types of end fixity are:

Free	No support
Simple	Shaft restrained against radial and/or axial loads
Fixed	Shaft rigidly restrained against radial, axial and moment loads

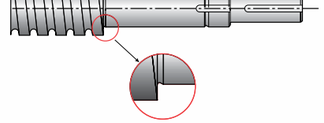
See pages 46-47 for a more detailed definition of end fixity.

LOCKNUT THREADS

Locknut threads are machined to allow the bearing retention on the screw shaft by means of a locknut. The thread used on standard machined ends follows American National Form NS Class 3. Precision ground locknuts are available from Nook Industries on special order.

UNDERCUTS AND RADII

Whenever a shaft changes diameter, an undercut or a radius is machined into the transition to minimize stress concentration. Undercuts are preferred for bearing shoulders because they allow clearance for the corner of the bearing.



CONCENTRICITY

Concentricity refers to multiple diameters sharing the same center. For end machining, close concentricity allows all components to rotate around the same axis resulting in smooth operation and long operating life.

APPROVAL DRAWINGS

If custom ends or special dimensions are desired, an approval drawing can be developed after the order is entered. These drawings will show all the critical dimensions with appropriate tolerance and customer approval is required prior to manufacture.

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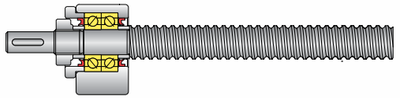
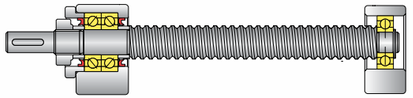
SUPPORTING METHOD

Using Nook Industries Compact Universal Support mounts is a convenient and cost-effective way to support a ball screw. Several configurations are available and designed to provide the proper axial and radial support needed for most linear motion applications. Nook Industries offers both a single bearing and multiple bearing arrangement. Below is a depiction of various bearing arrangements and graphs to assist in determining the proper screw size based on column strength and critical speed.



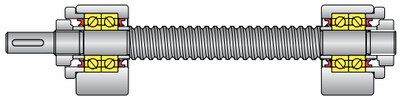
A: One end supported with a Double Bearing EZZE-MOUNT™, other end Free. Use Line A" in reference to the charts shown on the following pages.

NOTE: Not recommended for any application other than short travels and slow speeds.



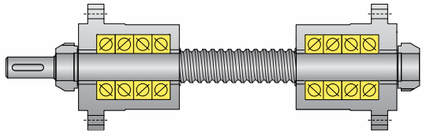
B: One end supported with a Double Bearing EZZE-MOUNT™, other supported with a Single Bearing EZZE-MOUNT™. Use Line B in reference to the charts shown on the following pages.

NOTE: This is the preferred supporting method.



C: Both ends supported with a Double Bearing EZZE-MOUNT™. Use Line C in reference to the charts shown on the following pages.

CAUTION: When using fixed bearing mounts on both ends, contact Nook Engineering to determine the mount-to-mount length tolerance of the final assembly.



D: Both ends supported with a Quad Bearing EZRF EZZE MOUNT™. Use Line D in reference to the charts shown on the following pages.

NOTE: When supporting a screw with two EZRF mounts, the screw is highly rigid. Extra care should be taken to ensure compliance in your assembly.

CAUTION: When using fixed bearing mounts on both ends, contact Nook Engineering to determine the mount-to-mount length tolerance of the final assembly.

COLUMN STRENGTH CHART

This column strength chart may be used to verify that the screw can carry the required load without buckling.

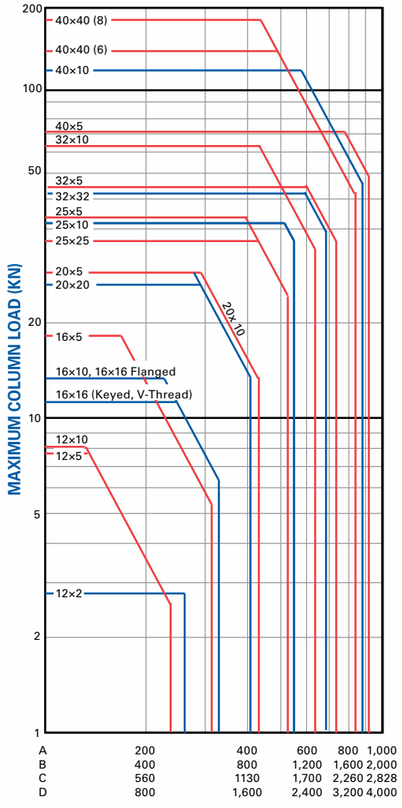
The charts show the theoretical limitations of each screw on a separate line. The lines are limited horizontally by the slenderness ratio (the length divided by radius of gyration) and vertically by the maximum static capacity of the nut. Actual load is limited by the maximum nut capacity or end mounting.

If the selected screw does not meet compression load criteria, consider the following options:

- Change end fixity (e.g. simple to fixed)
- Design to use screw in tension
- Increase screw diameter

TO USE THIS CHART:

Find a point at which the maximum length between bearing support and ball nut intersects the maximum load. Be sure the screw selected is above and to the right of that point.



CRITICAL SPEED CHART

This critical speed chart is provided to quickly determine the minimum screw size applicable for Nook EZZE-MOUNT™ designs. Maximum travel rate is also limited by ball velocity. The ball velocity is a function of the ball circle diameter and rotational speed. Critical speed of the nut is limited by a maximum DN (ball circle diameter × rpm). The charts show the maximum speed based on the DN value for each screw in parentheses.

If the selected ball screw does not meet the speed criteria, consider the following options:

- Increase screw lead (reduce rpm)
- Change end fixity (e.g. simple to fixed)
- Increase ball circle diameter

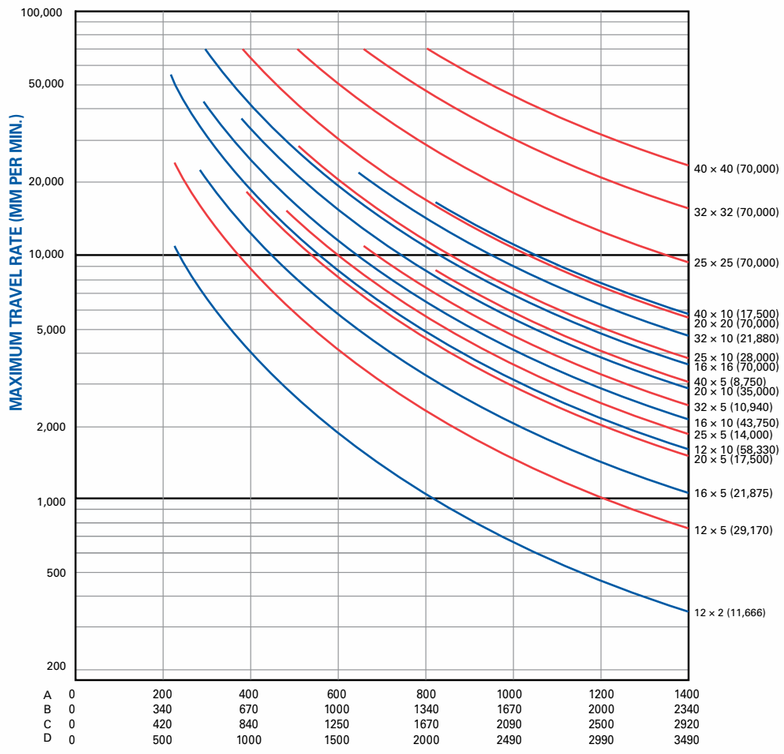
The final consideration should be to recheck the selected screw against all three of the design criteria: life, column strength and critical speed.

TO USE THIS CHART:

Determine maximum travel rate required. Determine screw length L. Find point at which travel rate and screw length intersect and select a screw above and to the right of that point.

NOTES:

- Speed indicated by curves are 80% of theoretical critical speed.
- Maximum recommended speed (as limited by DN = 70,000, regardless of screw length) is indicated in parenthesis after each curve's screw size label.
- Number in parenthesis is the maximum speed in millimeters per minute based on DN= 70,000.
- Chart below assumes earth gravity at sea level.



For critical speed values on Nook miniature ball screws, contact Nook Engineering.

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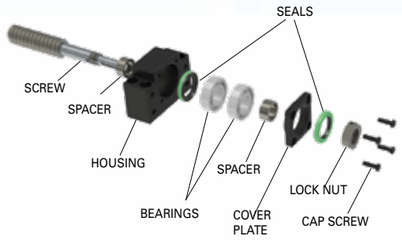
END BEARING IDENTIFICATION

COMPACT UNIVERSAL BEARING MOUNTS

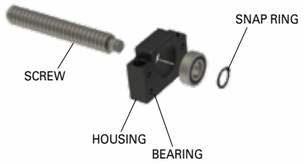
EZBK/EZEK DOUBLE BEARING



EZB PART#	NICKEL-PLATED PART#	BEARING	MAX AXIAL LOAD (kN)
EZEK06-EGB*	EZEK06-EGN*	606	.84
EZEK06-SLB*	EZEK06-SLN*	706	.84
EZEK08-EGB*	EZEK08-EGN*	608	1.20
EZEK08-SLB*	EZEK08-SLN*	708	1.20
EZBK10-SLB	EZBK10-SLN	7000A	1.91
EZBK12-SLB	EZBK12-SLN	7001A	2.13
EZBK15-SLB	EZBK15-SLN	7002A	2.36
EZBK17-SLB	EZBK17-SLN	7003A	2.59
EZBK20-SLB	EZBK20-SLN	7004A	4.20
EZBK25-SLB	EZBK25-SLN	7005A	4.50
EZBK30-SLB	EZBK30-SLN	7006A	6.20
EZBK35-SLB	EZBK35-SLN	7007A	8.750

*Use (2) deep groove ball bearings, all others - use (2) angular contact (30 deg.) Universal ground ball bearings in back-to back configuration.

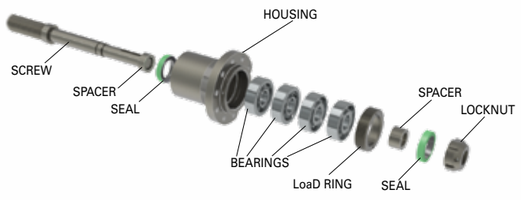
EZBF/EZEF SINGLE BEARING



EZB PART#	NICKEL-PLATED PART#	BEARING	LOCKNUT MAX AXIAL LOAD (kN)
EZEF06-EB	EZEF06-EN	606ZZ	—
EZEF08-EB	EZEF08-EN	606ZZ	—
EZBF10-SB	EZBF10-SN	608ZZ	—
EZBF12-SB	EZBF12-SN	6000ZZ	—
EZBF15-SB	EZBF15-SN	6002ZZ	—
EZBF17-SB	EZBF17-SN	6203ZZ	—
EZBF20-SB	EZBF20-SN	6004ZZ	—
EZBF25-SB	EZBF25-SN	6205ZZ	—
EZBF30-SB	EZBF30-SN	6206ZZ	—
EZBF35-SB	EZBF35-SN	6207ZZ	—

FIXED FLANGED BEARING MOUNTS

EZRF (HIGH CAPACITY)

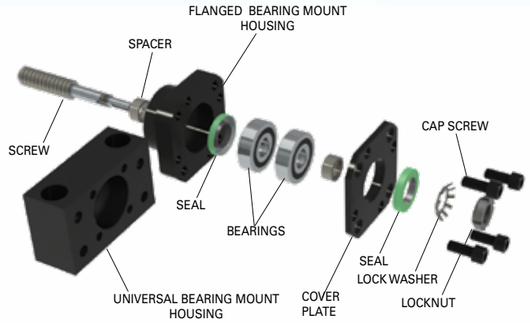


EZRF PART#	BEARING	LOCKNUT NO.	LOCKNUTS MAX AXIAL LOAD (kN)
EZRF-3012	7301	SFZ 12×1	40
EZRF-3015	7302	SFZ 15×1	60
EZRF-3017	7303	SFZ 17×1	80
EZRF-3020	7304	SFZ 20×1	90
EZRF-3025	7305	SFZ 25×1.5	130
EZRF-3035	7307	SFZ 35×1.5	190
EZRF-3040	7308	SFZ 40×1.5	210
EZRF-3045	7309	SFZ 45×1.5	240

NOTE: Refer to bearing manufacturer for axial and radial load ratings.

UNIVERSAL AND FLANGED BEARING MOUNTS

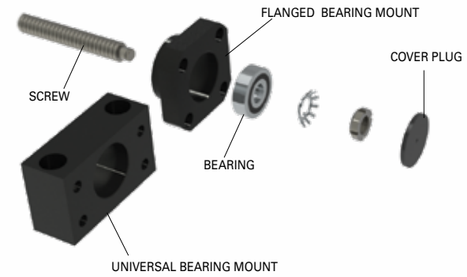
EZM/EZF DOUBLE BEARING



EZM	EZF	BEARING	LOCKNUT NO.	LOCKNUTS MAX AXIAL LOAD (LB)
EZM-1007*	EZF-1007*	627-2RS1	¼"-20	1,800
EZM-1008*	EZF-1008*	608-2RS1	5⁄16"-24	2,300
EZM-1009*	EZF-1009*	629-2RS1	5⁄16"-24	2,300
EZM-3010*	EZF-3010*	6000-2RS1	N-00	4,100
EZM-3012	EZF-3012	7301	N-01	6,900
EZM-3015	EZF-3015	7302	N-02	8,100
EZM-3017	EZF-3017	7303	N-03	9,900
EZM-2020	EZF-2020	7204	N-04	13,200
EZM-3025	EZF-3025	7305	N-05	16,200
EZM-2030	EZF-2030	7206	N-06	23,700

*Use (2) deep groove ball bearings, all others - use (2) angular contact (40 deg.) Universal ground ball bearings in back-to back configuration.

EZM/EZF SINGLE BEARING



NOTE: Refer to bearing manufacturer for axial and radial load ratings.

CAUTION: When using fixed bearing mounts on both ends, contact Nook Engineering to determine the mount-to-mount length tolerance of the final assembly.

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

QUICK REFERENCE: EZZE-MOUNT™ AND END MACHINING
PRECISION METRIC BALL SCREWS

NOMINAL DIA-LEAD	END CODE TYPE					UNIVERSAL MOUNTS		FLANGE MOUNTS		COMPACT UNIVERSAL MOUNTS		FIXED FLANGE MOUNTS
	1,2,3	4	5	6	7	Double	Single	Double	Single	Double*	Single*	Quadruple
12 × 2	10	6	-	10	8	EZM-3010	EZM-4010	EZF-3010	EZF-4010	EZBK10-SLB	EZBF10-SB	-
12 × 5	8	4	-	8	6	EZM-1008	EZM-4008	EZF-1008	EZF-4008	EZEK08-SLB	EZEF08-EB	-
12 × 10	8	4	-	8	6	EZM-1008	EZM-4008	EZF-1008	EZF-4008	EZEK08-SLB	EZEF08-EB	-
16 × 5	12	6	12	12	10	EZM-3012	EZM-4012	EZF-3012	EZF-4012	EZBK12-SLB	EZBF12-SB	EZRF-3012
16 × 10	12	8	12	12	10	EZM-3012	EZM-4012	EZF-3012	EZF-4012	EZBK12-SLB	EZBF12-SB	EZRF-3012
16 × 16	12	6	12	12	10	EZM-3012	EZM-4012	EZF-3012	EZF-4012	EZBK12-SLB	EZBF12-SB	EZRF-3012
20 × 5	15	10	15	15	15	EZM-3015	EZM-4015	EZF-3015	EZF-4015	EZBK15-SLB	EZBF15-SB	EZRF-3015
20 × 10	15	10	15	15	15	EZM-3015	EZM-4015	EZF-3015	EZF-4015	EZBK15-SLB	EZBF15-SB	EZRF-3015
20 × 20	15	10	15	15	15	EZM-3015	EZM-4015	EZF-3015	EZF-4015	EZBK15-SLB	EZBF15-SB	EZRF-3015
25 × 5	20	12	20	20	20	EZM-2020	EZM-4020	EZF-2020	EZF-4020	EZBK20-SLB	EZBF20-SB	EZRF-3020
25 × 10	20	12	20	20	20	EZM-2020	EZM-4020	EZF-2020	EZF-4020	EZBK20-SLB	EZBF20-SB	EZRF-3020
25 × 25	20	12	20	20	20	EZM-2020	EZM-4020	EZF-2020	EZF-4020	EZBK20-SLB	EZBF20-SB	EZRF-3020
32 × 5	25	16	25	25	25	EZM-3025	EZM-4025	EZF-3025	EZF-4025	EZBK25-SLB	EZBF25-SB	EZRF-3025
32 × 10	25	12	25	25	25	EZM-3025	EZM-4025	EZF-3025	EZF-4025	EZBK25-SLB	EZBF25-SB	EZRF-3025
32 × 32	25	16	25	25	25	EZM-3025	EZM-4025	EZF-3025	EZF-4025	EZBK25-SLB	EZBF25-SB	EZRF-3025
40 × 5	30	19	25	30	30	EZM-2030	EZM-4030	EZF-2030	EZF-4030	EZBK30-SLB	EZBF30-SB	EZRF-3025
40 × 10	30	19	25	30	30	EZM-2030	EZM-4030	EZF-2030	EZF-4030	EZBK30-SLB	EZBF30-SB	EZRF-3025
40 × 40	30	19	25	30	30	EZM-2030	EZM-4030	EZF-2030	EZF-4030	EZBK30-SLB	EZBF30-SB	EZRF-3025

* For nickel-plated mounts, change the part numbers "-SLB" to "-SLN" and change "-SB" to "-SN"

QUICK REFERENCE: EZZE-MOUNT™ AND END MACHINING
MINIATURE BALL SCREWS

NOMINAL DIA-LEAD	END CODE TYPE					UNIVERSAL MOUNTS		FLANGE MOUNTS		COMPACT UNIVERSAL MOUNTS	
	1,2,3	4	5	6	7	Double	Single	Double	Single	Double*	Single*
6 × 1.25	5	2	-	-	-	-	-	-	-	-	-
6 × 2	3	2	-	-	-	-	-	-	-	-	-
8 × 2.5	6	4	-	6	6	-	-	-	-	EZEK06-SLB/EGB	EZEF06-EB
8 × 6	6	4	-	6	6	-	-	-	-	EZEK06-SLB/EGB	EZEF06-EB
10 × 2	8	4	-	8	8	EZM-1008	EZM-4008	EZF-1008	EZF-4008	EZEK08-EGB	EZEF08-EB
12 × 2.5	10	6	-	10	8	EZM-3010	EZM-4010	EZF-3010	EZF-4010	EZBK10-SLB	EZBF10-SB
14 × 3	10	6	-	10	8	EZM-3010	EZM-4010	EZF-3010	EZF-4010	EZBK10-SLB	EZBF10-SB
14 × 6	10	6	-	10	8	EZM-3010	EZM-4010	EZF-3010	EZF-4010	EZBK10-SLB	EZBF10-SB

* For nickel-plated mounts, change the part numbers "-SLB" to "-SLN," "-SB" to "-SN," "-EGB" to "-EGN," and "-EB" to "-EN."

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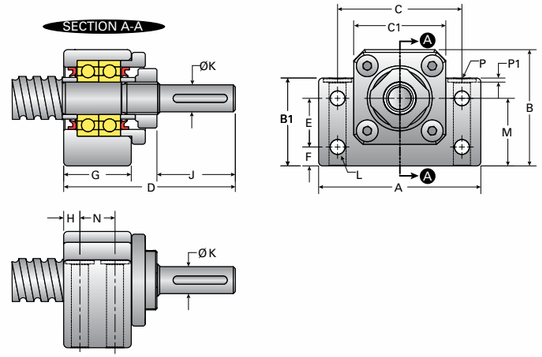
COMPACT UNIVERSAL-MOUNT DOUBLE

Double Angular Contact Bearing, which should be used with Type 6 Standard Ends
(for nickel-plated mounts, replace the "B" at the end of the part number with an "N.")

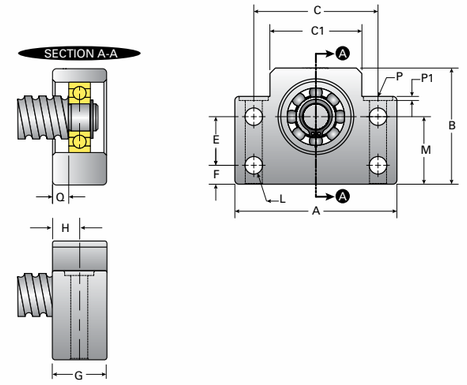
DOUBLE PART NO.	A (mm)	B (mm)	B1 (mm)	C (mm)	C1 (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	J (mm)	K SHAFT DIA. (mm)	L THRU (mm)	M (mm)	N (mm)	P Bolt Size (mm)	P Thru (mm)	P C'Bore (mm)	P P1 (mm)	END CODE
EZEK06-EGB / SLB	42	25	12.0	30	20	38	-	-	20	10	10.0	4	-	13	-	5	5.2	-	-	06
EZEK08-EGB / SLB	52	32	16.0	38	27	42	-	-	23	11.5	10.0	6	-	17	-	6	6.3	-	-	08
EZBK10-SLB	60	39	32.5	46	34	53.5	15	7	25	6	17.5	8	5.5	22	13	6	6.3	10.5	6.5	10
EZBK12-SLB	60	42	32.5	46	34	54.5	18	7	25	6	18.5	10	5.5	25	13	6	6.3	10.5	1.5	12
EZBK15-SLB	70	47	38.0	54	38	60.5	18	10	27	6	20.5	12	5.5	28	15	6	6.3	10.5	6.5	15
EZBK17-SLB	86	63	55.0	68	48	86.5	28	11	35	8	33.5	15	6.6	39	19	8	8.7	14.0	8.6	17
EZBK20-SLB	88	59	50.0	70	50	86.5	22	12	35	8	33.5	16	6.6	34	19	8	8.7	14.0	8.5	20
EZBK25-SLB	106	79	70.0	85	62	104.5	33	15	42	10	39.5	20	9.0	48	22	10	10.7	17.5	10.8	25
EZBK30-SLB	128	88	78.0	102	74	126.0	33	18	45	11	54.0	25	11.0	51	23	12	13.7	20.0	13.0	30



COMPACT UNIVERSAL-MOUNT SINGLE

Single Radial Bearing, which should be used with Type 7 Standard Ends
(for nickel-plated mounts, replace the "B" at the end of the part number with an "N.")

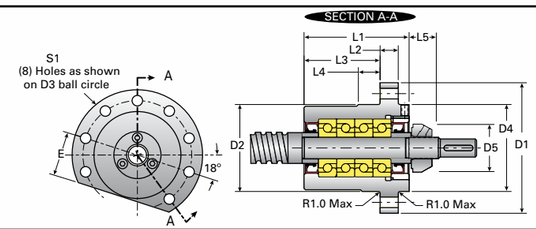
SINGLE PART NO.	A (mm)	B (mm)	B1 (mm)	C (mm)	C1 (mm)	E (mm)	F (mm)	G (mm)	H (mm)	L THRU (mm)	M (mm)	P Bolt Size (mm)	P Thru (mm)	P C'Bore (mm)	P P1 (mm)	Q (mm)	END CODE
EZEF06-EB	42	25	12	30	20	-	-	12	6	-	13	5	5.2	-	-	6.0	06
EZEF08-EB	52	32	16	38	27	-	-	14	7	-	17	6	6.3	-	-	8.0	06
EZBF10-SB	60	39	32.5	46	34	15	7	20	10	5.5	22	6	6.3	10.8	5.0	6.5	08
EZBF12-SB	60	43	32.5	46	34	18	7	20	10	5.5	25	6	6.3	10.8	1.5	6.0	10
EZBF15-SB	70	48	38.0	54	40	18	10	20	10	5.5	28	6	6.3	11.0	6.5	5.5	15
EZBF17-SB	86	64	55.0	68	50	28	11	23	11.5	6.6	39	8	8.7	14.0	8.6	5.5	17
EZBF20-SB	88	60	50.0	70	52	22	12	26	13	6.6	34	8	8.7	14.0	8.6	7.0	20
EZBF25-SB	106	80	70.0	85	64	33	15	30	15	9.0	48	10	10.7	17.5	11.0	7.5	25
EZBF30-SB	128	89	78.0	102	76	33	18	32	16	11.0	51	12	13.7	20.0	13.0	8.0	30



FLANGED FIXED

Quadruple Angular Contact Bearing, which should be used with Type 5 Standard Ends

PART NO.	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	D1 (mm)	D2 G6 (mm)	D3 (mm)	D4 (mm)	D5 (mm)	E (mm)	S (mm)
EZRF-3012	67	10	51.0	14	15	72	48	60	48	30	25	5.8
EZRF-3015	72	10	55.5	15	17	82	54	68	54	33	28	6.8
EZRF-3017	78	12	59.0	16	19	92	64	78	64	37	33	6.8
EZRF-3020	82	12	62.0	17	19	100	64	82	64	40	33	8.8
EZRF-3025	93	15	69.5	19	21	116	80	98	80	44	41	8.8



NOTE: When selecting the bearing support for an application with high axial loads, the capacities of the bearings and locknuts must be considered. See pages 48-49

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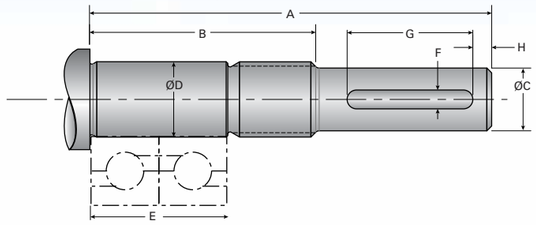
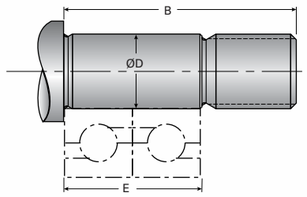
METRIC MACHINED ENDS

TYPE 6

Type 6K (with keyway)
Type 6L (without keyway)



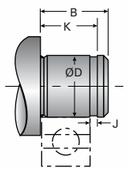
Type 6N



Machine End Code	TYPE 6 (K, L) Typical Journal for Duplexed Bearing Block (mm) A	C	F	G	H	TYPE 6 (K, L, N) Common Dimensions (mm) B	D	E	LOCKNUT
6	38.0	4.00/3.98	-	-	-	28.0	6.005/5.996	20.00	M6 × 1.0
8	42.0	6.00/5.98	2.00	6.0	1.5	32.0	8.005/7.996	22.00	M8 × 1.0
10	53.5	8.00/7.98	2.00	12.0	3.0	36.0	10.005/9.996	20.00	M10 × 1.0
12	54.5	10.00/9.98	3.00	14.0	3.0	36.0	12.006/11.995	22.00	M12 × 1.0
15	60.5	12.00/11.98	4.00	16.0	3.0	40.0	15.006/14.995	28.00	M15 × 1.0
17	86.5	15.00/14.97	5.00	25.0	3.0	53.0	17.006/16.995	36.00	M17 × 1.0
20	86.5	16.00/15.98	5.00	25.0	3.0	53.0	20.007/19.994	38.00	M20 × 1.0
25	104.5	20.00/19.98	6.00	30.0	3.0	65.0	25.007/24.994	47.00	M25 × 1.5
30	126.0	25.00/24.98	8.00	45.0	3.0	72.0	30.007/29.994	47.00	M30 × 1.5

TYPE 7

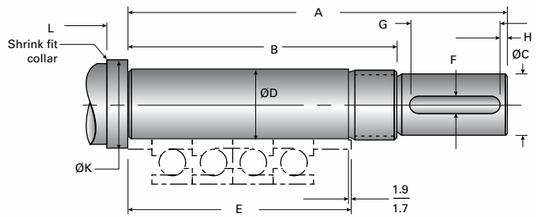
Type 7N



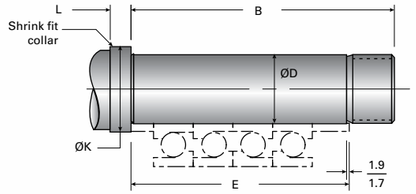
Machine End Code	TYPE 7 (N) Typical Journal for Single Bearing Block (mm) B	D	J	K
6	9.0	6.005/5.996	0.87	6.95
8	10.0	8.005/7.996	0.97	7.95
10	11.0	10.005/9.996	1.22	9.20
15	13.0	15.006/14.995	1.22	10.20
17	16.0	17.006/16.995	1.22	13.20
20	19.0	20.007/19.994	1.42	13.40
25	20.0	25.007/24.994	1.42	16.40
30	21.0	30.007/29.994	1.82	17.80

TYPE 5

Type 5K (with keyway)
Type 5L (without keyway)

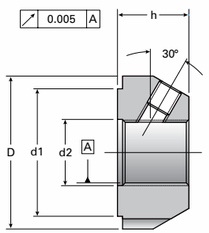


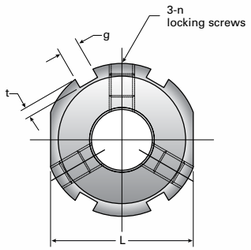
Type 5N



Machine End Code	TYPE 5 (K L N) Common Dimensions (mm) B	D	E	K	L	TYPE 5 (K, L) Typical Journal for EZRF Bearing Block (mm) A	C	F	G	H	LOCKNUT
12	85	12.008/11.997	69	18	8	117	10.00/9.97	3	26	2	SFZ 12 × 1
15	93	15.008/14.997	74	22	9	133	12.00/11.97	4	33	3	SFZ 15 × 1
17	101	17.008/16.997	80	24	9	141	15.00/14.97	5	33	3	SFZ 17 × 1
20	105	20.009/19.996	84	28	9	151	17.00/16.97	5	37	4	SFZ 20 × 1
25	119	25.009/24.996	95	32	10	170	20.00/19.97	6	41	5	SFZ 25 × 1.5

SFZ LOCKNUTS





Conventional locknuts may not be suitable in a typical ball screw application due to the high axial load generated. Nook series SFZ locknuts are designed to carry high axial forces while minimizing the rotational inertia, an important benefit in high dynamic applications. SFZ locknuts are designed to carry high axial load, have a high loosening torque, and are manufactured with high accuracy to optimize the load on the thread interface.

Part No. Dia. × Pitch	Dimensions in mm D	h	g	t	d1	d2	L	Locking Screws DIN	Max Tightening Torque (T) (N·m)	Allowable Axial Load (Ca) (kN)	Loosening Torque (T) (N·m)
SFZ 12×1	30	14	4	2	25	13	27	M5	4.7	40	18
SFZ 15×1	33	16	4	2	28	16	30	M5	4.7	60	20
SFZ 17×1	37	18	5	2	33	18	34	M6	8	80	25
SFZ 20×1	40	18	5	2	35	21	36	M6	8	90	35
SFZ 25×1.5	44	20	5	2	39	26	41	M6	8	130	45

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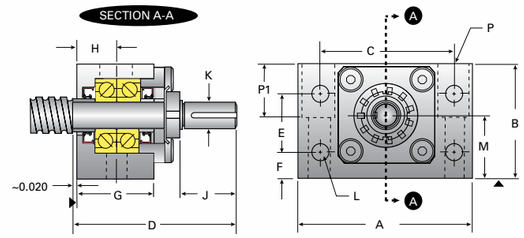
INCH UNIVERSAL MOUNT
SINGLE AND DOUBLE BEARING SUPPORT

UNIVERSAL-MOUNT DOUBLE

Double Angular Contact Bearing, which should be used with Type 3 Standard Ends

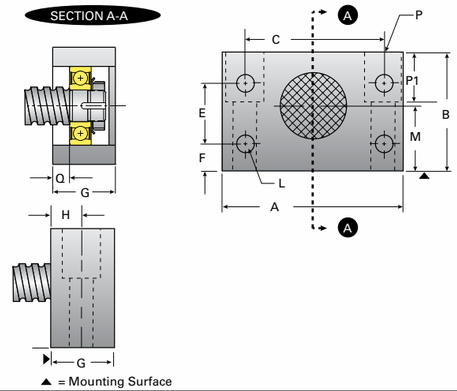
DOUBLE PART NO.	A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	G (in)	H (in)	J (in)	K SHAFT DIA. (in)	L THRU (in)	M (in)	P Bolt Size (in)	P Thru (in)	P C'Bore (in)	P1 (in)	END CODE
EZM-1007	2.00	1.38	1.50	1.94	.88	.25	1.06	.50	.46	.187 .186	.22	.687	¼ × 1⅜	.28	.41	.41	7
EZM-1008	2.00	1.38	1.50	2.00	.88	.25	1.06	.50	.56	.250 .249	.22	.687	¼ × 1⅜	.28	.41	.41	8
EZM-1009	2.75	2.00	2.00	2.38	1.38	.31	1.19	.56	.56	.250 .249	.28	1.000	5⁄16 × 2	.34	.50	.56	9
EZM-3010	2.75	2.00	2.00	2.50	1.38	.31	1.19	.56	.69	.312 .311	.28	1.000	5⁄16 × 2	.34	.50	.56	10
EZM-3012	3.50	2.22	2.75	3.29	1.25	.50	1.38	.69	1.30	.406 .405	.28	1.187	⅜ × 1¾	.41	.62	1.00	12
EZM-3015	3.50	2.52	2.75	3.50	1.25	.80	1.38	.69	1.30	.500 .499	.28	1.438	⅜ × 2⅛	.41	.62	1.00	15
EZM-3017	4.50	2.69	3.38	3.65	1.38	.62	1.69	.84	1.30	.500 .499	.41	1.500	½ × 2¼	.53	.88	1.25	17
EZM-2020	5.00	3.03	3.75	4.03	1.50	.75	1.72	.86	1.30	.625 .624	.47	1.625	⅝ × 2½	.66	1.00	1.50	20
EZM-3025	6.50	3.69	4.75	4.45	2.00	.88	1.94	.97	1.61	.750 .749	.66	1.875	⅞ × 3¼	.91	1.38	1.75	25
EZM-2030	6.50	3.69	4.75	4.86	2.00	.88	1.94	.97	1.81	1.000 .999	66	1.875	⅞ × 3¼	.91	1.38	1.75	30



UNIVERSAL-MOUNT SINGLE

Single Radial Bearing, which should be used with Type 1 Standard Ends

SINGLE PART NO.	A (in)	B (in)	C (in)	E (in)	F (in)	G (in)	H (in)	L THRU (in)	M (in)	P Bolt Size (in)	P Thru (in)	P C'Bore (in)	P1 (in)	Q (in)	END CODE
EZM-4007	2.00	1.38	1.50	.88	.25	1.06	.50	.22	.687	¼ × 1⅜	.28	.41	.41	.19	7
EZM-4008	2.00	1.38	1.50	.88	.25	1.06	.50	.22	.687	¼ × 1⅜	.28	.41	.41	.19	8
EZM-4009	2.75	2.00	2.00	1.38	.31	1.19	.56	.28	1.000	5⁄16 × 2	.34	.50	.56	.38	9
EZM-4010	2.75	2.00	2.00	1.38	.31	1.19	.56	.28	1.000	5⁄16 × 2	.34	.50	.56	.38	10
EZM-4012	3.50	2.22	2.75	1.25	.50	1.38	.69	.28	1.187	⅜ × 1¾	.41	.62	1.00	.33	12
EZM-4015	3.50	2.52	2.75	1.25	.80	1.38	.69	.28	1.438	⅜ × 2⅛	.41	.62	1.00	.33	15
EZM-4017	4.50	2.69	3.38	1.38	.62	1.69	.84	.41	1.500	½ × 2¼	.53	.88	1.25	.38	17
EZM-4020	5.00	3.03	3.75	1.50	.75	1.72	.86	.47	1.625	⅝ × 2½	.66	1.00	1.50	.5	20
EZM-4025	6.50	3.69	4.75	2.00	.88	1.94	.97	.66	1.875	⅞ × 3¼	.91	1.38	1.75	.52	25
EZM-4030	6.50	3.69	4.75	2.00	.88	1.94	.97	.66	1.875	⅞ × 3¼	.91	1.38	1.75	.52	30



Note: When selecting the bearing support for an application with high axial loads, the capacities of the bearings and locknuts must be considered. See pages 48-49

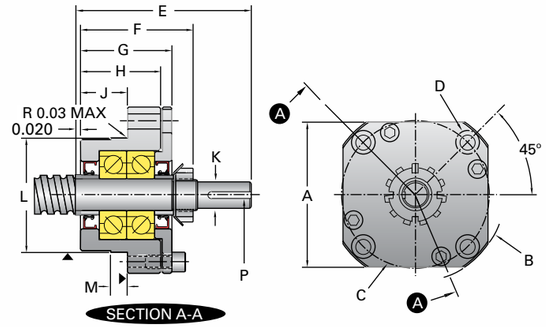
The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

INCH FLANGE MOUNT
SINGLE AND DOUBLE BEARING SUPPORT

FLANGE-MOUNT DOUBLE

Double Angular Contact Bearing, which should be used with Type 3 Standard Ends

DOUBLE PART NO.	A (in)	B (in)	C (in)	D THRU (in)	C'BORE (in)	E (in)	F (in)	G (in)	H (in)	J (in)	K SHAFT DIA. (in)	L THRU (in)	M (in)	P (in)	END CODE
EZF-1007	1.88	2.44	1.875	0.266	0.44	1.94	1.44	1.06	0.82	0.50	0.187-0.186	1.3775-1.3770	0.188	0.063	7
EZF-1008	1.88	2.44	1.875	0.266	0.44	2.00	1.44	1.06	0.82	0.50	0.250-0.249	1.3775-1.3770	0.188	0.094	8
EZF-1009	2.00	2.60	2.000	0.266	0.44	2.38	1.81	1.33	1.09	0.71	0.250-0.249	1.4957-1.4951	0.188	0.094	9
EZF-3010	2.00	2.60	2.000	0.266	0.44	2.50	1.81	1.33	1.09	0.71	0.312-0.311	1.4957-1.4951	0.190	0.125	10
EZF-3012	2.50	3.17	2.500	0.266	0.44	3.29	1.99	1.57	1.38	0.75	0.406-0.405	1.8894-1.8888	0.312	0.125	12
EZF-3015	2.70	3.27	2.750	0.281	0.44	3.50	2.10	1.71	1.50	0.88	0.500-0.499	2.1256-2.1250	0.312	0.125	15
EZF-3017	3.38	4.03	3.250	0.344	0.53	3.65	2.33	1.93	1.63	0.94	0.500-0.499	2.5193-2.5185	0.312	0.125	17
EZF-2020	3.38	4.03	3.250	0.344	0.53	4.03	2.71	1.98	1.72	1.03	0.625-0.624	2.5193-2.5185	0.312	0.188	20
EZF-3025	4.38	5.31	4.250	0.531	0.81	4.45	2.89	2.36	1.94	1.19	0.750-0.749	3.1492-3.1482	0.375	0.188	25
EZF-2030	4.38	5.31	4.250	0.531	0.81	4.86	3.05	2.36	1.94	1.19	0.531-0.81	3.1492-3.1482	0.375	0.250	30

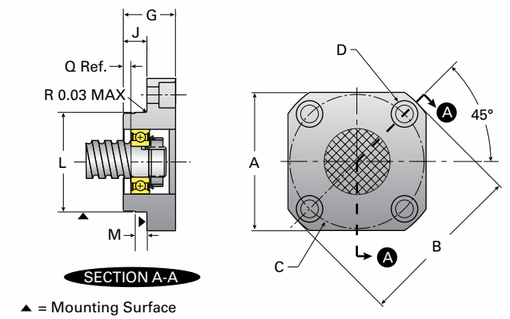


▲ = Mounting Surface

FLANGE-MOUNT SINGLE

Single Radial Bearing, which should be used with Type 1 Standard Ends

SINGLE PART NO.	A (in)	B (in)	C (in)	D THRU (in)	C'BORE (in)	G (in)	J (in)	L THRU (in)	M (in)	Q (in)	END CODE
EZF-4007	1.88	2.44	1.875	0.266	0.44	1.00	0.40	1.3775 1.3770	0.188	0.13	7
EZF-4008	1.88	2.44	1.875	0.266	0.44	1.00	0.40	1.3775 1.3770	0.188	0.13	8
EZF-4009	2.00	2.60	2.000	0.266	0.44	1.00	0.44	1.4957 1.4951	0.188	0.13	9
EZF-4010	2.00	2.60	2.000	0.266	0.44	1.00	0.44	1.4957 1.4951	0.190	0.13	10
EZF-4012	2.50	3.17	2.500	0.266	0.44	1.15	0.55	1.8894 1.8888	0.312	0.13	12
EZF-4015	2.70	3.27	2.750	0.281	0.44	1.25	0.63	2.1256 2.1250	0.312	0.20	15
EZF-4017	3.38	4.03	3.250	0.344	0.53	1.32	0.63	2.5193 2.5185	0.312	0.20	17
EZF-4020	3.38	4.03	3.250	0.344	0.53	1.47	0.72	2.5193 2.5185	0.312	0.20	20
EZF-4025	4.38	5.31	4.250	0.531	0.81	1.67	0.76	3.1492 3.1482	0.375	0.25	25
EZF-4030	4.38	5.31	4.250	0.531	0.81	1.67	0.76	3.1492 3.1482	0.375	0.25	30



▲ = Mounting Surface

NOTE: When selecting the bearing support for an application with high axial loads, the capacities of the bearings and locknuts must be considered. See page 48-49.

2D/3D CAD ONLINE

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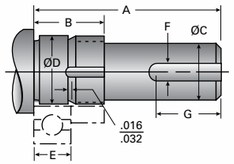
INCH MACHINED ENDS

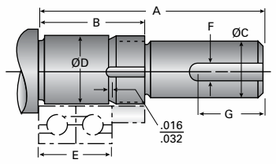
TYPE 1, TYPE 2, & TYPE 3

Specifying standard machined ends provides quicker deliveries. The machined ends shown below represent designs that are compatible with common application requirements for either simple or fixed bearing support. Included in the chart are the locknut and lockwasher identification. These standard ends may be machined and ground to finish size. NOTE: A Type 1N end is required for single bearing EZZE-MOUNT™. A Type 3 K, L, or N end is required for double bearing EZZE-MOUNT™

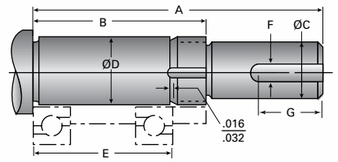
Type 1K (with keyway)
Type 1L (without keyway)



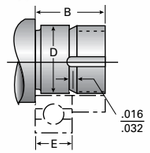
Type 2K (with keyway)
Type 2L (without keyway)



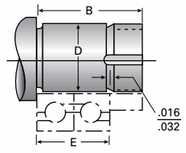
Type 3K (with keyway)
Type 3L (without keyway)



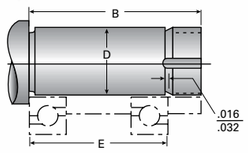
Type 1N



Type 2N



Type 3N



MACHINE END CODE	TYPE 1 (K, L, N) Typical Journal for Single Bearing A (in)	B (in)	E (in)	TYPE 2 (K, L, N) Typical Journal for Duplexed Bearing A (in)	B (in)	E (in)	TYPE 3 (K, L, N) Typical Journal for Multiple Sets of Duplexed Bearing A (in)	B (in)	E (in)	COMMON DIMENSIONS FOR TYPE 1, 2, 3 (K, L, N) C (in)	D (in)	F (in)	G (in)	Locknut	Lock washer
3	.63	.36	.156	.75	.52	.312	1.09	.83	.624	.093/.092	.1251/.1248	N/A	N/A	#5-40	N/A
5	.88	.55	.236	1.09	.78	.472	1.56	1.26	.944	.125/.124	.1970/.1967	N/A	N/A	#10-32	N/A
6	.88	.55	.236	1.09	.78	.472	1.56	1.26	.944	.125/.124	.2363/.2360	N/A	N/A	#10-32	N/A
7	1.12	.65	.276	1.41	.93	.552	1.94	1.48	1.104	.187/.186	.2757/.2754	.063	.34	¼-20	N/A
8	1.31	.68	.276	1.56	.96	.552	2.00	1.44	1.060	.250/.249	.3151/.3148	.094	.46	5/16-24	N/A
9	1.38	.72	.315	1.69	1.04	.630	2.38	1.81	1.438	.250/.249	.3544/.3541	.094	.46	5/16-24	N/A
10	1.37	.69	.315	1.67	1.00	.630	2.50	1.81	1.438	.312/.311	.3939/.3936	.125	.50	N-00	W-00
12	2.11	.81	.394	2.50	1.20	.788	3.29	1.99	1.576	.406/.405	.4726/.4723	.125	1.00	N-01	W-01
15	2.15	.84	.433	2.59	1.27	.866	3.50	2.18	1.732	.500/.499	.5908/.5905	.125	1.00	N-02	W-02
17	2.23	.92	.472	2.71	1.39	.944	3.65	2.33	1.888	.500/.499	.6695/.6692	.125	1.00	N-03	W-03
20	2.37	1.06	.551	2.93	1.61	1.102	4.03	2.71	2.204	.625/.624	.7877/.7873	.188	1.00	N-04	W-04
25	2.68	1.12	.591	3.27	1.71	1.182	4.45	2.89	2.364	.750/.749	.9846/.9842	.188	1.00	N-05	W-05
30	2.97	1.16	.630	3.60	1.79	1.260	4.86	3.05	2.520	1.000/.999	1.1814/1.1810	.250	1.25	N-06	W-06

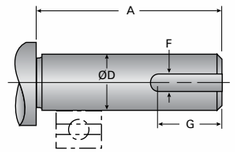
END TYPES

- 1K, 2K, 3K and 4K are designed with a shaft extension and keyway for square keys.
- 1L, 2L, 3L and 4L are designed with a shaft extension without a keyway.
- 1N, 2N, 3N and 4N are designed to be a non-driven support end.
- Double bearing supports use a Type 3N, 3L and 3K.
- Single bearing supports use Type 1N.

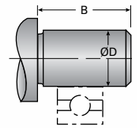
Where standard ends do not satisfy the application requirements, special ends may be machined to customer specifications. Please submit a print for a prompt and competitive quotation.

TYPE 4

Type 4K (with keyway)
Type 4L (without keyway)



Type 4N



MACHINE END CODE	TYPE 4 (K, L, N) Typical Journal for Pillow Block A (in)	B (in)	D (in)	F (in)	G (in)
2	.75	.25	.1251 / .1248	N/A	N/A
4	1.38	.50	.2501 / .2498	.063	.63
6	1.50	.75	.3751 / .3748	.125	.75
8	2.63	1.00	.5000 / .4995	.125	1.50
10	2.63	1.25	.6250 / .6245	.188	1.50
12	2.72	1.50	.7500 / .7495	.188	1.50
16	2.84	1.50	1.0000 / .9995	.250	1.50
19	3.25	1.78	1.1875 / 1.1870	.250	1.75

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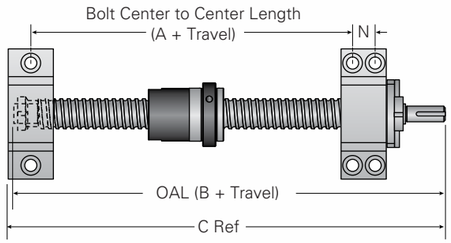
BALL SCREW ASSEMBLIES

COMPACT UNIVERSAL BEARING MOUNTS

EZBK (DOUBLE BEARING)
EZBF (SINGLE BEARING)

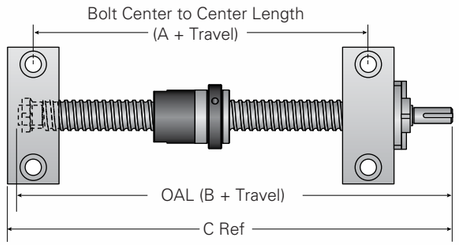


NOTE: Dimensions reflect a 12.5 mm over travel at each end. Add Travel to measurements below for total length.

	FLANGE NUT			V-THREAD NUT			CYLINDRICAL KEYED NUT			
	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)	N (mm)
12x2	66.0	135.0	131	75.0	144.0	140	66.0	135.0	131	13
12x5	75.5	115.0	112	81.5	121.0	118	72.5	112.0	109	13
12x10	75.5	115.0	112	80.5	120.0	117	72.5	112.0	109	13
16x5	98.0	163.0	166	98.0	163.5	166	86.0	151.5	154	13
16x10	86.0	151.0	154	86.0	151.5	154	86.0	151.5	154	13
16x16	74.0	139.0	142	74.0	139.5	142	74.0	139.5	142	13
20x5	98.0	174.0	176	98.0	174.0	176	86.0	162.0	164	15
20x10	101.0	177.0	179	101.0	177.0	179	101.0	177.0	179	15
20x20	77.0	153.0	155	77.0	153.0	155	77.0	153.0	155	15
25x5	103.0	194.5	195	109.0	200.5	201	92.0	183.5	184	19
25x10	110.0	201.5	202	110.0	201.5	202	110.0	201.5	202	19
25x25	86.0	177.5	178	86.0	177.5	178	86.0	177.5	178	19
32x5	107.0	214.0	217	107.0	214.0	217	98.0	205.0	208	22
32x10	131.0	238.0	241	131.0	238.0	241	127.0	234.0	237	22
32x32	100.0	207.0	210	100.0	207.0	210	100.0	207.0	210	22
40x5	124.0	252.0	255	118.0	246.0	249	106.0	234.0	237	23
40x10	145.0	273.0	276	145.0	273.0	276	127.0	255.0	258	23
40x40 (6)	134.0	262.0	265	—	—	—	—	—	—	23
40x40 (8)	154.0	282.0	285	154.0	282.0	285	282.0	154.0	285	23

UNIVERSAL BEARING MOUNTS

EZM (DOUBLE BEARING AND SINGLE BEARING)



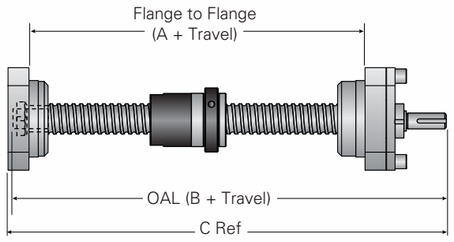
NOTE: Dimensions reflect a 12.5 mm over travel at each end. Add Travel to measurements below for total length.

	FLANGE NUT			V-THREAD NUT			CYLINDRICAL KEYED NUT		
	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)
12x2	81.5	143.7	147	90.5	152.7	156	81.5	143.7	147
12x5	83.4	130.9	136	89.4	136.9	142	80.4	127.9	133
12x10	83.4	130.9	136	88.4	135.9	141	80.4	127.9	133
16x5	117.1	194.5	201	117.1	194.5	201	105.1	182.5	189
16x10	105.1	182.5	189	105.1	182.5	189	105.1	182.5	189
16x16	93.1	170.5	177	93.1	170.5	177	93.1	170.5	177
20x5	117.1	200.6	206	117.1	200.6	206	105.1	188.6	194
20x10	120.1	203.6	209	120.1	203.6	209	120.1	203.6	209
20x20	96.1	179.6	185	96.1	179.6	185	96.1	179.6	185
25x5	125.7	225.3	228	131.7	231.3	234	114.7	214.3	217
25x10	132.7	232.3	235	132.7	232.3	235	132.7	232.3	235
25x25	108.7	208.3	211	108.7	208.3	211	108.7	208.3	211
32x5	131.3	236.7	244	131.3	236.7	244	122.3	227.7	235
32x10	155.3	260.7	268	155.3	260.7	268	151.3	256.7	264
32x32	124.3	229.7	237	124.3	229.7	237	124.3	229.7	237
40x5	146.3	263.1	270	140.3	257.1	264	128.3	245.1	252
40x10	167.3	284.1	291	167.3	284.1	291	149.3	266.1	273
40x40 (6)	156.3	273.1	280	-	-	-	-	-	-
40x40 (8)	176.3	293.1	300	176.3	293.1	300	176.3	293.1	300

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

BALL SCREW ASSEMBLIES (Continued)

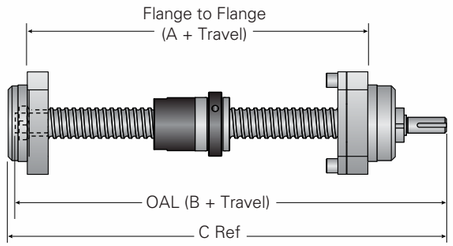
FLANGED BEARING MOUNTS - PILOT FACING IN
EZF (DOUBLE BEARING AND SINGLE BEARING)



NOTE: Dimensions reflect a 12.5 mm over travel at each end. Add Travel to measurements below for total length.

	FLANGE NUT			V-THREAD NUT			CYLINDRICAL KEYED NUT		
	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)
12×2	82.2	137.3	142	91.2	146.3	151	82.2	137.3	142
12×5	80.9	129.4	134	86.9	135.4	140	77.9	126.4	131
12×10	80.9	129.4	134	85.9	134.4	139	77.9	126.4	131
16×5	115.0	189.4	195	115.0	189.4	195	103.0	177.4	183
16×10	103.0	177.4	183	103.0	177.4	183	103.0	177.4	183
16×16	91.0	165.4	171	91.0	165.4	171	91.0	165.4	171
20×5	120.4	197.3	203	120.4	197.3	203	108.4	185.3	191
20×10	123.4	200.3	206	123.4	200.3	206	123.4	200.3	206
20×20	99.4	176.3	182	99.4	176.3	182	99.4	176.3	182
25×5	126.5	216.4	222	132.5	222.4	228	115.5	205.4	211
25×10	133.5	223.4	229	133.5	223.4	229	133.5	223.4	229
25×25	109.5	199.4	205	109.5	199.4	205	109.5	199.4	205
32×5	131.6	229.8	237	131.6	229.8	237	122.6	220.8	228
32×10	155.6	253.8	261	155.6	253.8	261	151.6	249.8	257
32×32	124.6	222.8	230	124.6	222.8	230	124.6	222.8	230
40×5	146.6	256.3	263	140.6	250.3	257	128.6	238.3	245
40×10	167.6	277.3	284	167.6	277.3	284	149.6	259.3	266
40×40 (6)	156.6	266.3	273	—	—	—	—	—	—
40×40 (8)	176.6	286.3	293	176.6	286.3	293	176.6	286.3	293

FLANGED BEARING MOUNTS - PILOT FACING OUT
EZF (DOUBLE BEARING AND SINGLE BEARING)

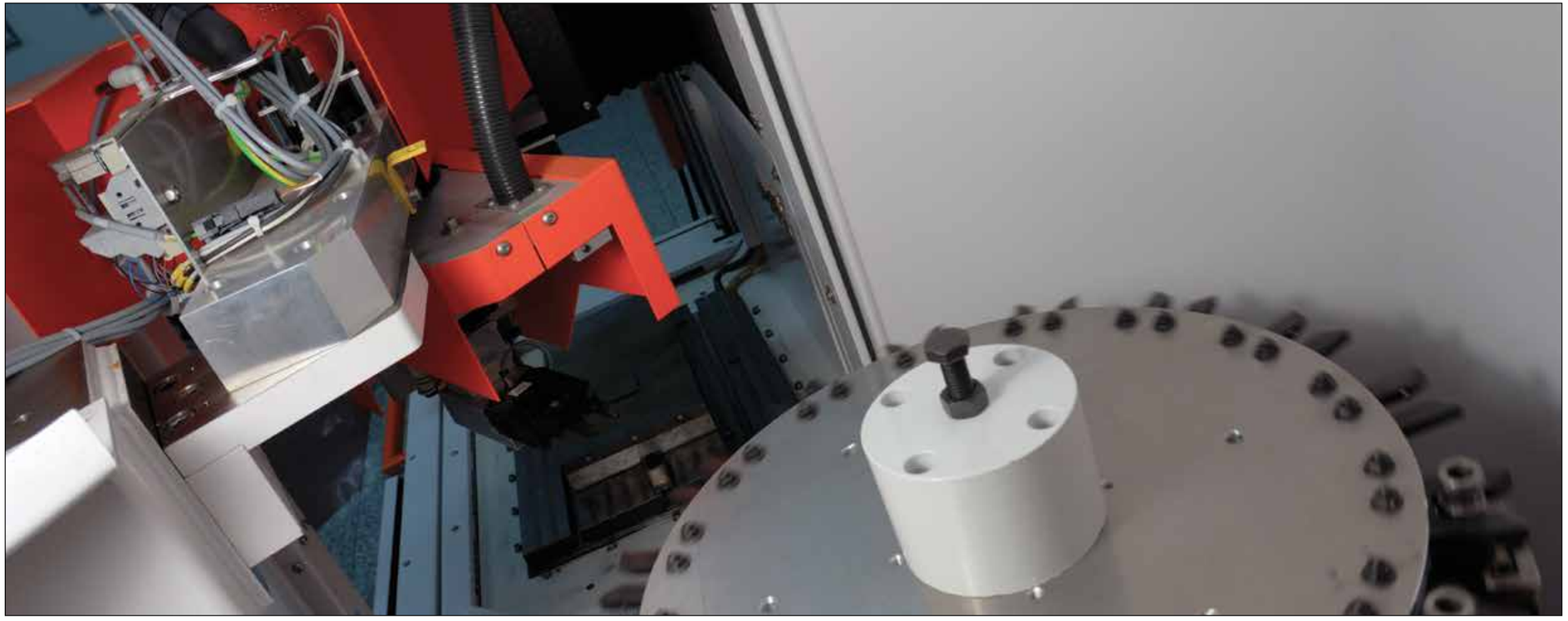


NOTE: Dimensions reflect a 12.5 mm over travel at each end. Add Travel to measurements below for total length.

	FLANGE NUT			V-THREAD NUT			CYLINDRICAL KEYED NUT		
	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)
12×2	83.0	137.3	142	92.0	146.3	151	83.0	137.3	142
12×5	87.5	129.4	134	93.5	135.4	140	84.5	126.4	131
12×10	87.5	129.4	134	92.5	134.4	139	84.5	126.4	131
16×5	118.1	189.4	195	118.1	189.4	195	106.1	177.4	183
16×10	106.1	177.4	183	106.1	177.4	183	106.1	177.4	183
16×16	94.1	165.4	171	94.1	165.4	171	94.1	165.4	171
20×5	118.9	197.3	203	118.9	197.3	203	106.9	185.3	191
20×10	121.9	200.3	206	121.9	200.3	206	121.9	200.3	206
20×20	97.9	176.3	182	97.9	176.3	182	97.9	176.3	182
25×5	125.2	216.4	222	131.2	222.4	228	114.2	205.4	211
25×10	132.2	223.4	229	132.2	223.4	229	132.2	223.4	229
25×25	108.2	199.4	205	108.2	199.4	205	108.2	199.4	205
32×5	134.9	229.8	237	134.9	229.8	237	125.9	220.8	228
32×10	158.9	253.8	261	158.9	253.8	261	154.9	249.8	257
32×32	127.9	222.8	230	127.9	222.8	230	127.9	222.8	230
40×5	149.9	256.3	263	143.9	250.3	257	131.9	238.3	245
40×10	170.9	277.3	284	170.9	277.3	284	152.9	259.3	266
40×40 (6)	159.9	266.3	273	—	—	—	—	—	—
40×40 (8)	179.9	286.3	293	179.9	286.3	293	179.9	286.3	293

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

EZZE-MOUNT™
MOTOR MOUNTS



MOTOR MOUNTS

MOTOR MOUNTS 68-71
Universal Mount Bearing Support 68-89
Flanged Mount Bearing Support 70-71

BALL SCREW ASSEMBLIES 72-73
Universal Mounts 72
Flanged Mounts 73

NOOK MOTOR EZZE-MOUNTS™ are ruggedly designed specifically to connect to virtually any servo motor, stepper motor, or planetary gearbox with Nook Ball Screws. Standard NEMA and ISO frames are available, however specific mounting dimensions are required. Nook Industries' engineers are able to design mounting flanges to fit your unique motor or gearbox. Many motor mount designs have already been created for common motor manufacturers.

Check with Nook Engineering to determine if a particular motor mount has already been produced.

To expedite the engineering process, the following data is needed to create a custom motor mount:

- Pilot Diameter (AK)
- Pilot Depth (BB)
- Bolt-Circle-Diameter (AJ)
- Shaft Diameter (U)
- Shaft Length
- Coupling

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MOTOR MOUNTS

NOOK UNIVERSAL MOUNT BEARING SUPPORT

BOTH NEMA AND IEC FRAMES ARE AVAILABLE

Universal Mount with motor mount includes an EZZE-MOUNT™ block with a motor mount for easy, accurate installation of ball screw and acme screw assemblies. Motor mounts include a coupling.

NOTE: When selecting the bearing support for an application with high axial loads, the capacities of the bearings and locknuts must be considered. See page 48-49.

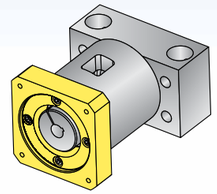
EXAMPLE:

PMBS20×5R - 4FW / 2 /T5 / U3 / 4N / 1550 / 1 / S
EZM-2020-34

EXAMPLES OF EZM DESIGNATIONS:

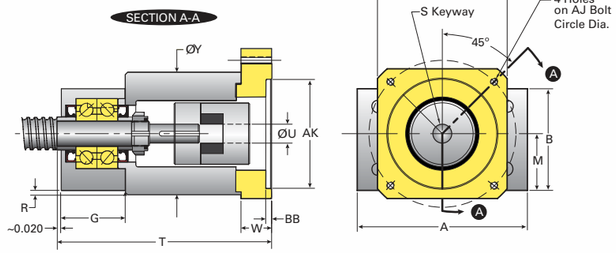
U1, U2, U3 or U4 = Standard Mount available above

UX = modified, further explanation needed (i.e.: Special Frame)



Two-piece construction for rapid mounting flange development.

PART NO.	REF. CODE	AA (in)	PILOT DEPTH BB (in)	T (in)	SHAFT DIAMETER U (in)	S (in)	Y (in)	W (in)	PILOT DIAMETER AK (in)	BOLT CIRCLE DIAMETER AJ (in)	TAP (in)	R (in)
EZM-1008-17	U1	1.75	0.25	3.35	0.25	0.094	1.75	0.52	.868/.871	1.725	#8-32	0.19
EZM-1009-23	U2	2.50	0.19	4.10	0.38	0.125	2.50	0.38	1.503/1.506	2.625	#10-32	0.26
EZM-3010-23	U2	2.50	0.19	4.10	0.38	0.125	2.50	0.38	1.503/1.506	2.625	#10-32	0.26
EZM-3012-23	U2	2.50	0.19	4.48	0.38	0.125	2.50	0.38	1.503/1.506	2.625	#10-32	0.10
EZM-3012-34	U3	3.25	0.16	4.92	0.50	0.125	2.50	0.81	2.878/2.882	3.875	#10-32	0.10
EZM-3015-23	U2	2.50	0.19	4.69	0.38	0.125	2.50	0.38	1.503/1.506	2.625	#10-32	–
EZM-3015-34	U3	3.25	0.16	5.13	0.50	0.125	2.50	0.81	2.878/2.882	3.875	#10-32	0.19
EZM-3017-34	U3	3.25	0.16	5.56	0.50	0.125	3.12	0.81	2.878/2.882	3.875	#10-32	0.13
EZM-3017-42	U4	4.50	0.19	6.31	0.63	0.188	3.12	1.56	2.504/2.508	5.000	¼"-20	0.13
EZM-2020-34	U3	3.44	0.16	5.96	0.50	0.125	3.44	0.81	2.878/2.882	3.875	#10-32	0.10
EZM-2020-42	U4	4.50	0.19	6.71	0.63	0.188	3.44	1.56	2.504/2.508	5.000	¼"-20	0.10
EZM-3025-34	U3	4.00	0.16	6.44	0.50	0.125	4.38	0.81	2.878/2.882	3.875	#10-32	0.31
EZM-3025-42	U4	4.50	0.19	7.17	0.63	0.188	4.38	1.56	2.504/2.508	5.000	¼"-20	0.31
EZM-2030-34	U3	4.00	0.16	6.97	0.50	0.125	4.38	0.81	2.878/2.882	3.875	#10-32	0.31
EZM-2030-42	U4	4.50	0.19	7.72	0.63	0.188	4.38	1.56	2.504/2.508	5.000	¼"-20	0.31
EZM-2030-56	U5	Ø6.63	0.19	7.78	0.63	0.188	4.38	1.62	4.502/4.506	5.875	0.41 dia. thru	0.31



To ensure proper mounting and coupling, please supply motor drawing with your order.
* Motor Mounts require motor mounting dimensions, motor size, and manufacturer's part number.

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

MOTOR MOUNTS

NOOK FLANGE MOUNT BEARING SUPPORT

BOTH NEMA AND IEC FRAMES ARE AVAILABLE

Flange Mount with motor mount includes an EZZE-MOUNT™ block with a motor mount for easy, accurate installation of ball screw assemblies. Mounts include coupling.

NOTE: When selecting the bearing support for an application with high axial loads, the capacities of the bearings and locknuts must be considered. See page 48-49.

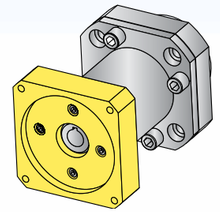
EXAMPLE:

105-RA /Y3 / 4N / 41.87 / 20105 / FS
EZF-3017-34

EXAMPLES OF EZF DESIGNATIONS:

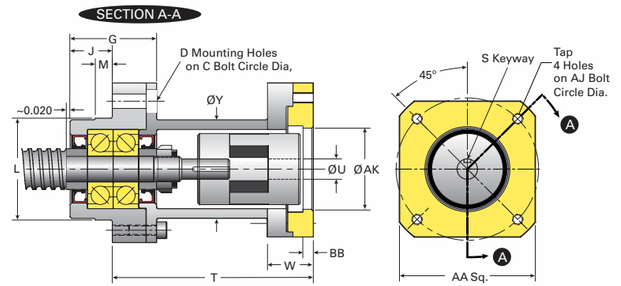
Y1, Y2, Y3, Y4 = Standard Mount available above

YX = modified, further description needed (i.e.: Special Frame)



Two-piece construction for rapid mount ing flange development.

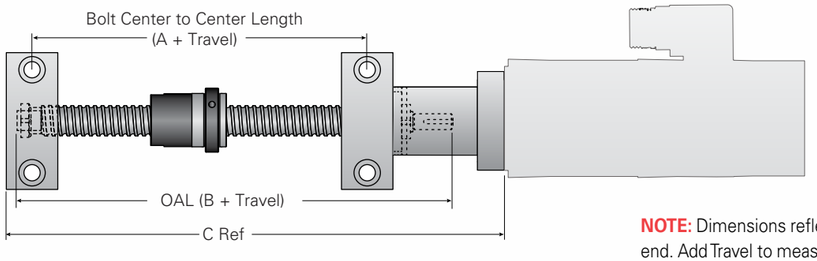
PART NO.	REF. CODE	AA (in)	PILOT DEPTH BB (in)	T (in)	SHAFT DIAMETER U (in)	S (in)	Y (in)	W (in)	PILOT DIAMETER AK (in)	BOLT CIRCLE DIAMETER AJ (in)	TAP (in)
EZF-1008-17	Y1	1.75	0.25	2.84	0.25	0.094	2.2	0.52	.868/.871	1.725	#8-32
EZF-1009-23	Y2	2.50	0.19	3.41	0.38	0.125	2.1	0.88	1.503/1.506	2.625	#10-32
EZF-3010-23	Y2	2.50	0.19	3.41	0.38	0.125	2.1	0.88	1.503/1.506	2.625	#10-32
EZF-3012-23	Y2	2.50	0.19	3.70	0.38	0.125	1.81	0.88	1.503/1.506	2.625	#10-32
EZF-3012-34	Y3	3.25	0.16	4.14	0.50	0.125	1.81	1.31	2.878/2.882	3.875	#10-32
EZF-3015-23	Y2	2.50	0.19	3.84	0.38	0.125	1.98	0.88	1.503/1.506	2.625	#10-32
EZF-3015-34	Y3	3.25	0.16	4.61	0.50	0.125	1.98	1.31	2.878/2.882	3.875	#10-32
EZF-3017-34	Y3	3.25	0.16	4.62	0.50	0.125	2.25	1.67	2.878/2.882	3.875	#10-32
EZF-3017-42	Y4	4.50	0.19	5.37	0.63	0.188	2.25	2.41	2.504/2.508	5.000	¼"-20
EZF-2020-34	Y3	3.44	0.16	4.92	0.50	0.125	2.37	1.67	2.878/2.882	3.875	#10-32
EZF-2020-42	Y4	4.50	0.19	5.67	0.63	0.188	2.37	2.41	2.504/2.508	5.000	¼"-20
EZF-3025-34	Y3	4.00	0.16	5.24	0.50	0.125	3.00	1.67	2.878/2.882	3.875	#10-32
EZF-3025-42	Y4	4.50	0.19	5.98	0.63	0.188	3.00	2.41	2.504/2.508	5.000	¼"-20
EZF-2030-34	Y3	4.00	0.16	5.78	0.50	0.125	3.00	1.67	2.878/2.882	3.875	#10-32
EZF-2030-42	Y4	4.50	0.19	6.53	0.63	0.188	3.00	2.41	2.504/2.508	5.000	¼"-20
EZF-2030-56	Y5	Ø 6.63	0.19	6.60	0.63	0.188	3.00	2.42	4.502/4.506	5.875	Ø 0.41 thru



To ensure proper mounting and coupling, please supply motor drawing with your order.
* Motor Mounts require motor mounting dimensions, motor size, and manufacturer's part number, and coupling part number if applicable

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

BALL SCREW ASSEMBLIES
UNIVERSAL MOTOR MOUNTS
EZM (DOUBLE BEARING AND SINGLE BEARING)

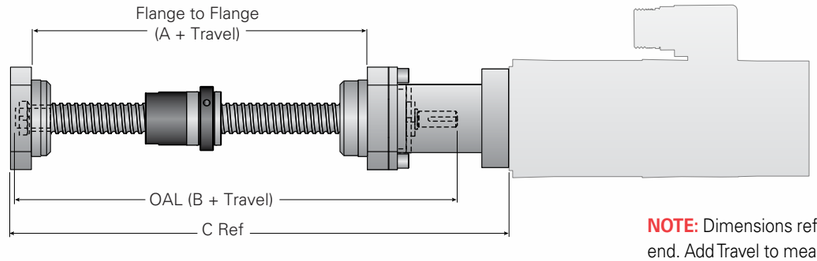


NOTE: Dimensions reflect a 12.5 mm over travel at each end. Add Travel to measurements below for total length.

	AVAILABLE MOTOR FRAME SIZES	FLANGE NUT			V-THREAD NUT			CYLINDRICAL KEYED NUT		
		A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)
12×2	23	81.5	143.7	187	90.5	152.7	196	81.5	143.7	187
12×5	23	83.4	130.9	170	89.4	136.9	176	80.4	127.9	167
12×10	23	83.4	130.9	170	88.4	135.9	175	80.4	127.9	167
16×5	23/34	117.1	194.5	231	117.1	194.5	231	105.1	182.5	219
16×16	23/34	105.1	182.5	219	105.1	182.5	219	105.1	182.5	219
16×16	23/34	93.1	170.5	207	93.1	170.5	207	93.1	170.5	207
20×5	23/34	117.1	200.6	247	117.1	200.6	247	105.1	188.6	235
20×10	23/34	120.1	203.6	250	120.1	203.6	250	120.1	203.6	250
20×20	23/34	96.1	179.6	226	96.1	179.6	226	96.1	179.6	226
25×5	34/42	125.7	225.3	277	131.7	231.3	283	114.7	214.3	266
25×10	34/42	132.7	232.3	284	132.7	232.3	284	132.7	232.3	284
25×25	34/42	108.7	208.3	260	108.7	208.3	260	108.7	208.3	260
32×5	34/42	131.3	236.7	295	131.3	236.7	295	122.3	227.7	286
32×10	34/42	155.3	260.7	319	155.3	260.7	319	151.3	256.7	315
32×32	34/42	124.3	229.7	288	124.3	229.7	288	124.3	229.7	288
40×5	34/42/56	146.3	263.1	323	140.3	257.1	317	128.3	245.1	305
40×10	34/42/56	167.3	284.1	344	167.3	284.1	344	149.3	266.1	326
40×40 (6)	34/42/56	156.3	273.1	333	—	—	—	—	—	—
40×40 (8)	34/42/56	176.3	293.1	353	176.3	293.1	353	176.3	293.1	353

Nook Industries can supply from stock a range of stepper motors and drives in NEMA 17, 23, or 34 sizes in the above assemmblies.

BALL SCREW ASSEMBLIES
FLANGED MOTOR MOUNTS
EZF (DOUBLE BEARING AND SINGLE BEARING)



NOTE: Dimensions reflect a 12.5 mm over travel at each end. Add Travel to measurements below for total length.

	AVAILABLE MOTOR FRAME SIZES	FLANGE NUT			V-THREAD NUT			CYLINDRICAL KEYED NUT		
		A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)	A (mm)	B (mm)	C (mm)
12×2	23	82.2	137.3	165	91.2	146.3	174	82.2	137.3	165
12×5	23	80.9	129.4	156	86.9	135.4	162	77.9	126.4	153
12×10	23	80.9	129.4	156	85.9	134.4	161	77.9	126.4	153
16×5	23/34	115.0	189.4	205	115.0	189.4	205	103.0	177.4	193
16×16	23/34	103.0	177.4	193	103.0	177.4	193	103.0	177.4	193
16×16	23/34	91.0	165.4	181	91.0	165.4	181	91.0	165.4	181
20×5	23/34	120.4	197.3	224	120.4	197.3	224	108.4	185.3	212
20×10	23/34	123.4	200.3	227	123.4	200.3	227	123.4	200.3	227
20×20	23/34	99.4	176.3	203	99.4	176.3	203	99.4	176.3	203
25×5	34/42	126.5	216.4	244	132.5	222.4	250	115.5	205.4	233
25×10	34/42	133.5	223.4	251	133.5	223.4	251	133.5	223.4	251
25×25	34/42	109.5	199.4	227	109.5	199.4	227	109.5	199.4	227
32×5	34/42	131.6	229.8	258	131.6	229.8	258	122.6	220.8	249
32×10	34/42	155.6	253.8	282	155.6	253.8	282	151.6	249.8	278
32×32	34/42	124.6	222.8	251	124.6	222.8	251	124.6	222.8	251
40×5	34/42/56	146.6	256.3	286	140.6	250.3	280	128.6	238.3	268
40×10	34/42/56	167.6	277.3	307	167.6	277.3	307	149.6	259.3	289
40×40 (6)	34/42/56	156.6	266.3	296	—	—	—	—	—	—
40×40 (8)	34/42/56	176.6	286.3	316	176.6	286.3	316	176.6	286.3	316

Nook Industries can supply from stock a range of stepper motors and drives in NEMA 17, 23, or 34 sizes in the above assemmblies.

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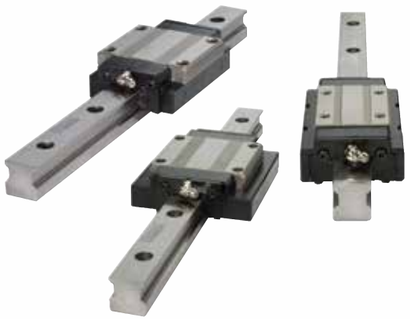
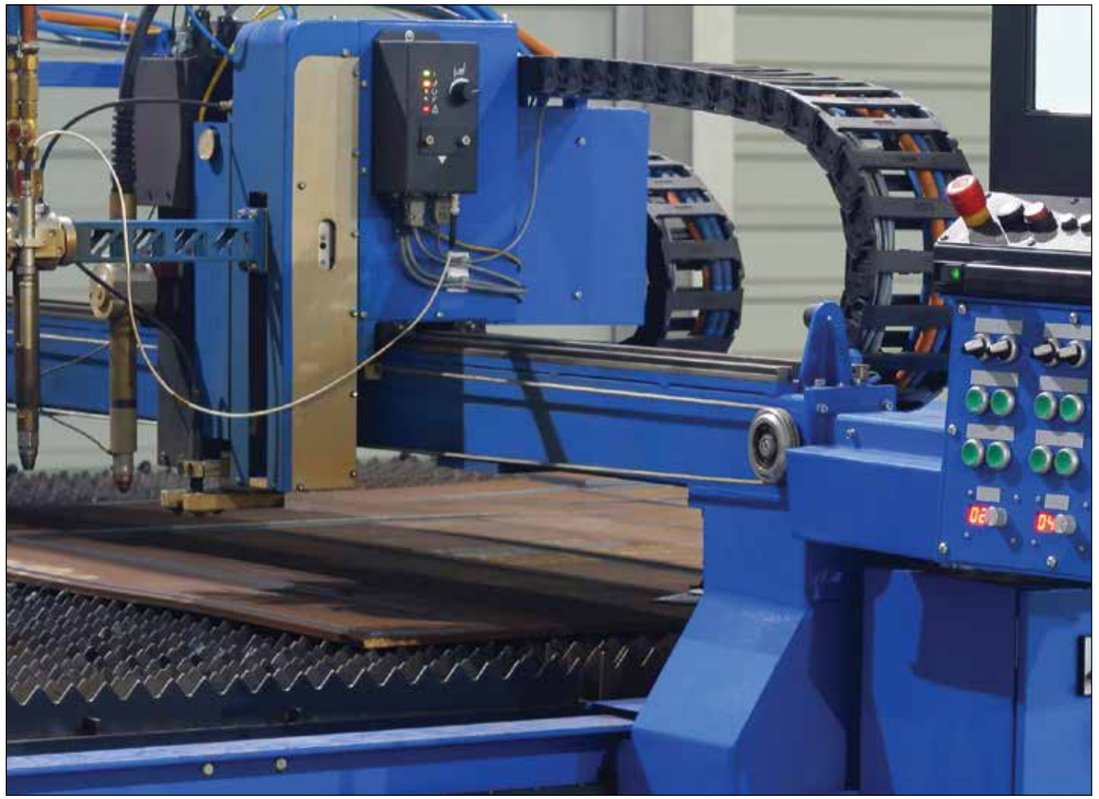
GUIDANCE PRODUCTS

PROFILE RAILS AND GUIDES

Precision profile rail linear guide systems provide stable and efficient linear motion guidance under variable speeds and high load conditions. The profile rail is offered in many sizes as well as caged ball technology.

DRIVE SYSTEM	PROFILE SIZE (MM)	MAX SPEED (M/SEC)	PRELOAD OPTION	MAX LENGTH (M)
NON-CAGED	15 to 65	2	yes	4
CAGED	15 to 55	10	yes	4
MINIATURE	3 to 15	5	yes	1





CROSS ROLLER/BALL RAILS AND CROSS ROLLER RAIL ASSEMBLIES

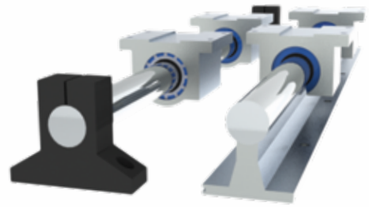
DRIVE SYSTEM	ROLLER/BALL DIAMETER (MM)	MAX STROKE LENGTH (MM)
CROSS ROLLER RAILS	3 to 12	492
CROSS BALL RAILS	3 to 12	496

	BLOCK WIDTH (MM)	MAX STROKE LENGTH
CROSS ROLLER RAIL ASSEMBLY	30 to 100	335

ROUND RAIL LINEAR SHAFTING, SUPPORTS, BEARINGS, AND PILLOW BLOCKS

Hardened and ground shafting is manufactured for use with precision linear bearings and other applications requiring an accurate, round hardened shaft or guide rod. All linear shafting can be machined by Nook to any configuration.

SHAFT DIAMETER	MAX LENGTH
¼ to 2"	20 ft
10 to 50 mm	6 m



- Common features include:
- Solid shell LBB linear bearings
- Excel™ self-aligning linear bearings
- HG hardened and ground linear shafting
- Shafting, pillow blocks and complete slide systems

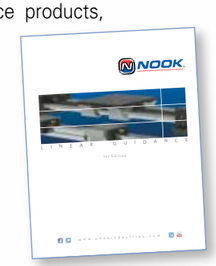
APPLICATION-SPECIFIC CUSTOM-ENGINEERED PRODUCTS

- Specialty materials
- Custom coatings
- Customer-specific testing
- MIL-spec

Nook Industries has the design expertise, manufacturing capability, and the experience to help your special projects from concept to start-up and beyond. Whether you need a simple modification, or an entirely new approach to a problem, contact us early in your design stage. We look forward to working with you.

For more information on Nook Linear Guidance products, check out our 208-page Linear Guidance catalog!

Information is available at:
www.nookindustries.com



QUALITY STATEMENT

HISTORY

Since 1969, Nook Industries, Inc. has relentlessly and continuously developed the capabilities and skills to deliver products of the highest quality. Knowledge of testing and design, coupled with this experience working with stringent customer requirements in aerospace, medical, energy and military applications has provided the background to be a reliable partner.

HIGH TECH QUALITY EXPERIENCE

When you select Nook Industries as a supplier, you can be assured that your product will be designed and tested to rigorous product planning. Pre-design activity includes understanding of customer requirements applied to predictive models, engineering calculations and linear modeling through prototype development, stereo-lithography samples of form, fit, and function that verify design criteria.

VALIDATION AND VERIFICATION

Through many years of rigorous development, Nook Industries has proven its designs and manufacturing processes against the most stringent standards and specifications. Design and process verification and validation tools are employed throughout the product life cycle.

CERTIFICATIONS

Nook Industries, Inc. is certified to ISO-9,001-2,008 Internationally Recognized Quality System. Nook also serves many customers in the Aerospace and Medical device markets and has complied with those Quality System Requirements as well.

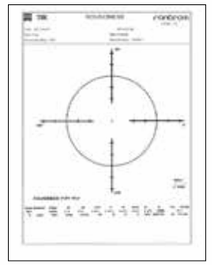
ITAR

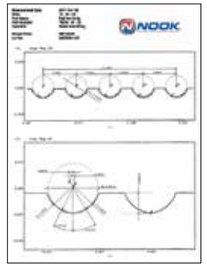
Nook Industries is registered with the Department Of State For International Traffic In Arms Compliance.

INSPECTION CAPABILITY

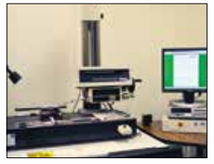
Laser Lead Measurement - Precise lead error gauging is utilized to validate processes to conform to Nook internal specifications and customer requirements.

Zeiss Roundness Measurement - Critical to quality, characteristics such as roundness are monitored throughout the screw manufacturing process.

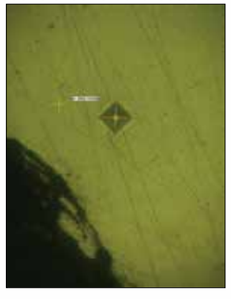




Zeiss Contour Readers - Prior to the start of any production run, thread form geometry is precisely measured to stringent engineering specifications.



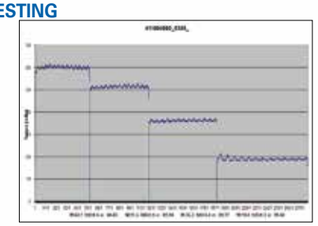
Metallurgical Lab - The metallurgical lab is capable of determining material composition from raw materials to final product. A micro hardness and case depth inspection is a routine check that validates the heat treat process.



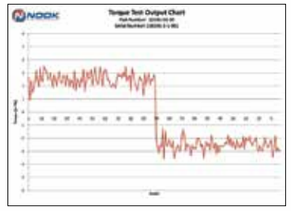
QUALITY TOOLS:

- Design for Six Sigma manufacturing
- D.O.E. (Design of Experiments)
- APQP (Advanced Product Quality Planning)
- DFMEA, PFEMA
- FEA (Finite Element Analysis)
- DVP&R (Design Verification Plan & Report)
- Reliability Testing
- Process validation to 21 CFR Part 82 (Medical Device)

TESTING



Efficiency Measurement - Nook Engineering has designed test machines to measure and validate screw assembly efficiency.



Torque Measurement - Preloaded ball screw assemblies are evaluated to determine compliance with engineering specifications utilizing a Dynamic Torque Testing Machine.

FUNCTIONAL TESTING

Nook test systems and engineered testing processes perform analysis, verification, and solidification of life, durability, and performance. The functional testing defines operating limits in specifications and helps set defined targets in Product Launch Process and Assurance Plans.

The engineered testing provides predictive tools, generates data for prognostics, and validates performance wear models. Life tests help determine performance in multiple operating conditions as well. Nook offers proof testing for customers developing new systems and actuators to help accelerate product release dates.

High Load Modular Test System
40,000 lb load - 100" CC

Convertible Test System
20,000 lb load - 100" CC

NOOK QUALITY EVOLUTION

DEVELOPED MANUFACTURING SYSTEMS

QUALITY SYSTEMS AND ACCREDITATIONS

SUPPLY CHAIN APPROVAL PROCESS

STATE OF THE ART MANAGEMENT SYSTEMS

APQP LAUNCH PROTOCOLS

SYSTEM AND PROCESS PROTOCOLS

ENGINEERING ANALYSIS AND PREDICTIVE TOOLS

CTQ/KPV ENGINEERING SPECIFICATION PROCESSES

RELIABILITY ENGINEERING AND TESTING

DVP&R AND TEST PLANNING

NOOK DESIGNED AND BUILT TEST MACHINES

CUSTOM ENGINEERED AND BUILT TEST INSTRUMENTATION

DESIGN AND TEST FOR FAULT TOLERANCE AND PROGNOSTICS

OVERLOAD/PROOF END OF LINE TESTING

CERTIFICATION TESTING

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Also find us at:

4950 East 49th Street | Cleveland, OH 44125-1016 USA | 216.271.7900 | toll-free: 800.321.7800 | f: 216.271.7020 | email: nook@nookind.com