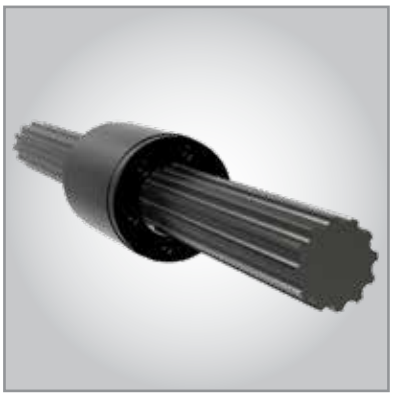
NOOK™ | THOMSON® Linear Motion. Optimized.™

# PRECISION METRIC & MINIATURE BALL SCREW ASSEMBLIES

MADE IN USA

www.nookindustries.com

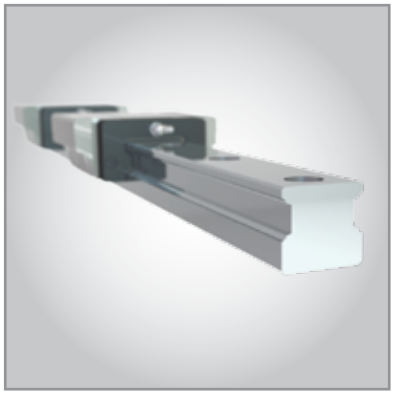
**Precision Ball Screws**



**Ball Splines**

**CC™ Cylinders**

**Worm Gear Screw Jacks**



**Profile Rails**

**Planetary Roller Screws**

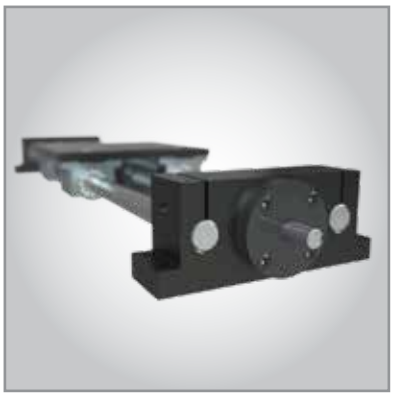
## HISTORY

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, Inc. on the map as a successful business and a trusted company.

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

In 2021, Nook Industries, Inc. was acquired by Altra Industrial Motion Corp. and integrated into Thomson Industries, Inc. within the Automation & Specialty segment.

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



Linear Slides

Electric Cylinders

EZZE Mounts™

Modular Linear Actuators

## PARTNER

Rockwell Automation Encompass Product Partner

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## TRADE ASSOCIATIONS

AMT MANUFACTURING TECHNOLOGY

mca MOTION CONTROL ASSOCIATION MEMBER

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## MARKET SEGMENTS SERVED

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

# INTRODUCTION

Nook/Thomson 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/Thomson, and the latest innovations from Nook/Thomson 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/Thomson 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/Thomson 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

# TECHNICAL DATA

# TECHNICAL DATA

# 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.

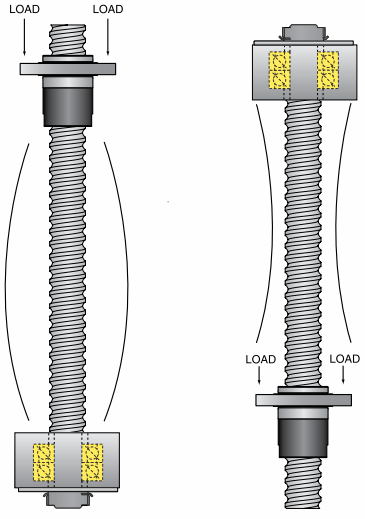
**LENGTH** - Unsupported length of the screw.

**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.

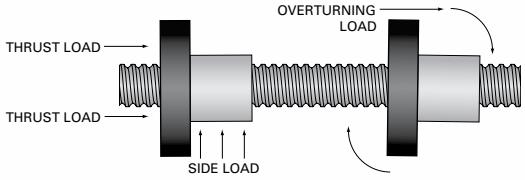



Compression Load Tension Load

**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.

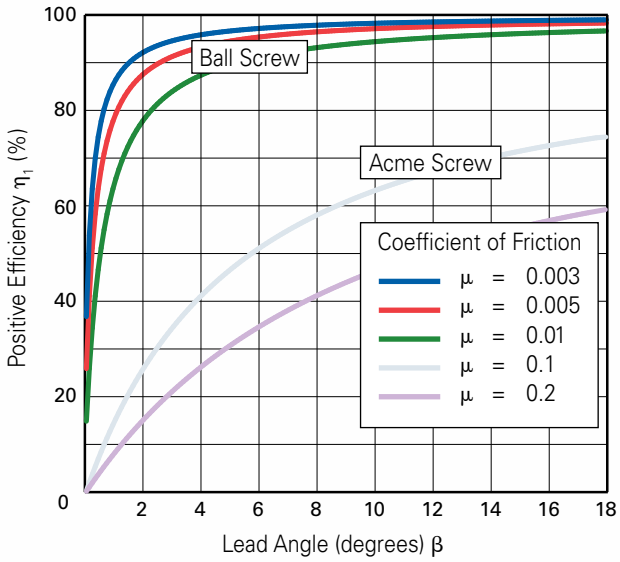
## ACCURACY GRADE

The grade of accuracy of Nook/Thomson 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

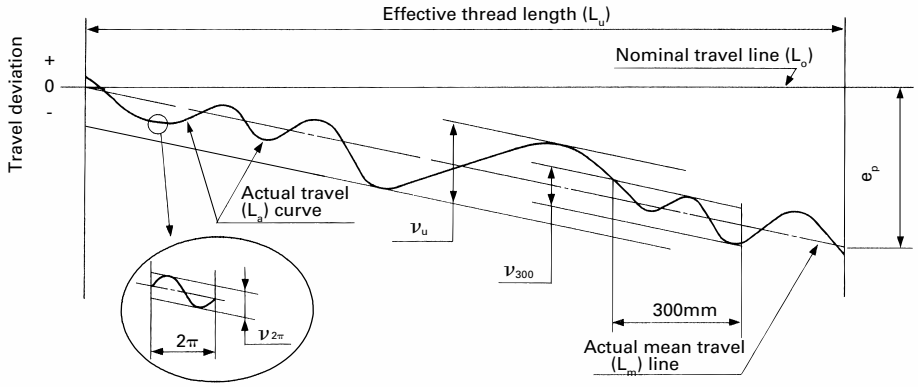
Lead Accuracy for Nook/Thomson Precision Metric Ball Screws conforms to ISO 3408. ISO 3408 prescribes the tolerance on specified travel and travel variation in respect to the effective length of travel of nut or to the effective length of the threaded portion of the screw shaft. It also prescribes travel 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

| $\nu_{300}$ | 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.

## $\nu$ = TRAVEL VARIATION

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

$\nu_u$ : 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.)

$\nu_{300}$ : 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.

# 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)

$\beta$ = 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 ($T_{p\ \text{variation}}$)

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:

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

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

| | $S_{Ratio} \leq 40$ | | | $40 < S_{Ratio} \leq 60$ | | | $S_{Ratio} > 60$ | | |
|---|---|---|---|---|---|---|---|---|---|
| $T_p$ (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)
$\eta_1$ = 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)
$\eta_2$ = 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 ($T_{p\ variation}$)

$$S_{ratio} = \frac{1550 \text{ mm}}{32 \text{ mm}} = 46.9$$

$T_{p\ Variation} = \pm 45\%$

$T_p$ = .251 N·m to .663 N·m

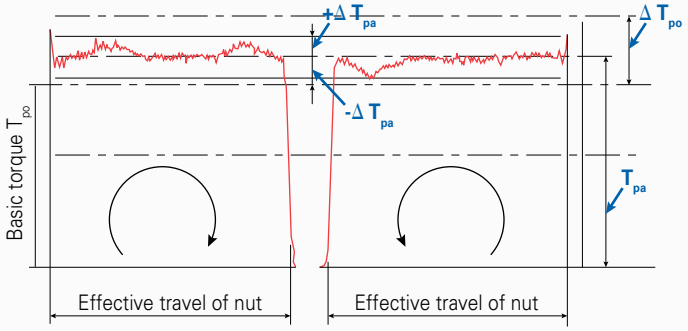
Driving Torque

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

Total Torque = 21.472 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 $\Delta T_{pa}$

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 $\Delta T_{po}$

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.

# 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 MBN12×2R-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:

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

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

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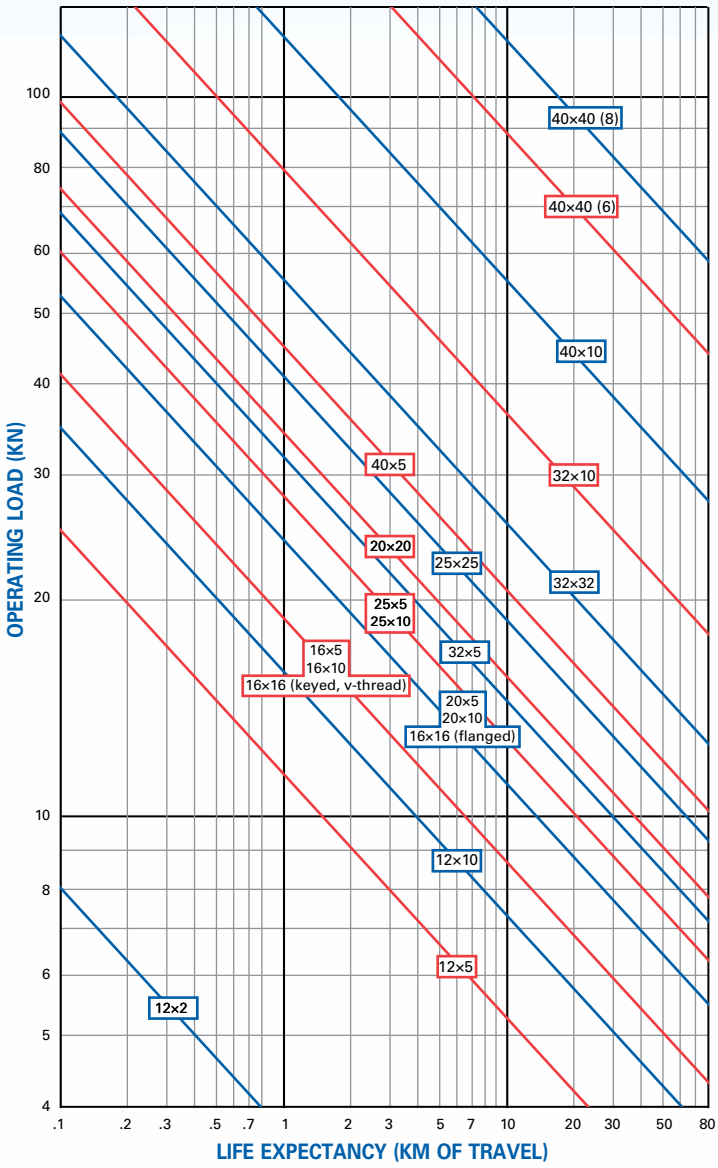
$$L_h = \frac{2.600 \times 10^6}{(60) \times (260)}$$

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/Thomson.

# 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 ($2.05 \times 10^5$ 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

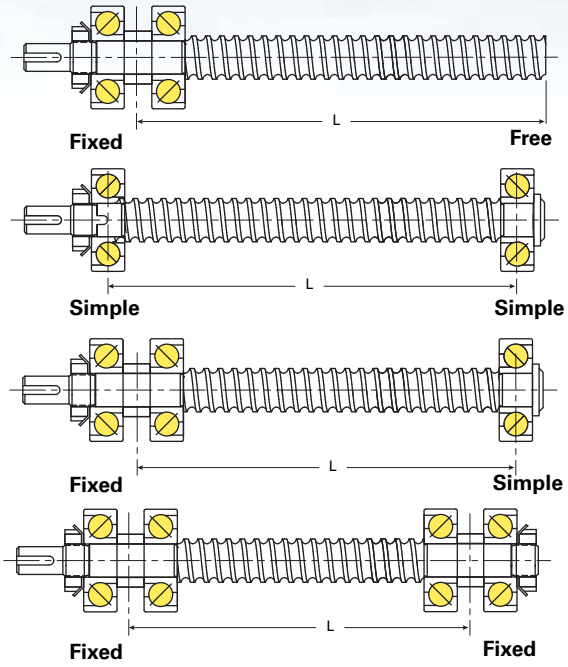
| | |
|---|---|
| One end fixed other end free | n=0.25 |
| Both ends simply supported | n=1 |
| One end fixed other end simply supported | n=2 |
| Both ends fixed | n=4 |

**NOTE:** No safety factor incorporated into above equation. Nook/Thomson 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 ($2.05 \times 10^5$ 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 ($9.81 \times 10^3$ mm/sec$^2$)

$\gamma$ = Specific weight ($7.71 \times 10^{-5}$ N/mm$^3$)

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

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

$\lambda$ = 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/Thomson EZZE MOUNTS™, refer to pages 46-47.

**CAUTION:** When using fixed bearing mounts on both ends, contact Nook/Thomson 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 x N VALUE

The critical speed is also limited by the ball circle diameter x 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 |

# PRECISION METRIC BALL SCREWS

# PRECISION METRIC BALL SCREWS

# PRECISION METRIC BALL SCREW SIZES

Nook/Thomson 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/Thomson 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 |
|---|---|---|---|
| 12x2 | MBN12×2R-3FW | MBN12×2R-3VW | MBN12×2R-3CW |
| 12x5 | MBN12×5R-3FW | MBN12×5R-3VW | MBN12×5R-3CW |
| 12x10 | MBN12×10R-3FW | MBN12×10R-3VW | MBN12×10R-3CW |
| 16x5 | MBN16×5R-4FW | MBN16×5R-4VW | MBN16×5R-4CW |
| 16x10 | MBN16×10R-3FW | MBN16×10R-3VW | MBN16×10R-3CW |
| 16x16 | MBN16×16R-4FW | MBN16×16R-4VW | MBN16×16R-3CW |
| 20x5 | MBN20×5R-4FW | MBN20×5R-4VW | MBN20×5R-4CW |
| 20x10 | MBN20×10R-4FW | MBN20×10R-4VW | MBN20×10R-4CW |
| 20x20 | MBN20×20R-4FW | MBN20×20R-4VW | MBN20×20R-4CW |
| 25x5 | MBN25×5R-4FW | MBN25×5R-4VW | MBN25×5R-4CW |
| 25x10 | MBN25×10R-4FW | MBN25×10R-4VW | MBN25×10R-4CW |
| 25x25 | MBN25×25R-4FW | MBN25×25R-4VW | MBN25×25R-4CW |
| 32x5 | MBN32×5R-4FW | MBN32×5R-4VW | MBN32×5R-4CW |
| 32x10 | MBN32×10R-4FW | MBN32×10R-4VW | MBN32×10R-4CW |
| 32x32 | MBN32×32R-4FW | MBN32×32R-4VW | MBN32×32R-4CW |
| 40x5 | MBN40×5R-5FW | MBN40×5R-5VW | MBN40×5R-5CW |
| 40x10 | MBN40×10R-4FW | MBN40×10R-4VW | MBN40×10R-4CW |
| 40x40 | MBN40×40R-6FW | — | — |
| 40x40 | 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/Thomson for T5 lengths and availability.

## PRECISION GROUND BALLSCREW SIZES AND LENGTHS

Nook/Thomson Precision Ground Metric Ball Screws are the highest precision product offered by Nook/Thomson. 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/Thomson 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/Thomson.

# REFERENCE NUMBER SYSTEM
## PRECISION METRIC BALL SCREW ASSEMBLIES

**PMBS20×5R - 4FW / 2 / T5 / EKS / 4NX / 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

### 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:** Preload percentage value as measured without wipers

**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 S**

EK = Universal Double Bearing Support, with Keyway

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

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.

### Bearing Mount Install

S = Bearing Mount Installed
N = Bearing Mount Shipped Loose
X = No Bearing Mount

### Shaft Extension

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

B = Universal Double Bearing Support End Cap Facing Screw Thread

C = Universal Single Bearing Support

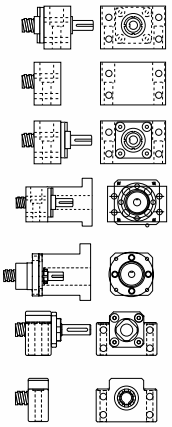
E = Universal Double Bearing Support End Cap Facing Away From Screw Thread

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

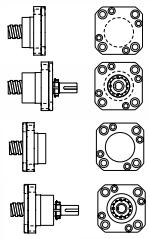


D = Flanged Single Bearing Support Flange Facing Screw Thread

F = Flanged Double Bearing Support Flange Facing Screw Thread

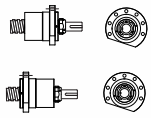
G = Flanged Single Bearing Support Flange Facing Away From Screw Thread

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).

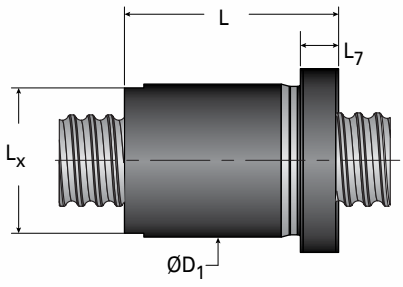
XX = Custom Machining (Print or specified data must be provided).

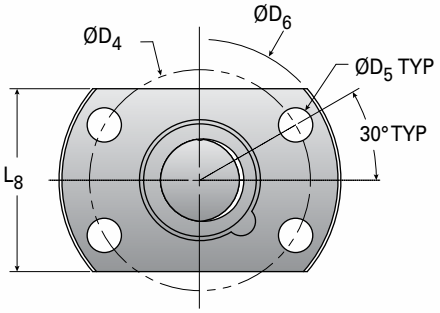
# SINGLE NUT WITH FLANGE (12MM DIA)
## FOUR-HOLE FLANGE

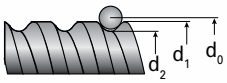
- Complies with ISO 3408
- Ball nuts are provided clearance or preloaded fit
- To be used with all accuracy classes (precision rolled T10, T7, T5 and precision ground T3)
- Mounting dimensions per DIN69 051 Part 5 Type C

| | 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) |
|---|---|---|---|---|---|---|---|---|---|
| 12mm Dia. | **12x2** | **MBN12X2R-3FW** | 2 | 3 | RH | 2820 | 4730 | 1.588 | 11700 |
| | **12x5** | **MBN12X5R-3FW** | 5 | 3 | RH | 6850 | 8830 | 3.175 | 29200 |
| | **12x10** | **MBN12X10R-3FW** | 10 | 3 | RH | 7050 | 9440 | 3.175 | 58400 |

* Based on DN values



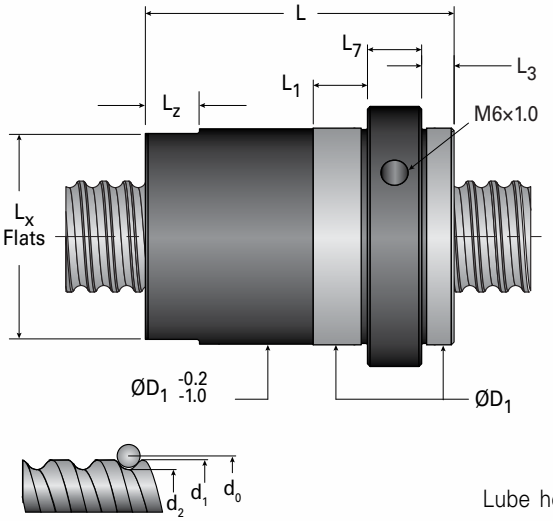

| Size | Screw Dimensions (mm) | | | Screw weight (kg/m) | Ball Nut Dimensions (mm) | | | | | | | | | Nut Wt. (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_0$ | $d_1$ | $d_2$ | | $D_1$ (g6) | L | $L_x$ | $L_z$ | $L_7$ | $L_8$ | $D_4$ | $D_5$ | $D_6$ | |
| **12x2** | 12 | 11.44 | 10.32 | 0.72 | 20 | 28 | 19 | 2.5 | 5 | 24 | 29 | 4 x 4.5 | 37 | 0.05 |
| **12x5** | 12 | 11.33 | 8.72 | 0.64 | 26 | 36 | 22.5 | 2.5 | 8 | 26 | 32 | 4 x 4.5 | 40 | 0.09 |
| **12x10** | 12 | 11.33 | 8.72 | 0.64 | 28 | 36 | 26 | 3.8 | 8 | 30 | 36 | 4 x 4.5 | 44 | 0.13 |

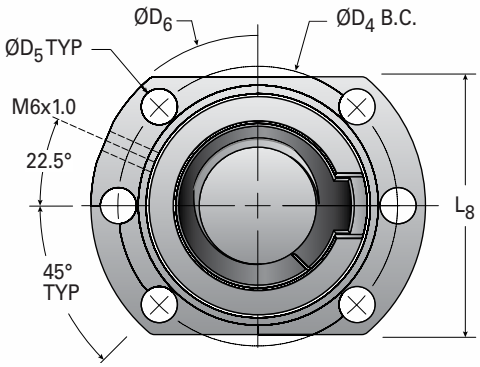
# SINGLE NUT WITH FLANGE (16-32MM DIA)
## SIX-HOLE FLANGE

- 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

| | 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) |
|---|---|---|---|---|---|---|---|---|---|
| 16mm Dia. | 16x5 | MBN16X5R-4FW | 5 | 4 | RH | 12150 | 18400 | 3.500 | 21900 |
| | 16x10 | MBN16X10R-3FW | 10 | 3 | RH | 8590 | 14290 | 3.000 | 43800 |
| | 16x16 | MBN16X16R-4FW | 16 | 4 | RH | 9470 | 15710 | 3.175 | 70000 |
| 20mm Dia. | 20x5 | MBN20X5R-4FW | 5 | 4 | RH | 14560 | 25580 | 3.500 | 17500 |
| | 20x10 | MBN20X10R-4FW | 10 | 4 | RH | 12550 | 24600 | 3.000 | 35000 |
| | 20x20 | MBN20X20R-4FW | 20 | 4 | RH | 12110 | 22010 | 3.500 | 70000 |
| 25mm Dia. | 25x5 | MBN25X5R-4FW | 5 | 4 | RH | 16380 | 32880 | 3.500 | 14000 |
| | 25x10 | MBN25X10R-4FW | 10 | 4 | RH | 13880 | 30940 | 3.000 | 28000 |
| | 25x25 | MBN25X25R-4FW | 25 | 4 | RH | 13680 | 28500 | 3.500 | 70000 |
| 32mm Dia. | 32x5 | MBN32X5R-4FW | 5 | 4 | RH | 18630 | 43790 | 3.500 | 11000 |
| | 32x10 | MBN32X10R-4FW | 10 | 4 | RH | 36230 | 63880 | 6.350 | 21900 |
| | 32x32 | MBN32X32R-4FW | 32 | 4 | RH | 18020 | 41150 | 3.969 | 70000 |

* Based on DN values




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

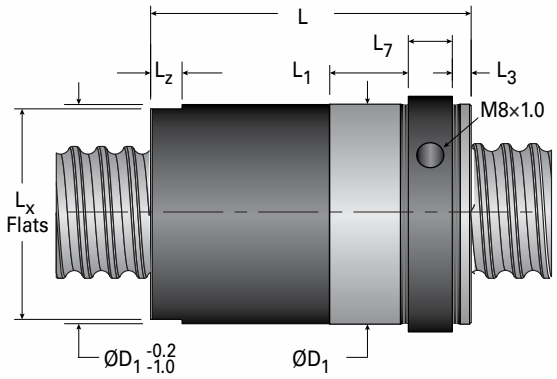
| Size | Lube Hole Location | Screw Dimensions (mm) | | | Screw weight (kg/m) | Ball Nut Dimensions (mm) | | | | | | | | | | | Nut Wt. (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $d_0$ | $d_1$ | $d_2$ | | $D_1$ (g6) | L | $L_1$ (min) | $L_x$ | $L_z$ | $L_3$ | $L_7$ | $L_8$ | $D_4$ | $D_5$ | $D_6$ | |
| **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** | R | 16 | 14.98 | 12.90 | 1.24 | 28 | 45 | 16 | 27 | 10 | -- | 12 | 40 | 42 | 6 × 5.5 | 52 | 0.22 |
| **16x16** | L | 16 | 15.33 | 12.72 | 1.17 | 32 | 33 | 10 | 30 | 5 | 4 | 10 | 40 | 42 | 6 × 5.5 | 52 | 0.19 |
| **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** | R | 20 | 18.98 | 16.90 | 2.04 | 33 | 60 | 16 | 31 | 10 | -- | 12 | 44 | 47 | 6 × 6.6 | 58 | 0.35 |
| **20x20** | L | 20 | 19.26 | 16.38 | 1.94 | 36 | 36 | 10 | 35 | 5 | 4 | 10 | 44 | 47 | 6 × 6.6 | 58 | 0.24 |
| **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** | R | 25 | 23.98 | 21.90 | 3.32 | 38 | 64 | 16 | 36 | 10 | -- | 12 | 48 | 51 | 6 × 6.6 | 62 | 0.38 |
| **25x25** | L | 25 | 24.26 | 21.38 | 3.28 | 40 | 40 | 10 | 39 | 5 | 4 | 10 | 48 | 51 | 6 × 6.6 | 62 | 0.27 |
| **32x5** | R | 32 | 31.26 | 28.38 | 5.48 | 50 | 57 | 10 | 48 | 10 | 6 | 12 | 62 | 65 | 6 × 9 | 80 | 0.65 |
| **32x10** | L | 32 | 30.49 | 25.45 | 4.93 | 50 | 81 | 20 | 48 | 10 | 5 | 12 | 62 | 65 | 6 × 9 | 80 | 0.82 |
| **32x32** | L | 32 | 31.17 | 27.90 | 5.54 | 56 | 50 | 20 | 54 | 5 | 5 | 14 | 65 | 71 | 6 × 9 | 86 | 0.81 |

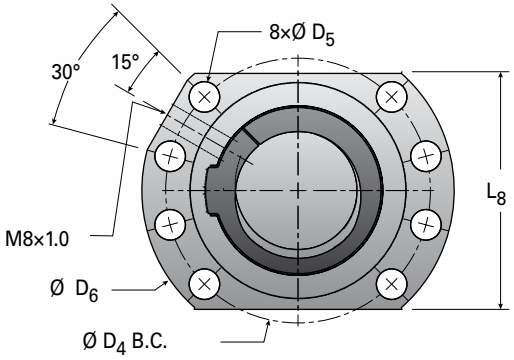
# SINGLE NUT WITH FLANGE (40MM DIA)
## EIGHT-HOLE FLANGE

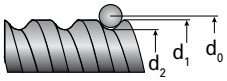
- Complies with ISO 3408
- With wipers at both ends
- Ball nuts are provided clearance or preloaded fit
- To be used with all accuracy classes (precision rolled T10, T7, T5 and precision ground T3)
- Mounting dimensions per DIN69 051 Part 5 Type c

| | 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) |
|---|---|---|---|---|---|---|---|---|---|
| 40mm Dia. | **40x5** | **MBN40X5R-5FW** | 5 | 5 | RH | 25170 | 70660 | 3.500 | 8800 |
| | **40x10** | **MBN40X10R-4FW** | 10 | 4 | RH | 56770 | 116070 | 7.144 | 16700 |
| | **40x40** | **MBN40X40R-6FW** | 40 | 6 | RH | 56490 | 129520 | 6.350 | 70000 |
| | **40x40** | **MBN40X40R-8FW** | 40 | 8 | RH | 75440 | 181330 | 6.350 | 70000 |

* Based on DN values



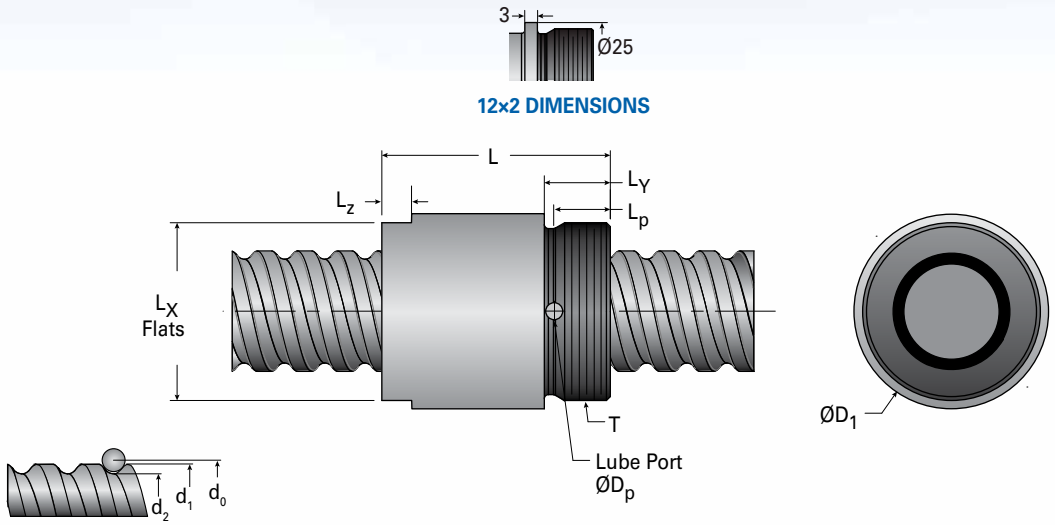

| Size | Screw Dimensions (mm) | | | Screw weight (kg/m) | Ball Nut Dimensions (mm) | | | | | | | | | | | Nut Wt. (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_0$ | $d_1$ | $d_2$ | | $D_1$ (g6) | L | $L_1$ (min) | $L_x$ | $L_z$ | $L_3$ | $L_7$ | $L_8$ | $D_4$ | $D_5$ | $D_6$ | |
| **40×5** | 40.0 | 39.26 | 36.38 | 8.82 | 63 | 72 | 20 | 60 | 10 | 5 | 14 | 70 | 78 | 8 × 9 | 93 | 1.16 |
| **40×10** | 42.1 | 40.00 | 34.81 | 8.65 | 63 | 93 | 20 | 60 | 10 | 8.5 | 14 | 70 | 78 | 8 × 9 | 93 | 1.31 |
| **40×40** | 40.0 | 38.49 | 33.45 | 8.06 | 70 | 82 | 25 | 67 | 10 | 6 | 14 | 75 | 85 | 8 × 9 | 100 | 1.71 |
| **40×40** | 40.0 | 38.49 | 33.45 | 8.06 | 70 | 102 | 25 | 67 | 10 | 6 | 14 | 75 | 85 | 8 × 9 | 100 | 2.11 |

# 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) |
|---|---|---|---|---|---|---|---|---|---|
| 12mm Dia. | 12×2 | MBN12X2R-3VW | 2 | 3 | RH | 2820 | 4730 | 1.588 | 11700 |
| | 12×5 | MBN12X5R-3VW | 5 | 3 | RH | 6850 | 8830 | 3.175 | 29200 |
| | 12×10 | MBN12X10R-3VW | 10 | 3 | RH | 7050 | 9440 | 3.175 | 58400 |
| 16mm Dia. | 16×5 | MBN16X5R-4VW | 5 | 4 | RH | 12150 | 18400 | 3.500 | 21900 |
| | 16×10 | MBN16X10R-3VW | 10 | 3 | RH | 8590 | 14290 | 3.000 | 43800 |
| | 16×16 | MBN16X16R-3VW | 16 | 3 | RH | 7400 | 11780 | 3.175 | 70000 |
| 20mm Dia. | 20×5 | MBN20X5R-4VW | 5 | 4 | RH | 14560 | 25580 | 3.500 | 17500 |
| | 20×10 | MBN20X10R-4VW | 10 | 4 | RH | 12550 | 24600 | 3.000 | 35000 |
| | 20×20 | MBN20X20R-4VW | 20 | 4 | RH | 12110 | 22010 | 3.500 | 70000 |
| 25mm Dia. | 25×5 | MBN25X5R-4VW | 5 | 4 | RH | 16380 | 32880 | 3.500 | 14000 |
| | 25×10 | MBN25X10R-4VW | 10 | 4 | RH | 13880 | 30940 | 3.000 | 28000 |
| | 25×25 | MBN25X25R-4VW | 25 | 4 | RH | 13680 | 28500 | 3.500 | 70000 |
| 32mm Dia. | 32×5 | MBN32X5R-4VW | 5 | 4 | RH | 18630 | 43790 | 3.500 | 11000 |
| | 32×10 | MBN32X10R-4VW | 10 | 4 | RH | 36230 | 63880 | 6.350 | 21900 |
| | 32×32 | MBN32X32R-4VW | 32 | 4 | RH | 18020 | 41150 | 3.969 | 70000 |
| 40mm Dia. | 40×5 | MBN40X5R-5VW | 5 | 5 | RH | 25170 | 70660 | 3.500 | 8800 |
| | 40×10 | MBN40X10R-4VW | 10 | 4 | RH | 56770 | 116070 | 7.144 | 16700 |
| | 40×40 | MBN40X40R-8VW | 40 | 8 | RH | 75440 | 181330 | 6.350 | 70000 |

* Based on DN values



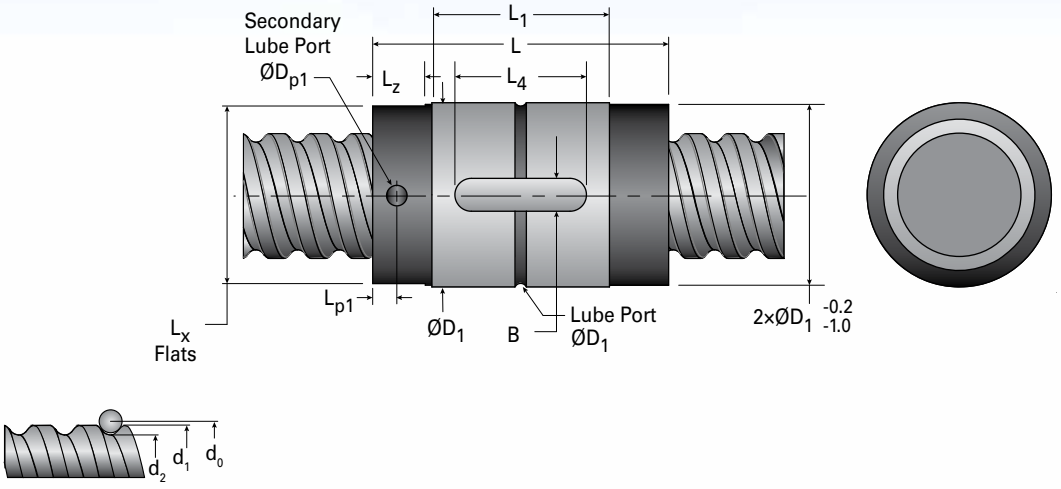

| Size | Screw Dimensions (mm) | | | Screw weight (kg/m) | Ball Nut Dimensions (mm) | | | | | | | | Nut Wt. (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_0$ | $d_1$ | $d_2$ | | $D_1$ (h8) | L | $L_x$ | $L_Y$ | $L_z$ | $L_p$ | $D_p$ | T (6g) | |
| **12x2** | 12.0 | 11.44 | 10.32 | 0.72 | 20 | 37 | 19 | 13 | 2.5 | — | — | M22 × 1.5 | 0.06 |
| **12x5** | 12.0 | 11.33 | 8.72 | 0.64 | 26 | 39 | 24 | 8 | 5 | 6.5 | 2.7 | M20 × 1.0 | 0.09 |
| **12x10** | 12.0 | 11.33 | 8.72 | 0.64 | 28 | 38 | 26 | 10 | 4 | 8.5 | 2.7 | M20 × 1.0 | 0.09 |
| **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** | 16.0 | 14.98 | 12.90 | 1.24 | 38 | 45 | 35 | 13 | 32 | 11.0 | 2.7 | M35 × 1.5 | 0.28 |
| **16x16** | 16.0 | 15.33 | 12.72 | 1.17 | 38 | 33 | 35 | 13 | 20 | 11.0 | 2.7 | M35 × 1.5 | 0.18 |
| **20x5** | 20.0 | 19.26 | 16.38 | 1.96 | 38 | 57 | 36 | 17 | 8 | 15.0 | 2.7 | M35 × 1.5 | 0.30 |
| **20x10** | 20.0 | 18.98 | 16.90 | 2.04 | 43 | 60 | 40 | 17 | 43 | 8.5 | 2.7 | M40 × 1.5 | 0.45 |
| **20x20** | 20.0 | 19.26 | 16.38 | 1.94 | 43 | 36 | 40 | 17 | 19 | 15.5 | 1.2 | M40 × 1.5 | 0.25 |
| **25x5** | 25.0 | 24.26 | 21.38 | 3.21 | 43 | 63 | 40 | 17 | 10 | 15.0 | 2.7 | M40 × 1.5 | 0.38 |
| **25x10** | 25.0 | 23.98 | 21.90 | 3.32 | 48 | 64 | 45 | 17 | 47 | 15.0 | 2.7 | M45 × 1.5 | 0.56 |
| **25x25** | 25.0 | 24.26 | 21.38 | 3.28 | 48 | 40 | 45 | 17 | 23 | 16.0 | 1.6 | M45 × 1.5 | 0.32 |
| **32x5** | 32.0 | 31.26 | 28.38 | 5.48 | 53 | 57 | 51 | 19 | 10 | 17.0 | 3.5 | M50 × 1.5 | 0.53 |
| **32x10** | 32.0 | 30.49 | 25.45 | 4.93 | 53 | 81 | 48 | 19 | 10 | 17.0 | 3.5 | M50 × 1.5 | 0.74 |
| **32x32** | 32.0 | 31.17 | 27.90 | 5.54 | 58 | 50 | 55 | 19 | 31 | 17.0 | 2.5 | M55 × 2.0 | 0.59 |
| **40x5** | 40.0 | 39.26 | 36.38 | 8.82 | 63 | 66 | 55 | 19 | 8 | 17.0 | 3.5 | M55 × 2.0 | 0.58 |
| **40x10** | 42.1 | 40.00 | 34.81 | 8.65 | 63 | 93 | 60 | 26 | 10 | 24.0 | 3.5 | M60 × 2.0 | 1.03 |
| **40x40** | 40.0 | 38.49 | 33.45 | 8.06 | 73 | 102 | 70 | 30 | 72 | 28.5 | 2.4 | M70 × 2.0 | 2.02 |

# 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

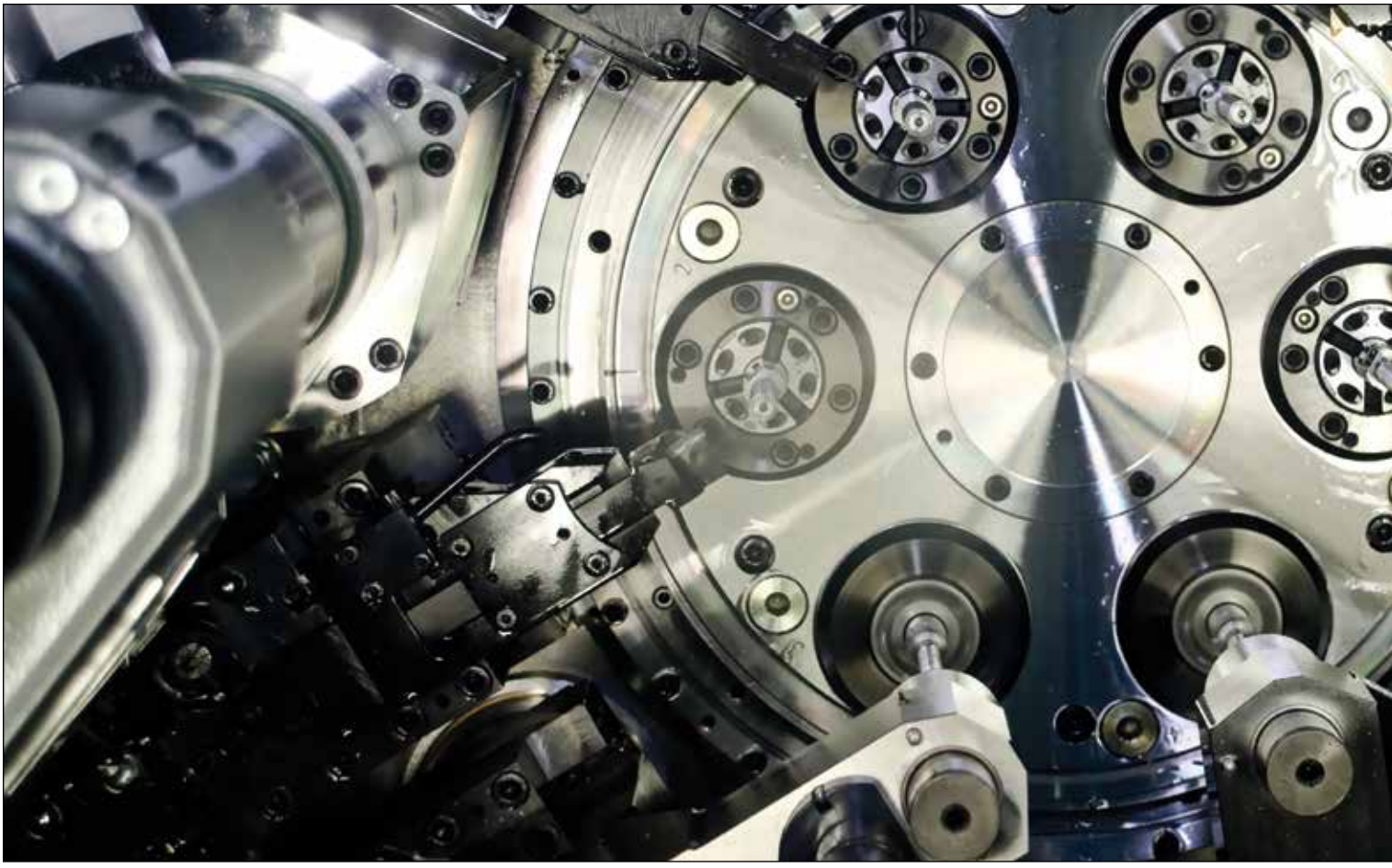
| | Size | Part Number | Lead (mm) | Active Turns | Helix | Dynamic Load $C_a$ (N) | Static Load $C_{0a}$ (N) | Nominal Ball Dia. (mm) | Linear Speed* (mm/min) |
|---|---|---|---|---|---|---|---|---|---|
| 12mm Dia. | 12×2 | MBN12X2R-3CW | 2 | 3 | RH | 2820 | 4730 | 1.588 | 11700 |
| | 12×5 | MBN12X5R-3CW | 5 | 3 | RH | 6850 | 8830 | 3.175 | 29200 |
| | 12×10 | MBN12X10R-3CW | 10 | 3 | RH | 7050 | 9440 | 3.175 | 58400 |
| 16mm Dia. | 16×5 | MBN16X5R-4CW | 5 | 4 | RH | 12150 | 18400 | 3.500 | 21900 |
| | 16×10 | MBN16X10R-3CW | 10 | 3 | RH | 8590 | 14290 | 3.000 | 43800 |
| | 16×16 | MBN16X16R-3CW | 16 | 3 | RH | 7400 | 11780 | 3.175 | 70000 |
| 20mm Dia. | 20×5 | MBN20X5R-4CW | 5 | 4 | RH | 14560 | 25580 | 3.500 | 17500 |
| | 20×10 | MBN20X10R-4CW | 10 | 4 | RH | 12550 | 24600 | 3.000 | 35000 |
| | 20×20 | MBN20X20R-4CW | 20 | 4 | RH | 12110 | 22010 | 3.500 | 70000 |
| 25mm Dia. | 25×5 | MBN25X5R-4CW | 5 | 4 | RH | 16380 | 32880 | 3.500 | 14000 |
| | 25×10 | MBN25X10R-4CW | 10 | 4 | RH | 13880 | 30940 | 3.000 | 28000 |
| | 25×25 | MBN25X25R-4CW | 25 | 4 | RH | 13680 | 28500 | 3.500 | 70000 |
| 32mm Dia. | 32×5 | MBN32X5R-4CW | 5 | 4 | RH | 18630 | 43790 | 3.500 | 11000 |
| | 32×10 | MBN32X10R-4CW | 10 | 4 | RH | 36230 | 63880 | 6.350 | 21900 |
| | 32×32 | MBN32X32R-4CW | 32 | 4 | RH | 18020 | 41150 | 3.969 | 70000 |
| 40mm Dia. | 40×5 | MBN40X5R-5CW | 5 | 5 | RH | 25170 | 70660 | 3.500 | 8800 |
| | 40×10 | MBN40X10R-4CW | 10 | 4 | RH | 56770 | 116070 | 7.144 | 16700 |
| | 40×40 | MBN40X40R-8CW | 40 | 8 | RH | 75440 | 181330 | 6.350 | 70000 |

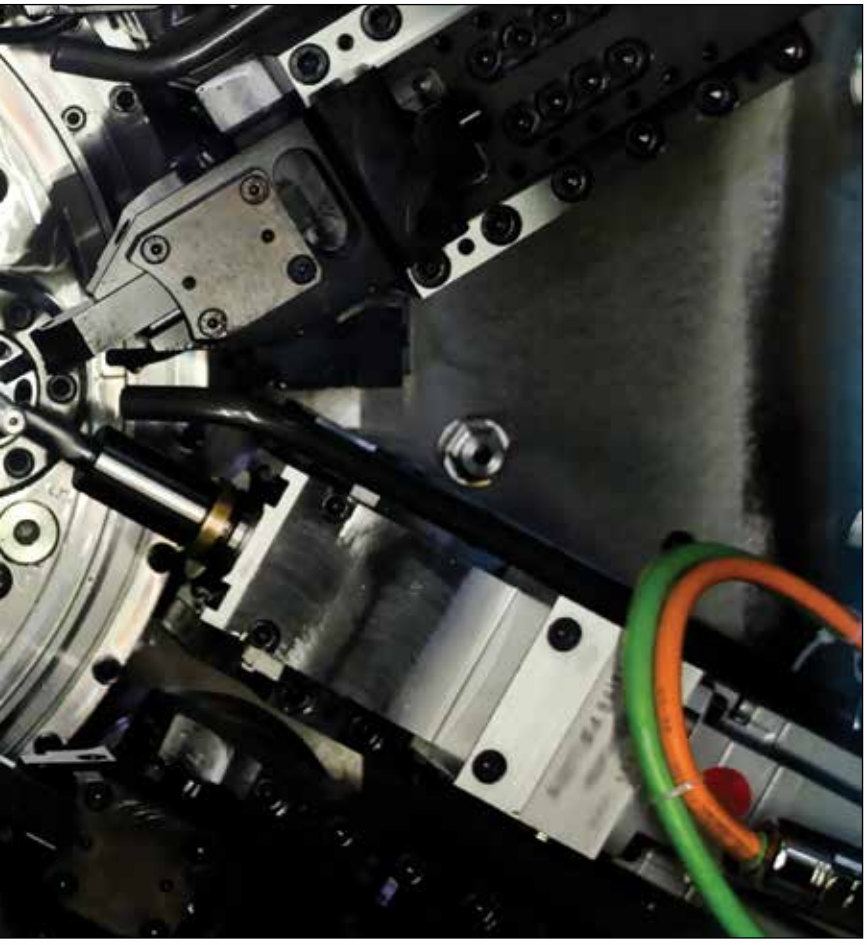
* Based on DN values




| Size | Screw Dimensions (mm) | | | Screw weight (kg/m) | Ball Nut Dimensions (mm) | | | | | | | | | | Nut Wt. (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $d_0$ | $d_1$ | $d_2$ | | $D_1$ (g6) | $L_1$ | $D_p$ | $L_{p1}$ | $D_{p1}$ | L | $L_x$ | $L_z$ | $L_4$ | B (P9) | |
| **12x2** | 12.0 | 11.44 | 10.32 | 0.72 | 20 | 28 | - | 4 | 2 | 28 | 19 | 2.5 | 10 | 3 | 0.04 |
| **12x5** | 12.0 | 11.33 | 8.72 | 0.64 | 26 | 30 | 1.5 | 4 | 2 | 30 | 24 | 2.5 | 12 | 3 | 0.09 |
| **12x10** | 12.0 | 11.33 | 8.72 | 0.64 | 28 | 28 | - | 3.2 | 3 | 28 | 26 | 3.81 | 12 | 3 | 0.07 |
| **16x5** | 16.0 | 15.26 | 12.38 | 1.18 | 28 | 25 | 1.5 | - | - | 45 | 26 | 8 | 20 | 5 | 0.11 |
| **16x10** | 16.0 | 14.98 | 12.90 | 1.24 | 28 | 45 | 1.5 | 9.5 | 4 | 45 | 27 | 8 | 20 | 5 | 0.12 |
| **16x16** | 16.0 | 15.33 | 12.72 | 1.17 | 33 | 33 | 1.5 | - | - | 33 | 32 | 5 | 20 | 5 | 0.13 |
| **20x5** | 20.0 | 19.26 | 16.38 | 1.96 | 33 | 25 | 1.5 | 6 | 4 | 45 | 31 | 8 | 20 | 5 | 0.15 |
| **20x10** | 20.0 | 18.98 | 16.90 | 2.04 | 33 | 60 | 1.5 | 9.5 | 4 | 60 | 31 | 10 | 20 | 5 | 0.20 |
| **20x20** | 20.0 | 19.26 | 16.38 | 1.94 | 36 | 36 | 1.2 | - | - | 36 | 35 | 5 | 20 | 5 | 0.15 |
| **25x5** | 25.0 | 24.26 | 21.38 | 3.21 | 38 | 25 | 1.5 | - | - | 46 | 36 | 7 | 20 | 5 | 0.19 |
| **25x10** | 25.0 | 23.98 | 21.90 | 3.32 | 38 | 64 | 1 | 12 | 4 | 64 | 36 | 10 | 20 | 5 | 0.26 |
| **25x25** | 25.0 | 24.26 | 21.38 | 3.28 | 40 | 40 | 1.5 | - | - | 40 | 39 | 5 | 20 | 5 | 0.18 |
| **32x5** | 32.0 | 31.26 | 28.38 | 5.48 | 48 | 28 | 1.5 | - | - | 48 | 46 | 8 | 20 | 5 | 0.33 |
| **32x10** | 32.0 | 30.49 | 25.45 | 4.93 | 50 | 53 | 1.5 | 9.5 | 4 | 77 | 46 | 10 | 20 | 5 | 0.52 |
| **32x32** | 32.0 | 31.17 | 27.90 | 5.54 | 56 | 30 | 2.4 | - | - | 50 | 54 | 5 | 25 | 5 | 0.57 |
| **40x5** | 40.0 | 39.26 | 36.38 | 8.82 | 56 | 34 | 3 | - | - | 54 | 54 | 8 | 20 | 5 | 0.42 |
| **40x10** | 42.1 | 40.00 | 34.81 | 8.65 | 63 | 51 | 3 | - | - | 75 | 60 | 10 | 30 | 5 | 0.89 |
| **40x40** | 40.0 | 38.49 | 33.45 | 8.06 | 70 | 60 | 2.4 | - | - | 102 | 67 | 10 | 40 | 5 | 1.85 |

# MINIATURE BALL SCREWS





# MINIATURE BALL SCREWS

# MINIATURE BALL SCREW SIZES

Nook/Thomson 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 |



# REFERENCE NUMBER SYSTEM
## MINIATURE BALL SCREW ASSEMBLIES

**MRT 10×2 RA / EKS / 4NX / 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 — **EK S**

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

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.

EK = Universal Double Bearing Support, with Keyway

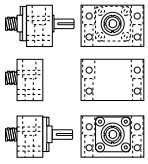
**Bearing Mount Install**
S = Bearing Mount Installed
N = Bearing Mount Shipped Loose
X = No Bearing Mount

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

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

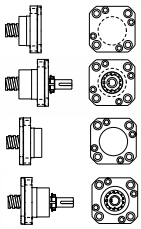


D = Flanged Single Bearing Support Flange Facing Screw Thread

F = Flanged Double Bearing Support Flange Facing Screw Thread

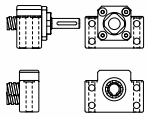
G = Flanged Single Bearing Support Flange Facing Away From Screw Thread

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).

# MINIATURE V-THREAD NUT

## EXTERNAL RETURNS

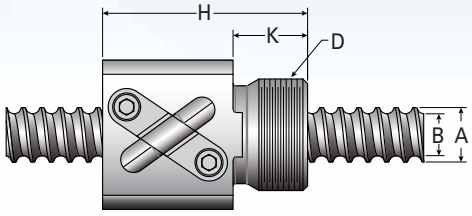
| | Size | Ball Nut Number | Screw Material | Lead (mm) | Active Turns | Helix | Dynamic Load $C_a$(N) | Static Load $C_{0a}$(N) | Nominal Ball Dia. (mm) | Linear Speed (mm/min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 6mm Dia. | 6x2 | MBN10922 | SS | 2 | 3.5 | RH | 751 | 719 | 1.5875 | 23400 |
| 8mm Dia. | 8x6 | MBN10961 | 4150 | 6 | 1.5 | RH | 1,343 | 1,632 | 1.5875 | 52500 |
| | 8x6 | MBN10924 | SS | 6 | 1.5 | RH | 592 | 480 | 1.5875 | 52500 |

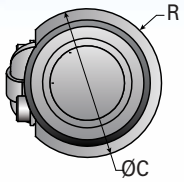
## INTERNAL RETURNS

| | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 6mm Dia. | 6x1.25 | MBN10636 | SS | 1.25 | 2 | RH | 258 | 253 | 0.8000 | 14600 |
| 8mm Dia. | 8x2.5 | MBN10830 | 4150 | 2.5 | 2 | RH | 1,407 | 1,638 | 1.5875 | 21900 |
| | 8x2.5 | MBN10731 | SS | 2.5 | 2 | RH | 480 | 623 | 1.5875 | 21900 |
| 10mm Dia. | 10x2 | MBN10834 | 4150 | 2 | 2 | RH | 1,259 | 1,514 | 1.5875 | 14000 |
| | 10x2 | MBN10757 | SS | 2 | 2 | RH | 560 | 444 | 1.5875 | 14000 |

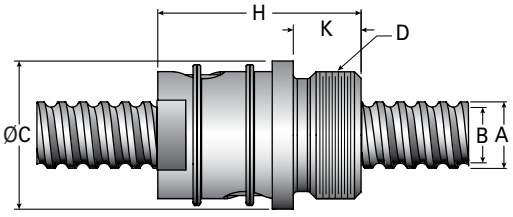
## FLANGED MINIATURES

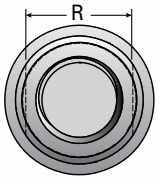
| | Size | Ball Nut Number | Screw Material | Lead (mm) | Active Turns | Helix | Dynamic Load $C_a$(N) | Static Load $C_{0a}$(N) | Nominal Ball Dia. (mm) | Linear Speed (mm/min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 6mm Dia. | 6 X 1.25 | MBN11179 | SS | 1.25 | 3 | RH | 330 | 305 | 0.8000 | 14600 |
| 8mm Dia. | 8 X 2.5 | MBN11181 | SS | 2.5 | 3 | RH | 880 | 725 | 1.5875 | 21900 |
| | 8 X 2.5 | MBN11185 | 4150 | 2.5 | 3 | RH | 1995 | 2460 | 1.5875 | 21900 |
| 10mm Dia. | 10 X 2 | MBN11183 | SS | 2 | 3 | RH | 790 | 665 | 1.5875 | 14000 |
| | 10 X 2 | MBN11187 | 4150 | 2 | 3 | RH | 1785 | 2270 | 1.5875 | 14000 |



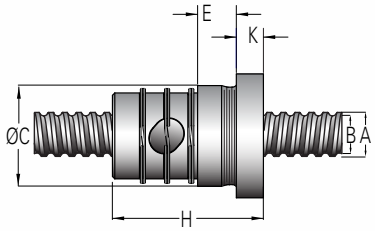



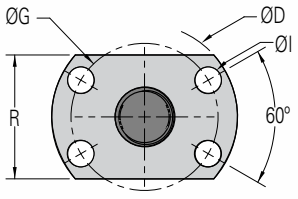

| Size | Lash (mm) | Torque to Raise 1 kN (N·m) | Screw Dimensions (mm) | | Screw weight (g/m) | Ball Nut Dimensions (mm) | | | | | Nut Wt. (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | | C | D | H | K | R | |
| **6×2** | 0.076 | 0.354 | 5.80 | 4.5 | 161 | 16.0 | M12 × 1 | 22.0 | 8.0 | 8.5 | 18.0 |
| **8×6** | 0.076 | 1.060 | 7.80 | 6.6 | 329 | 17.5 | M15×1 | 24.0 | 8.0 | 9.7 | 25.4 |
| **8×6** | 0.076 | 1.060 | 7.80 | 6.6 | 329 | 17.5 | M15×1 | 24.0 | 8.0 | 9.7 | 25.4 |




| Size | Lash (mm) | Torque to Raise 1 kN (N·m) | Screw Dimensions (mm) | | Screw weight (g/m) | Ball Nut Dimensions (mm) | | | | | Nut Wt. (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | | C | D | H | K | R | |
| **6×1.25** | 0.038 | 0.221 | 6.20 | 5.6 | 215 | 14.5 | M12×1 | 17.2 | 6.1 | 9.32 | 8.6 |
| **8×2.5** | 0.038 | 0.443 | 7.80 | 6.6 | 338 | 17.5 | M15×1 | 24.0 | 8.0 | 12.3 | 20.0 |
| **8×2.5** | 0.038 | 0.443 | 7.80 | 6.6 | 338 | 17.5 | M15×1 | 24.0 | 8.0 | 12.3 | 20.0 |
| **10×2** | 0.038 | 0.354 | 9.50 | 8.2 | 464 | 19.5 | M17×1 | 22.0 | 8.0 | 15.7 | 21.7 |
| **10×2** | 0.038 | 0.354 | 9.50 | 8.2 | 464 | 19.5 | M17×1 | 22.0 | 8.0 | 15.7 | 21.7 |




| Size | Lash (mm) | Torque to Raise 1 kN (N·m) | Screw Dimensions (mm) | | Screw weight (g/m) | Ball Nut Dimensions (mm) | | | | | | | | Nut Wt. (g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | | øC (g6) | øD | E | øG | H | øI | K | R | |
| **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 |
| **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** | 0.038 | 0.442 | 7.80 | 6.6 | 388 | 18 | 30 | 7 | 24 | 30 | 3.4 | 5 | 19 | 41 |
| **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** | 0.038 | 0.354 | 9.50 | 8.2 | 464 | 20 | 36 | 5.5 | 28 | 26 | 4.5 | 5 | 23 | 48 |

# MINIATURE CYLINDRICAL KEYED NUT

## CYLINDRICAL BODY

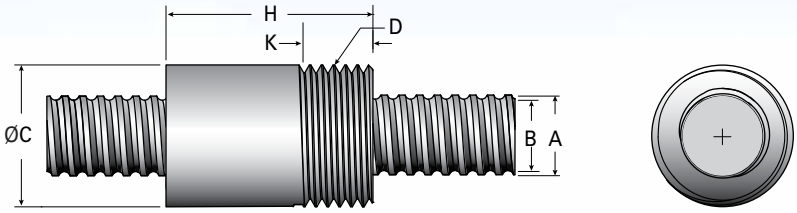
| | Size | Ball Nut Number | Screw Material | Lead (mm) | Active Turns | Helix | Dynamic Load $C_a$(N) | Static Load $C_{0a}$(N) | Nominal Ball Dia. (mm) | Linear Speed (mm/min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 12mm Dia. | **12x2.5** | **MBN11112** | 4150 | 2.5 | 5 | RH | 2,980 | 4,960 | 1.5875 | 14600 |
| 14mm Dia. | **14x3** | **MBN11123** | 4150 | 3 | 5 | RH | 5,812 | 10,340 | 2.0000 | 15000 |
| | **14x6** | **MBN11177** | 4150 | 6 | 5 | RH | 6,894 | 13,081 | 2.0000 | 30000 |

## INTERNAL RETURNS

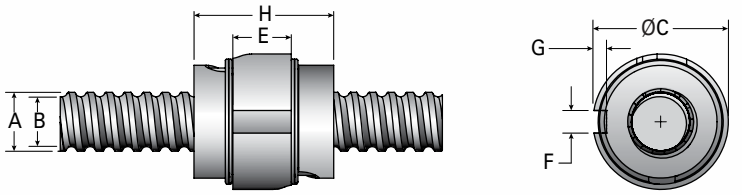
| | Size | Ball Nut Number | Screw Material | Lead (mm) | Active Turns | Helix | Dynamic Load $C_a$(N) | Static Load $C_{0a}$(N) | Nominal Ball Dia. (mm) | Linear Speed (mm/min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 6mm Dia. | **6x1.25** | **MBN10727** | SS | 1.25 | 2 | RH | 258 | 253 | 0.8000 | 14600 |
| 8mm Dia. | **8x2.5** | **MBN10828** | 4150 | 2.5 | 2 | RH | 1,407 | 1,638 | 1.5875 | 21900 |
| | **8x2.5** | **MBN10729** | SS | 2.5 | 2 | RH | 480 | 623 | 1.5875 | 21900 |
| | **10x2** | **MBN10832** | 4150 | 2 | 2 | RH | 1,259 | 1,514 | 1.5875 | 14000 |
| | **10x2** | **MBN10733** | SS | 2 | 2 | RH | 560 | 444 | 1.5875 | 14000 |

## INTERNAL RETURNS

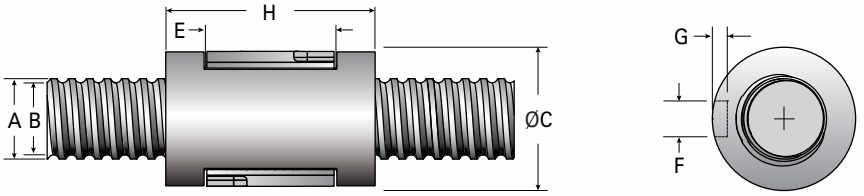
| | Size | Ball Nut Number | Screw Material | Lead (mm) | Active Turns | Helix | Dynamic Load $C_a$(N) | Static Load $C_{0a}$(N) | Nominal Ball Dia. (mm) | Linear Speed (mm/min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 14mm Dia. | **14x3** | **MBN11125** | 4150 | 3 | 5 | RH | 5,812 | 10,340 | 2.0000 | 15000 |
| | **14x6** | **MBN11175** | 4150 | 6 | 5 | RH | 6,894 | 13,081 | 2.0000 | 30000 |




| 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 (mm) | Ball Nut Dimensions (mm) D (mm) | Ball Nut Dimensions (mm) H (mm) | Ball Nut Dimensions (mm) K (mm) | Nut Wt. (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| **12x2.5** | 0.076 | 0.443 | 11.75 | 10.2 | 215 | 25.5 | M20×1.5 | 39.0 | 8.0 | 8.6 |
| **14x3** | 0.076 | 0.478 | 13.50 | 11.9 | 338 | 24.0 | M24×2 | 35.0 | 12.0 | 20.0 |
| **14x6** | 0.076 | 0.991 | 13.50 | 11.9 | 329 | 30.0 | M30×2 | 40.0 | 13.5 | 25.4 |




| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **6x1.25** | 0.038 | 0.221 | 6.2 | 5.6 | 215 | 13.0 | 17.2 | 8.61 | 2.0 | 1.20 | 9.5 |
| **8x2.5** | 0.038 | 0.443 | 7.8 | 6.6 | 321 | 18.0 | 18.6 | 7.7 | 3.0 | 1.80 | 20 |
| **8x2.5** | 0.038 | 0.443 | 7.8 | 6.6 | 321 | 18.0 | 18.6 | 7.7 | 3.0 | 1.80 | 20 |
| **10x2** | 0.038 | 0.354 | 9.5 | 8.2 | 464 | 20.0 | 22.0 | 12.0 | 3.0 | 1.80 | 29 |
| **10x2** | 0.038 | 0.354 | 9.5 | 8.2 | 464 | 20.0 | 22.0 | 12.0 | 3.0 | 1.80 | 29 |




| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **14x3** | 0.076 | 0.472 | 13.5 | 11.9 | 1,021 | 24.0 | 40 | 20.0 | 5.0 | 3.00 | 110 |
| **14x6** | 0.076 | 0.991 | 13.5 | 11.9 | 1,008 | 30.0 | 40 | 20.0 | 5.0 | 3.00 | 65 |

# EZZE-MOUNT™
# BEARING MOUNTS

# BEARING MOUNTS & END MACHINING

# 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.

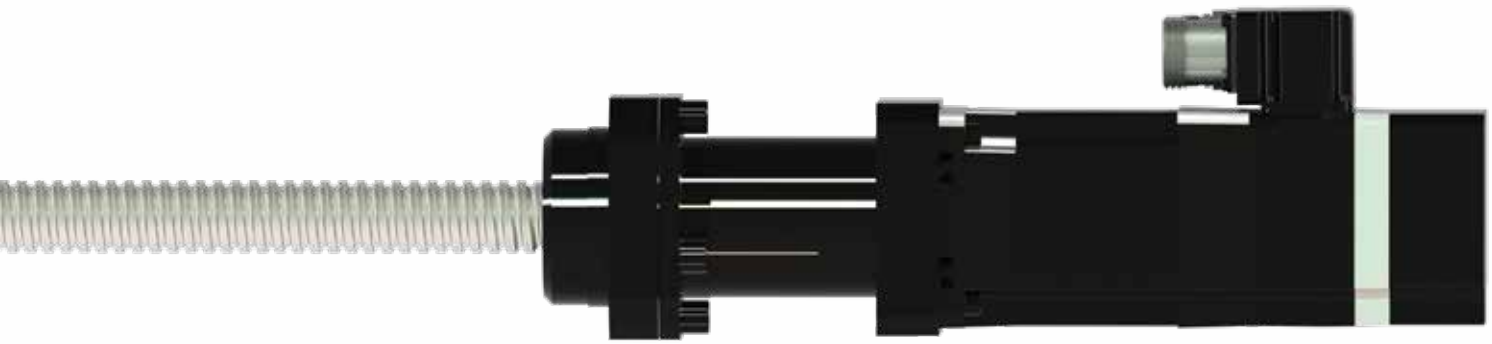
Flanged Bearing Mounts are mounted using the back face and come with a machined piloted surface for ease of mounting and alignment. They are available in alloy and nickel plating.

## FIXED FLANGED MOUNTS (EZRF)

### Quadruple Bearing

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

Nook/Thomson 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.



# INTRODUCTION

Nook/Thomson 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/Thomson offers both the bearing mounts and end machining as a complete assembly.

Nook/Thomson 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/Thomson 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/Thomson 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 |

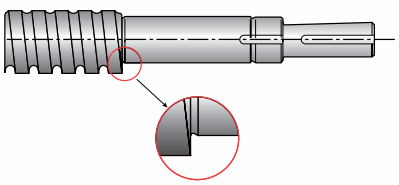
See pages 46-47 for a more detailed definition of end fixity.

### 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/Thomson 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

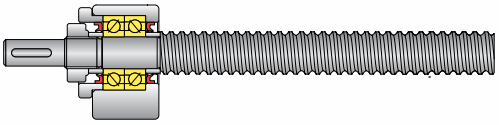
Concentricity refers to multiple diameters sharing the same center. For end machining, close concentricity allows all components to rotate around the same axis resulting in smooth operation and long operating life.

### 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.

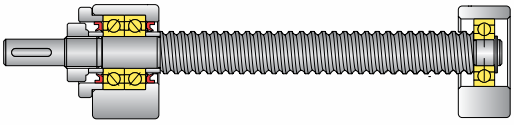
# SUPPORTING METHOD

Using Nook/Thomson 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/Thomson 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.



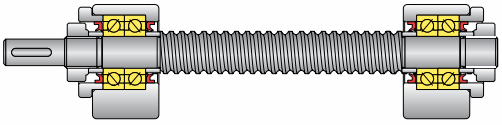
**A**: One end supported with a Double Bearing EZZE-MOUNT™, other end Free. Use Line A" in reference to the charts shown on the following pages.

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



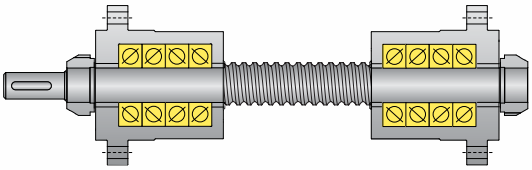
**B**: One end supported with a Double Bearing EZZE-MOUNT™, other supported with a Single Bearing EZZE-MOUNT™. Use Line B in reference to the charts shown on the following pages.

**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/Thomson 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/Thomson 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.

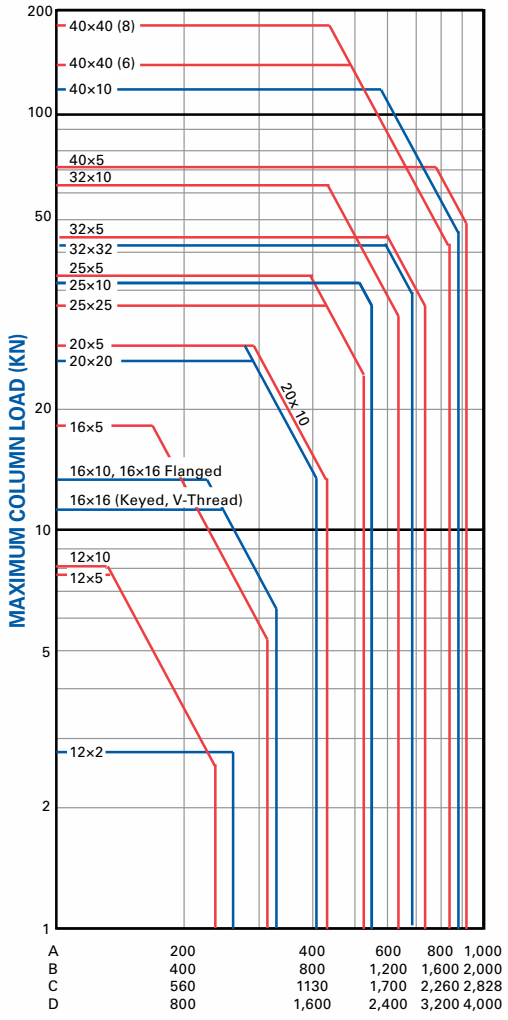
The charts show the theoretical limitations of each screw on a separate line. The lines are limited horizontally by the slenderness ratio (the length divided by radius of gyration) and vertically by the maximum static capacity of the nut. Actual load is limited by the maximum nut capacity or end mounting.

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/Thomson 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

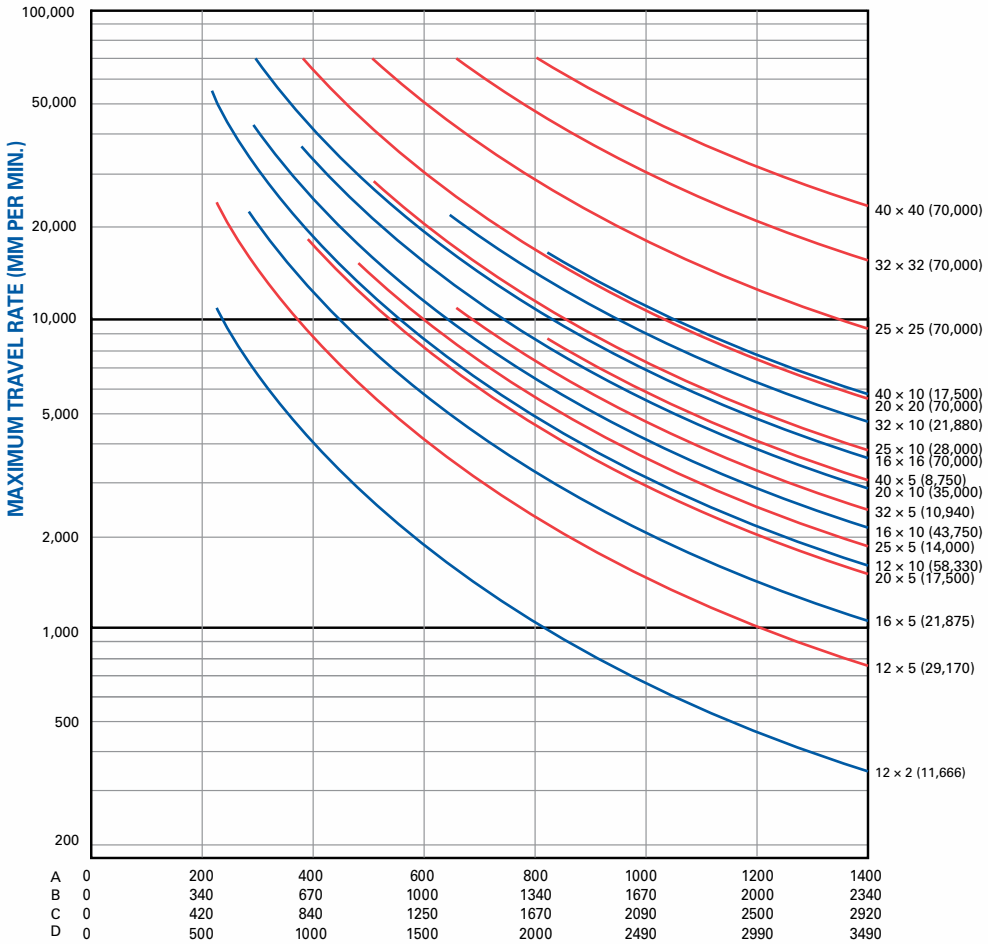
The final consideration should be to recheck the selected screw against all three of the design criteria: life, column strength and critical speed.

## 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.

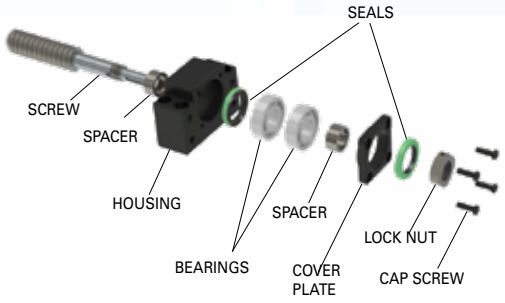



For critical speed values on Nook/Thomson miniature ball screws, contact Nook/Thomson Engineering.

# END BEARING IDENTIFICATION

## COMPACT UNIVERSAL BEARING MOUNTS

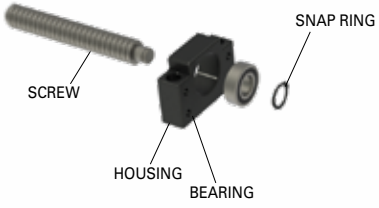
### EZBK/EZEK DOUBLE BEARING




| 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.

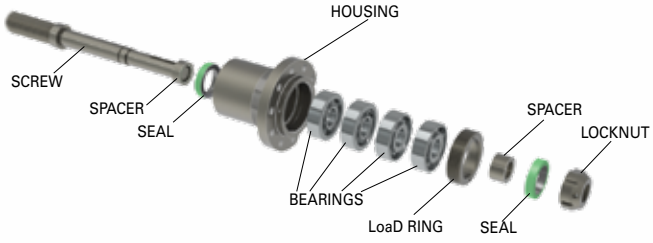
### EZBF/EZEF SINGLE BEARING




| 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)

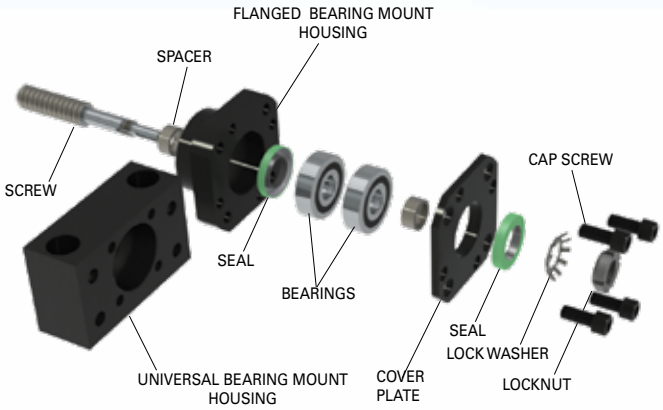



| EZRF PART# | BEARING | LOCKNUT NO. | LOCKNUTS MAX AXIAL LOAD (kN) |
|---|---|---|---|
| EZRF-3012 | 7301 | SFZ 12×1 | 40 |
| EZRF-3015 | 7302 | SFZ 15×1 | 60 |
| EZRF-3017 | 7303 | SFZ 17×1 | 80 |
| EZRF-3020 | 7304 | SFZ 20×1 | 90 |
| EZRF-3025 | 7305 | SFZ 25×1.5 | 130 |
| EZRF-3035 | 7307 | SFZ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

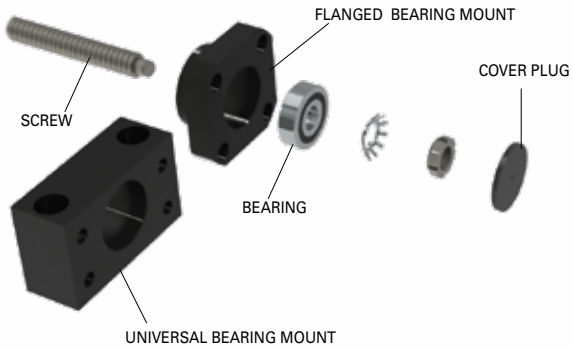
### EZM/EZF DOUBLE BEARING




| 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/Thomson Engineering to determine the mount-to-mount length tolerance of the final assembly.

# 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 x 2 | 10 | 6 | - | 10 | 8 | EZM-3010 | EZM-4010 | EZF-3010 | EZF-4010 | EZBK10-SLB | EZBF10-SB | - |
| 12 x 5 | 8 | 4 | - | 8 | 6 | EZM-1008 | EZM-4008 | EZF-1008 | EZF-4008 | EZEK08-SLB | EZEF08-EB | - |
| 12 x 10 | 8 | 4 | - | 8 | 6 | EZM-1008 | EZM-4008 | EZF-1008 | EZF-4008 | EZEK08-SLB | EZEF08-EB | - |
| 16 x 5 | 12 | 6 | 12 | 12 | 10 | EZM-3012 | EZM-4012 | EZF-3012 | EZF-4012 | EZBK12-SLB | EZBF12-SB | EZRF-3012 |
| 16 x 10 | 12 | 8 | 12 | 12 | 10 | EZM-3012 | EZM-4012 | EZF-3012 | EZF-4012 | EZBK12-SLB | EZBF12-SB | EZRF-3012 |
| 16 x 16 | 12 | 6 | 12 | 12 | 10 | EZM-3012 | EZM-4012 | EZF-3012 | EZF-4012 | EZBK12-SLB | EZBF12-SB | EZRF-3012 |
| 20 x 5 | 15 | 10 | 15 | 15 | 15 | EZM-3015 | EZM-4015 | EZF-3015 | EZF-4015 | EZBK15-SLB | EZBF15-SB | EZRF-3015 |
| 20 x 10 | 15 | 10 | 15 | 15 | 15 | EZM-3015 | EZM-4015 | EZF-3015 | EZF-4015 | EZBK15-SLB | EZBF15-SB | EZRF-3015 |
| 20 x 20 | 15 | 10 | 15 | 15 | 15 | EZM-3015 | EZM-4015 | EZF-3015 | EZF-4015 | EZBK15-SLB | EZBF15-SB | EZRF-3015 |
| 25 x 5 | 20 | 12 | 20 | 20 | 20 | EZM-2020 | EZM-4020 | EZF-2020 | EZF-4020 | EZBK20-SLB | EZBF20-SB | EZRF-3020 |
| 25 x 10 | 20 | 12 | 20 | 20 | 20 | EZM-2020 | EZM-4020 | EZF-2020 | EZF-4020 | EZBK20-SLB | EZBF20-SB | EZRF-3020 |
| 25 x 25 | 20 | 12 | 20 | 20 | 20 | EZM-2020 | EZM-4020 | EZF-2020 | EZF-4020 | EZBK20-SLB | EZBF20-SB | EZRF-3020 |
| 32 x 5 | 25 | 16 | 25 | 25 | 25 | EZM-3025 | EZM-4025 | EZF-3025 | EZF-4025 | EZBK25-SLB | EZBF25-SB | EZRF-3025 |
| 32 x 10 | 25 | 12 | 25 | 25 | 25 | EZM-3025 | EZM-4025 | EZF-3025 | EZF-4025 | EZBK25-SLB | EZBF25-SB | EZRF-3025 |
| 32 x 32 | 25 | 16 | 25 | 25 | 25 | EZM-3025 | EZM-4025 | EZF-3025 | EZF-4025 | EZBK25-SLB | EZBF25-SB | EZRF-3025 |
| 40 x 5 | 30 | 19 | 25 | 30 | 30 | EZM-2030 | EZM-4030 | EZF-2030 | EZF-4030 | EZBK30-SLB | EZBF30-SB | EZRF-3025 |
| 40 x 10 | 30 | 19 | 25 | 30 | 30 | EZM-2030 | EZM-4030 | EZF-2030 | EZF-4030 | EZBK30-SLB | EZBF30-SB | EZRF-3025 |
| 40 x 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 x 1.25 | 5 | 2 | - | - | - | - | - | - | - | - | - |
| 6 x 2 | 3 | 2 | - | - | - | - | - | - | - | - | - |
| 8 x 2.5 | 6 | 4 | - | 6 | 6 | - | - | - | - | EZEK06-SLB/EGB | EZEF06-EB |
| 8 x 6 | 6 | 4 | - | 6 | 6 | - | - | - | - | EZEK06-SLB/EGB | EZEF06-EB |
| 10 x 2 | 8 | 4 | - | 8 | 6 | EZM-1008 | EZM-4008 | EZF-1008 | EZF-4008 | EZEK08-EGB | EZEF08-EB |
| 12 x 2.5 | 10 | 6 | - | 10 | 8 | EZM-3010 | EZM-4010 | EZF-3010 | EZF-4010 | EZBK10-SLB | EZBF10-SB |
| 14 x 3 | 10 | 6 | - | 10 | 8 | EZM-3010 | EZM-4010 | EZF-3010 | EZF-4010 | EZBK10-SLB | EZBF10-SB |
| 14 x 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."

# METRIC BEARING SUPPORTS

## 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EZEK06-EGB / SLB | 42 | 25 | 12.0 | 30 | 20 | 38 | - | - | 20 | 10 | 10.0 | 4 | - | 13 | - |
| EZEK08-EGB / SLB | 52 | 32 | 16.0 | 38 | 27 | 42 | - | - | 23 | 11.5 | 10.0 | 6 | - | 17 | - |
| EZBK10-SLB | 60 | 39 | 32.5 | 46 | 34 | 53.5 | 15 | 7 | 25 | 6 | 17.5 | 8 | 5.5 | 22 | 13 |
| EZBK12-SLB | 60 | 42 | 32.5 | 46 | 34 | 54.5 | 18 | 7 | 25 | 6 | 18.5 | 10 | 5.5 | 25 | 13 |
| EZBK15-SLB | 70 | 47 | 38.0 | 54 | 38 | 60.5 | 18 | 10 | 27 | 6 | 20.5 | 12 | 5.5 | 28 | 15 |
| EZBK17-SLB | 86 | 63 | 55.0 | 68 | 48 | 86.5 | 28 | 11 | 35 | 8 | 33.5 | 15 | 6.6 | 39 | 19 |
| EZBK20-SLB | 88 | 59 | 50.0 | 70 | 50 | 86.5 | 22 | 12 | 35 | 8 | 33.5 | 16 | 6.6 | 34 | 19 |
| EZBK25-SLB | 106 | 79 | 70.0 | 85 | 62 | 104.5 | 33 | 15 | 42 | 10 | 39.5 | 20 | 9.0 | 48 | 22 |
| EZBK30-SLB | 128 | 88 | 78.0 | 102 | 74 | 126.0 | 33 | 18 | 45 | 11 | 54.0 | 25 | 11.0 | 51 | 23 |

## 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.")

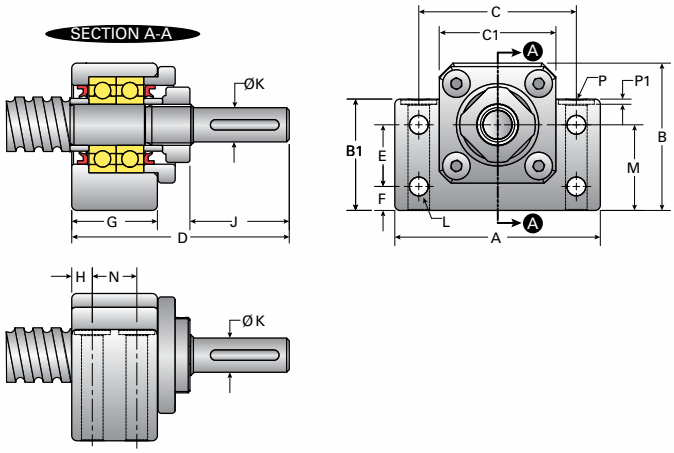
| SINGLE PART NO. | A (mm) | B (mm) | B1 (mm) | C (mm) | C1 (mm) | E (mm) | F (mm) | G (mm) | H (mm) | L THRU (mm) | M (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EZEF06-EB | 42 | 25 | 12 | 30 | 20 | - | - | 12 | 6 | - | 13 |
| EZEF08-EB | 52 | 32 | 16 | 38 | 27 | - | - | 14 | 7 | - | 17 |
| EZBF10-SB | 60 | 39 | 32.5 | 46 | 34 | 15 | 7 | 20 | 10 | 5.5 | 22 |
| EZBF12-SB | 60 | 43 | 32.5 | 46 | 34 | 18 | 7 | 20 | 10 | 5.5 | 25 |
| EZBF15-SB | 70 | 48 | 38.0 | 54 | 40 | 18 | 10 | 20 | 10 | 5.5 | 28 |
| EZBF17-SB | 86 | 64 | 55.0 | 68 | 50 | 28 | 11 | 23 | 11.5 | 6.6 | 39 |
| EZBF20-SB | 88 | 60 | 50.0 | 70 | 52 | 22 | 12 | 26 | 13 | 6.6 | 34 |
| EZBF25-SB | 106 | 80 | 70.0 | 85 | 64 | 33 | 15 | 30 | 15 | 9.0 | 48 |
| EZBF30-SB | 128 | 89 | 78.0 | 102 | 76 | 33 | 18 | 32 | 16 | 11.0 | 51 |

## FLANGED FIXED

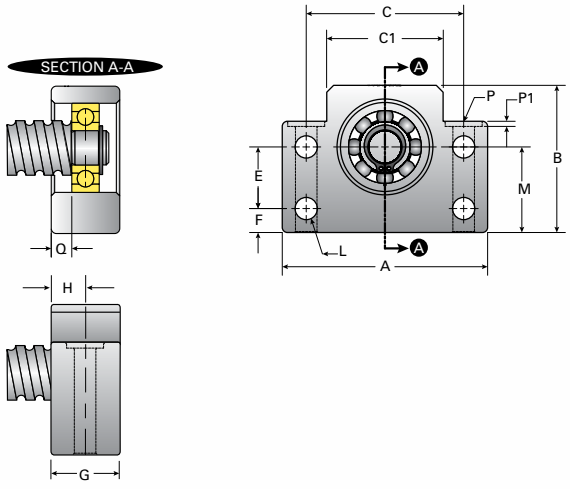
Quadruple Angular Contact Bearing, which should be used with Type 5 Standard Ends

| PART NO. | L1 (mm) | L2 (mm) | L3 (mm) | L4 (mm) | L5 (mm) | D1 (mm) | D2 G6 (mm) | D3 (mm) |
|---|---|---|---|---|---|---|---|---|
| EZRF-3012 | 67 | 10 | 51.0 | 14 | 15 | 72 | 48 | 60 |
| EZRF-3015 | 72 | 10 | 55.5 | 15 | 17 | 82 | 54 | 68 |
| EZRF-3017 | 78 | 12 | 59.0 | 16 | 19 | 92 | 64 | 78 |
| EZRF-3020 | 82 | 12 | 62.0 | 17 | 19 | 100 | 64 | 82 |
| EZRF-3025 | 93 | 15 | 69.5 | 19 | 21 | 116 | 80 | 98 |

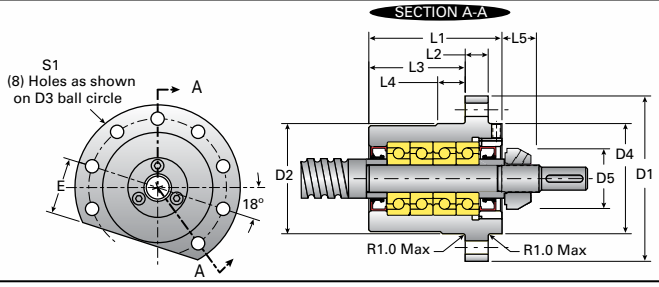
| Bolt Size (mm) | P Thru (mm) | P C'Bore (mm) | P1 (mm) | END CODE |
|---|---|---|---|---|
| 5 | 5.2 | - | - | 06 |
| 6 | 6.3 | - | - | 08 |
| 6 | 6.3 | 10.5 | 6.5 | 10 |
| 6 | 6.3 | 10.5 | 1.5 | 12 |
| 6 | 6.3 | 10.5 | 6.5 | 15 |
| 8 | 8.7 | 14.0 | 8.6 | 17 |
| 8 | 8.7 | 14.0 | 8.5 | 20 |
| 10 | 10.7 | 17.5 | 10.8 | 25 |
| 12 | 13.7 | 20.0 | 13.0 | 30 |




| Bolt Size (mm) | P Thru (mm) | P C'Bore (mm) | P1 (mm) | Q (mm) | END CODE |
|---|---|---|---|---|---|
| 5 | 5.2 | - | - | 6.0 | 06 |
| 6 | 6.3 | - | - | 8.0 | 06 |
| 6 | 6.3 | 10.8 | 5.0 | 6.5 | 08 |
| 6 | 6.3 | 10.8 | 1.5 | 6.0 | 10 |
| 6 | 6.3 | 11.0 | 6.5 | 5.5 | 15 |
| 8 | 8.7 | 14.0 | 8.6 | 5.5 | 17 |
| 8 | 8.7 | 14.0 | 8.6 | 7.0 | 20 |
| 10 | 10.7 | 17.5 | 11.0 | 7.5 | 25 |
| 12 | 13.7 | 20.0 | 13.0 | 8.0 | 30 |




| D4 (mm) | D5 (mm) | E (mm) | S (mm) |
|---|---|---|---|
| 48 | 30 | 25 | 5.8 |
| 54 | 33 | 28 | 6.8 |
| 64 | 37 | 33 | 6.8 |
| 64 | 40 | 33 | 8.8 |
| 80 | 44 | 41 | 8.8 |

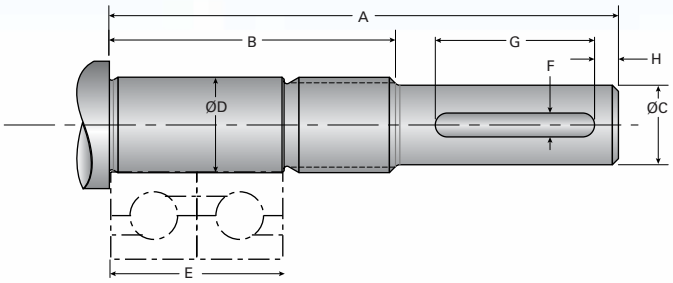



**NOTE:** When selecting the bearing support for an application with high axial loads, the capacities of the bearings and locknuts must be considered. See pages 48-49

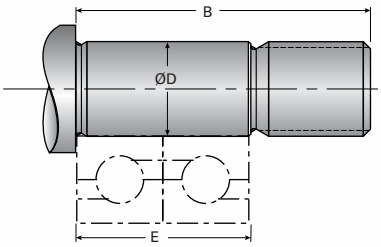
# METRIC MACHINED ENDS

## TYPE 6

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



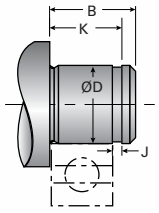

**Type 6N**




| 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

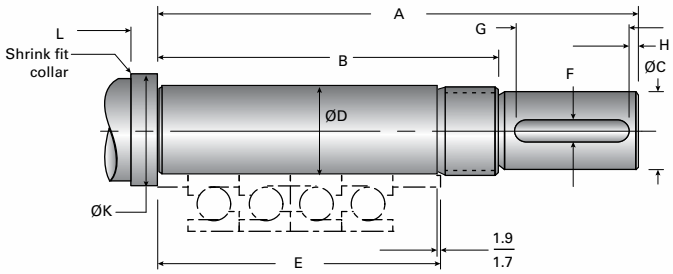
**Type 7N**



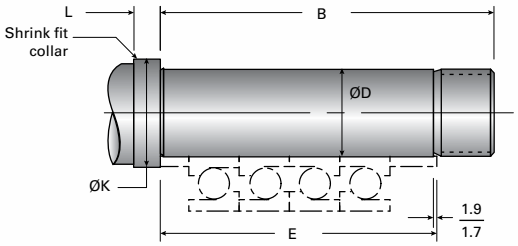

| Machine End Code | TYPE 7 (N) Typical Journal for Single Bearing Block (mm) B | D | J | K |
|---|---|---|---|---|
| 6 | 9.0 | 6.005/5.996 | 0.87 | 6.95 |
| 8 | 10.0 | 8.005/7.996 | 0.97 | 7.95 |
| 10 | 11.0 | 10.005/9.996 | 1.22 | 9.20 |
| 15 | 13.0 | 15.006/14.995 | 1.22 | 10.20 |
| 17 | 16.0 | 17.006/16.995 | 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)

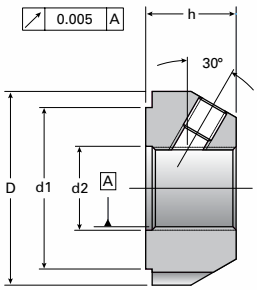


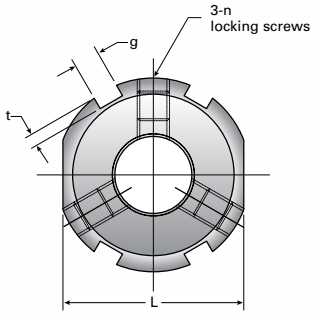

**Type 5N**




| 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/Thomson 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 |

# INCH UNIVERSAL MOUNT
## SINGLE AND DOUBLE BEARING SUPPORT

### UNIVERSAL-MOUNT DOUBLE

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

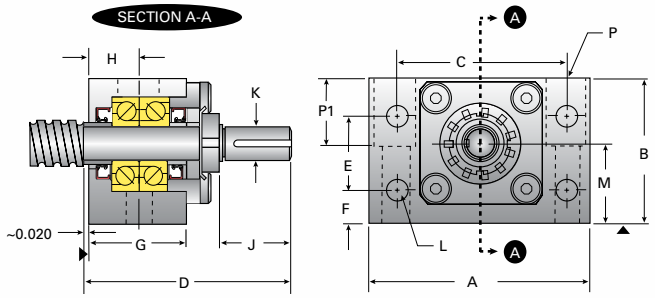
| DOUBLE PART NO. | A (in) | B (in) | C (in) | D (in) | E (in) | F (in) | G (in) | H (in) | J (in) | K SHAFT DIA. (in) | L THRU (in) | M (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EZM-1007 | 2.00 | 1.38 | 1.50 | 1.94 | .88 | .25 | 1.06 | .50 | .46 | .187 .186 | .22 | .687 |
| EZM-1008 | 2.00 | 1.38 | 1.50 | 2.00 | .88 | .25 | 1.06 | .50 | .56 | .250 .249 | .22 | .687 |
| EZM-1009 | 2.75 | 2.00 | 2.00 | 2.38 | 1.38 | .31 | 1.19 | .56 | .56 | .250 .249 | .28 | 1.000 |
| EZM-3010 | 2.75 | 2.00 | 2.00 | 2.50 | 1.38 | .31 | 1.19 | .56 | .69 | .312 .311 | .28 | 1.000 |
| EZM-3012 | 3.50 | 2.22 | 2.75 | 3.29 | 1.25 | .50 | 1.38 | .69 | 1.30 | .406 .405 | .28 | 1.187 |
| EZM-3015 | 3.50 | 2.52 | 2.75 | 3.50 | 1.25 | .80 | 1.38 | .69 | 1.30 | .500 .499 | .28 | 1.438 |
| EZM-3017 | 4.50 | 2.69 | 3.38 | 3.65 | 1.38 | .62 | 1.69 | .84 | 1.30 | .500 .499 | .41 | 1.500 |
| EZM-2020 | 5.00 | 3.03 | 3.75 | 4.03 | 1.50 | .75 | 1.72 | .86 | 1.30 | .625 .624 | .47 | 1.625 |
| EZM-3025 | 6.50 | 3.69 | 4.75 | 4.45 | 2.00 | .88 | 1.94 | .97 | 1.61 | .750 .749 | .66 | 1.875 |
| EZM-2030 | 6.50 | 3.69 | 4.75 | 4.86 | 2.00 | .88 | 1.94 | .97 | 1.81 | 1.000 .999 | 66 | 1.875 |

### UNIVERSAL-MOUNT SINGLE

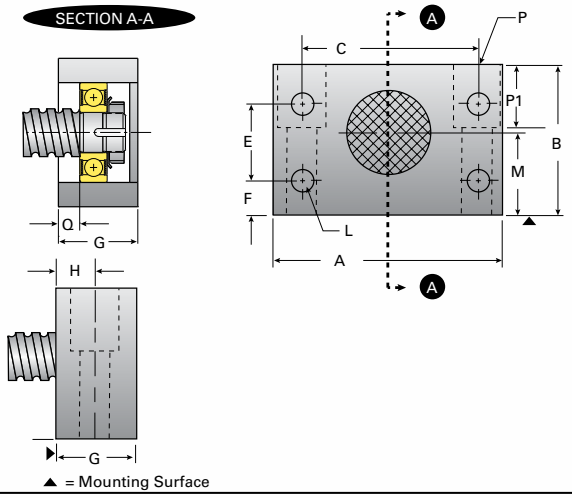
Single Radial Bearing, which should be used with Type 1 Standard Ends

| SINGLE PART NO. | A (in) | B (in) | C (in) | E (in) | F (in) | G (in) | H (in) | L THRU (in) | M (in) |
|---|---|---|---|---|---|---|---|---|---|
| EZM-4007 | 2.00 | 1.38 | 1.50 | .88 | .25 | 1.06 | .50 | .22 | .687 |
| EZM-4008 | 2.00 | 1.38 | 1.50 | .88 | .25 | 1.06 | .50 | .22 | .687 |
| EZM-4009 | 2.75 | 2.00 | 2.00 | 1.38 | .31 | 1.19 | .56 | .28 | 1.000 |
| EZM-4010 | 2.75 | 2.00 | 2.00 | 1.38 | .31 | 1.19 | .56 | .28 | 1.000 |
| EZM-4012 | 3.50 | 2.22 | 2.75 | 1.25 | .50 | 1.38 | .69 | .28 | 1.187 |
| EZM-4015 | 3.50 | 2.52 | 2.75 | 1.25 | .80 | 1.38 | .69 | .28 | 1.438 |
| EZM-4017 | 4.50 | 2.69 | 3.38 | 1.38 | .62 | 1.69 | .84 | .41 | 1.500 |
| EZM-4020 | 5.00 | 3.03 | 3.75 | 1.50 | .75 | 1.72 | .86 | .47 | 1.625 |
| EZM-4025 | 6.50 | 3.69 | 4.75 | 2.00 | .88 | 1.94 | .97 | .66 | 1.875 |
| EZM-4030 | 6.50 | 3.69 | 4.75 | 2.00 | .88 | 1.94 | .97 | .66 | 1.875 |

| Bolt Size (in) | P Thru (in) | P C'Bore (in) | P1 (in) | END CODE |
|---|---|---|---|---|
| ¼ x 1⅜ | .28 | .41 | .41 | 7 |
| ¼ x 1⅜ | .28 | .41 | .41 | 8 |
| 5⁄16 x 2 | .34 | .50 | .56 | 9 |
| 5⁄16 x 2 | .34 | .50 | .56 | 10 |
| ⅜ x 1¾ | .41 | .62 | 1.00 | 12 |
| ⅜ x 2⅛ | .41 | .62 | 1.00 | 15 |
| ½ x 2¼ | .53 | .88 | 1.25 | 17 |
| ⅝ x 2½ | .66 | 1.00 | 1.50 | 20 |
| ⅞ x 3¼ | .91 | 1.38 | 1.75 | 25 |
| ⅞ x 3¼ | .91 | 1.38 | 1.75 | 30 |




| Bolt Size (in) | P Thru (in) | P C'Bore (in) | P1 (in) | Q (in) | END CODE |
|---|---|---|---|---|---|
| ¼ x 1⅜ | .28 | .41 | .41 | .19 | 7 |
| ¼ x 1⅜ | .28 | .41 | .41 | .19 | 8 |
| 5⁄16 x 2 | .34 | .50 | .56 | .38 | 9 |
| 5⁄16 x 2 | .34 | .50 | .56 | .38 | 10 |
| ⅜ x 1¾ | .41 | .62 | 1.00 | .33 | 12 |
| ⅜ x 2⅛ | .41 | .62 | 1.00 | .33 | 15 |
| ½ x 2¼ | .53 | .88 | 1.25 | .38 | 17 |
| ⅝ x 2½ | .66 | 1.00 | 1.50 | .5 | 20 |
| ⅞ x 3¼ | .91 | 1.38 | 1.75 | .52 | 25 |
| ⅞ x 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

# INCH FLANGE MOUNT
## SINGLE AND DOUBLE BEARING SUPPORT

### FLANGE-MOUNT DOUBLE

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

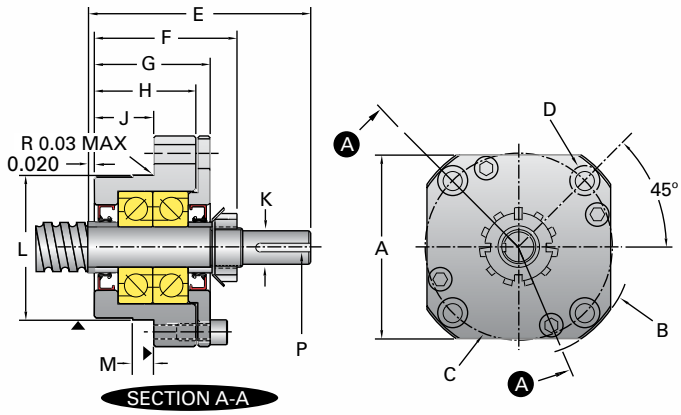
| DOUBLE PART NO. | A (in) | B (in) | C (in) | D THRU (in) | C'BORE (in) | E (in) | F (in) | G (in) | H (in) | J (in) | K SHAFT DIA. (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EZF-1007 | 1.88 | 2.44 | 1.875 | 0.266 | 0.44 | 1.94 | 1.44 | 1.06 | 0.82 | 0.50 | 0.187-0.186 |
| EZF-1008 | 1.88 | 2.44 | 1.875 | 0.266 | 0.44 | 2.00 | 1.44 | 1.06 | 0.82 | 0.50 | 0.250-0.249 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |

### FLANGE-MOUNT SINGLE

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

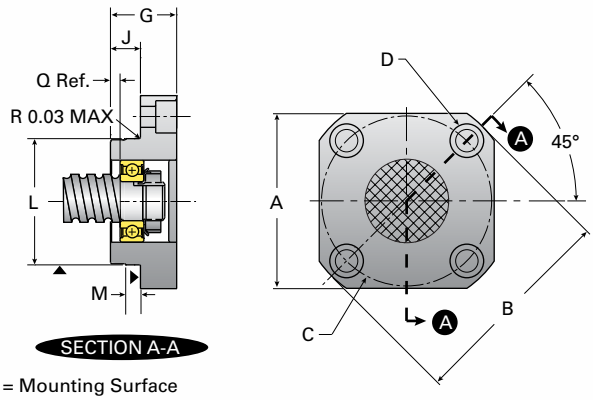
| SINGLE PART NO. | A (in) | B (in) | C (in) | D THRU (in) | C'BORE (in) | G (in) | J (in) |
|---|---|---|---|---|---|---|---|
| EZF-4007 | 1.88 | 2.44 | 1.875 | 0.266 | 0.44 | 1.00 | 0.40 |
| EZF-4008 | 1.88 | 2.44 | 1.875 | 0.266 | 0.44 | 1.00 | 0.40 |
| EZF-4009 | 2.00 | 2.60 | 2.000 | 0.266 | 0.44 | 1.00 | 0.44 |
| EZF-4010 | 2.00 | 2.60 | 2.000 | 0.266 | 0.44 | 1.00 | 0.44 |
| EZF-4012 | 2.50 | 3.17 | 2.500 | 0.266 | 0.44 | 1.15 | 0.55 |
| EZF-4015 | 2.70 | 3.27 | 2.750 | 0.281 | 0.44 | 1.25 | 0.63 |
| EZF-4017 | 3.38 | 4.03 | 3.250 | 0.344 | 0.53 | 1.32 | 0.63 |
| EZF-4020 | 3.38 | 4.03 | 3.250 | 0.344 | 0.53 | 1.47 | 0.72 |
| EZF-4025 | 4.38 | 5.31 | 4.250 | 0.531 | 0.81 | 1.67 | 0.76 |
| EZF-4030 | 4.38 | 5.31 | 4.250 | 0.531 | 0.81 | 1.67 | 0.76 |

| L THRU (in) | M (in) | P (in) | END CODE |
|---|---|---|---|
| 1.3775-1.3770 | 0.188 | 0.063 | 7 |
| 1.3775-1.3770 | 0.188 | 0.094 | 8 |
| 1.4957-1.4951 | 0.188 | 0.094 | 9 |
| 1.4957-1.4951 | 0.190 | 0.125 | 10 |
| 1.8894-1.8888 | 0.312 | 0.125 | 12 |
| 2.1256-2.1250 | 0.312 | 0.125 | 15 |
| 2.5193-2.5185 | 0.312 | 0.125 | 17 |
| 2.5193-2.5185 | 0.312 | 0.188 | 20 |
| 3.1492-3.1482 | 0.375 | 0.188 | 25 |
| 3.1492-3.1482 | 0.375 | 0.250 | 30 |




▲ = Mounting Surface

| L THRU (in) | M (in) | Q (in) | END CODE |
|---|---|---|---|
| 1.3775 1.3770 | 0.188 | 0.13 | 7 |
| 1.3775 1.3770 | 0.188 | 0.13 | 8 |
| 1.4957 1.4951 | 0.188 | 0.13 | 9 |
| 1.4957 1.4951 | 0.190 | 0.13 | 10 |
| 1.8894 1.8888 | 0.312 | 0.13 | 12 |
| 2.1256 2.1250 | 0.312 | 0.20 | 15 |
| 2.5193 2.5185 | 0.312 | 0.20 | 17 |
| 2.5193 2.5185 | 0.312 | 0.20 | 20 |
| 3.1492 3.1482 | 0.375 | 0.25 | 25 |
| 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.

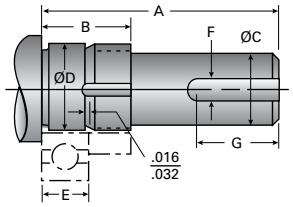
2D/3D CAD ONLINE

# INCH MACHINED ENDS

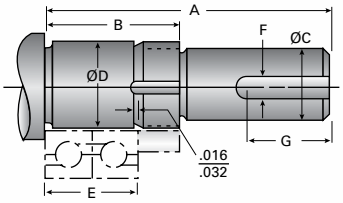
## TYPE 1, TYPE 2, & TYPE 3

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™

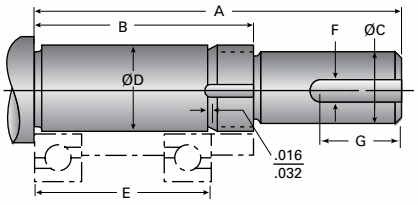
**Type 1K** (with keyway)
**Type 1L** (without keyway)



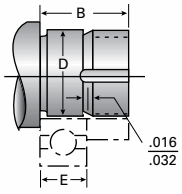

**Type 2K** (with keyway)
**Type 2L** (without keyway)



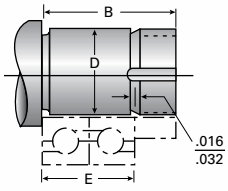

**Type 3K** (with keyway)
**Type 3L** (without keyway)



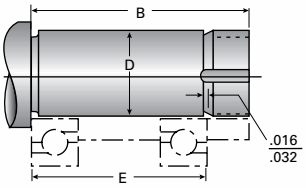

**Type 1N**




**Type 2N**




**Type 3N**




| MACHINE END CODE | TYPE 1 (K, L, N) Typical Journal for Single Bearing | | | TYPE 2 (K, L, N) Typical Journal for Duplexed Bearing | | | TYPE 3 (K, L, N) Typical Journal for Multiple Sets of Duplexed Bearing | | | COMMON DIMENSIONS FOR TYPE 1, 2, 3 (K, L, N) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A (in) | B (in) | E (in) | A (in) | B (in) | E (in) | A (in) | B (in) | E (in) | 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 |

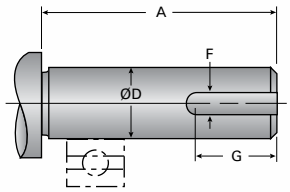
### END TYPES

- 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.

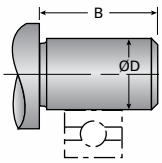
Where standard ends do not satisfy the application requirements, special ends may be machined to customer specifications. Please submit a print for a prompt and competitive quotation.

## TYPE 4

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




**Type 4N**




**TYPE 4 (K, L, N)**

Typical Journal for Pillow Block

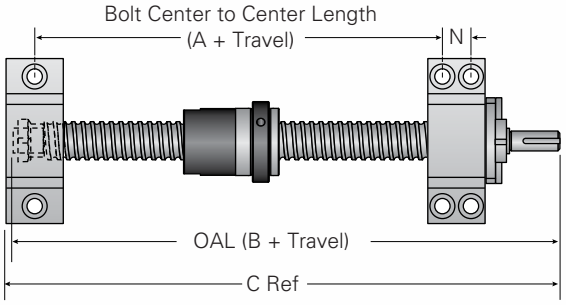
| MACHINE END CODE | A (in) | B (in) | D (in) | F (in) | G (in) |
|---|---|---|---|---|---|
| 2 | .75 | .25 | .1251 / .1248 | N/A | N/A |
| 4 | 1.38 | .50 | .2501 / .2498 | .063 | .63 |
| 6 | 1.50 | .75 | .3751 / .3748 | .125 | .75 |
| 8 | 2.63 | 1.00 | .5000 / .4995 | .125 | 1.50 |
| 10 | 2.63 | 1.25 | .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 |

# BALL SCREW ASSEMBLIES

## COMPACT UNIVERSAL BEARING MOUNTS

### EZBK (DOUBLE BEARING)

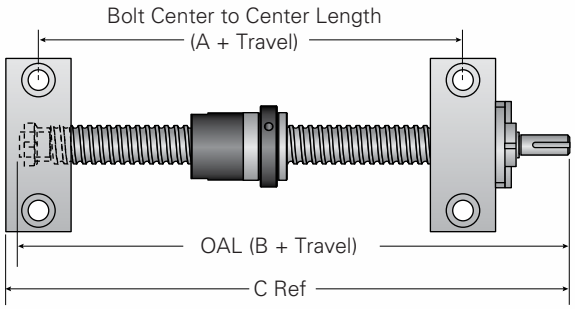
### EZBF (SINGLE BEARING)




**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) |
| 12×2 | 66.0 | 135.0 | 131 | 75.0 | 144.0 | 140 | 66.0 | 135.0 | 131 | 13 |
| 12×5 | 75.5 | 115.0 | 112 | 81.5 | 121.0 | 118 | 72.5 | 112.0 | 109 | 13 |
| 12×10 | 75.5 | 115.0 | 112 | 80.5 | 120.0 | 117 | 72.5 | 112.0 | 109 | 13 |
| 16×5 | 98.0 | 163.0 | 166 | 98.0 | 163.5 | 166 | 86.0 | 151.5 | 154 | 13 |
| 16×10 | 86.0 | 151.0 | 154 | 86.0 | 151.5 | 154 | 86.0 | 151.5 | 154 | 13 |
| 16×16 | 74.0 | 139.0 | 142 | 74.0 | 139.5 | 142 | 74.0 | 139.5 | 142 | 13 |
| 20×5 | 98.0 | 174.0 | 176 | 98.0 | 174.0 | 176 | 86.0 | 162.0 | 164 | 15 |
| 20×10 | 101.0 | 177.0 | 179 | 101.0 | 177.0 | 179 | 101.0 | 177.0 | 179 | 15 |
| 20×20 | 77.0 | 153.0 | 155 | 77.0 | 153.0 | 155 | 77.0 | 153.0 | 155 | 15 |
| 25×5 | 103.0 | 194.5 | 195 | 109.0 | 200.5 | 201 | 92.0 | 183.5 | 184 | 19 |
| 25×10 | 110.0 | 201.5 | 202 | 110.0 | 201.5 | 202 | 110.0 | 201.5 | 202 | 19 |
| 25×25 | 86.0 | 177.5 | 178 | 86.0 | 177.5 | 178 | 86.0 | 177.5 | 178 | 19 |
| 32×5 | 107.0 | 214.0 | 217 | 107.0 | 214.0 | 217 | 98.0 | 205.0 | 208 | 22 |
| 32×10 | 131.0 | 238.0 | 241 | 131.0 | 238.0 | 241 | 127.0 | 234.0 | 237 | 22 |
| 32×32 | 100.0 | 207.0 | 210 | 100.0 | 207.0 | 210 | 100.0 | 207.0 | 210 | 22 |
| 40×5 | 124.0 | 252.0 | 255 | 118.0 | 246.0 | 249 | 106.0 | 234.0 | 237 | 23 |
| 40×10 | 145.0 | 273.0 | 276 | 145.0 | 273.0 | 276 | 127.0 | 255.0 | 258 | 23 |
| 40×40 (6) | 134.0 | 262.0 | 265 | — | — | — | — | — | — | 23 |
| 40×40 (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)



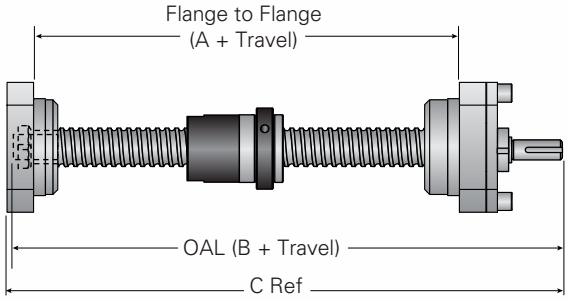

**NOTE:** Dimensions reflect a 12.5 mm over travel at each end. Add Travel to measurements below for total length.

| | 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 |

# BALL SCREW ASSEMBLIES (Continued)

## FLANGED BEARING MOUNTS - PILOT FACING IN

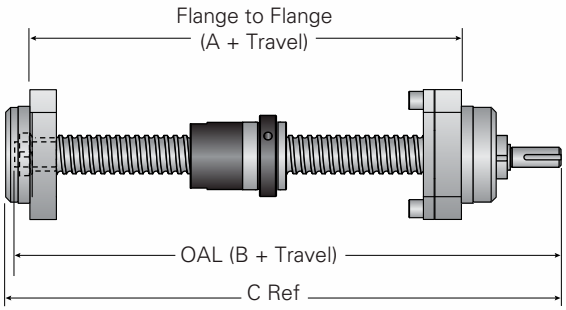
### EZF (DOUBLE BEARING AND SINGLE BEARING)




**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) |
| 12x2 | 82.2 | 137.3 | 142 | 91.2 | 146.3 | 151 | 82.2 | 137.3 | 142 |
| 12x5 | 80.9 | 129.4 | 134 | 86.9 | 135.4 | 140 | 77.9 | 126.4 | 131 |
| 12x10 | 80.9 | 129.4 | 134 | 85.9 | 134.4 | 139 | 77.9 | 126.4 | 131 |
| 16x5 | 115.0 | 189.4 | 195 | 115.0 | 189.4 | 195 | 103.0 | 177.4 | 183 |
| 16x10 | 103.0 | 177.4 | 183 | 103.0 | 177.4 | 183 | 103.0 | 177.4 | 183 |
| 16x16 | 91.0 | 165.4 | 171 | 91.0 | 165.4 | 171 | 91.0 | 165.4 | 171 |
| 20x5 | 120.4 | 197.3 | 203 | 120.4 | 197.3 | 203 | 108.4 | 185.3 | 191 |
| 20x10 | 123.4 | 200.3 | 206 | 123.4 | 200.3 | 206 | 123.4 | 200.3 | 206 |
| 20x20 | 99.4 | 176.3 | 182 | 99.4 | 176.3 | 182 | 99.4 | 176.3 | 182 |
| 25x5 | 126.5 | 216.4 | 222 | 132.5 | 222.4 | 228 | 115.5 | 205.4 | 211 |
| 25x10 | 133.5 | 223.4 | 229 | 133.5 | 223.4 | 229 | 133.5 | 223.4 | 229 |
| 25x25 | 109.5 | 199.4 | 205 | 109.5 | 199.4 | 205 | 109.5 | 199.4 | 205 |
| 32x5 | 131.6 | 229.8 | 237 | 131.6 | 229.8 | 237 | 122.6 | 220.8 | 228 |
| 32x10 | 155.6 | 253.8 | 261 | 155.6 | 253.8 | 261 | 151.6 | 249.8 | 257 |
| 32x32 | 124.6 | 222.8 | 230 | 124.6 | 222.8 | 230 | 124.6 | 222.8 | 230 |
| 40x5 | 146.6 | 256.3 | 263 | 140.6 | 250.3 | 257 | 128.6 | 238.3 | 245 |
| 40x10 | 167.6 | 277.3 | 284 | 167.6 | 277.3 | 284 | 149.6 | 259.3 | 266 |
| 40x40 (6) | 156.6 | 266.3 | 273 | — | — | — | — | — | — |
| 40x40 (8) | 176.6 | 286.3 | 293 | 176.6 | 286.3 | 293 | 176.6 | 286.3 | 293 |

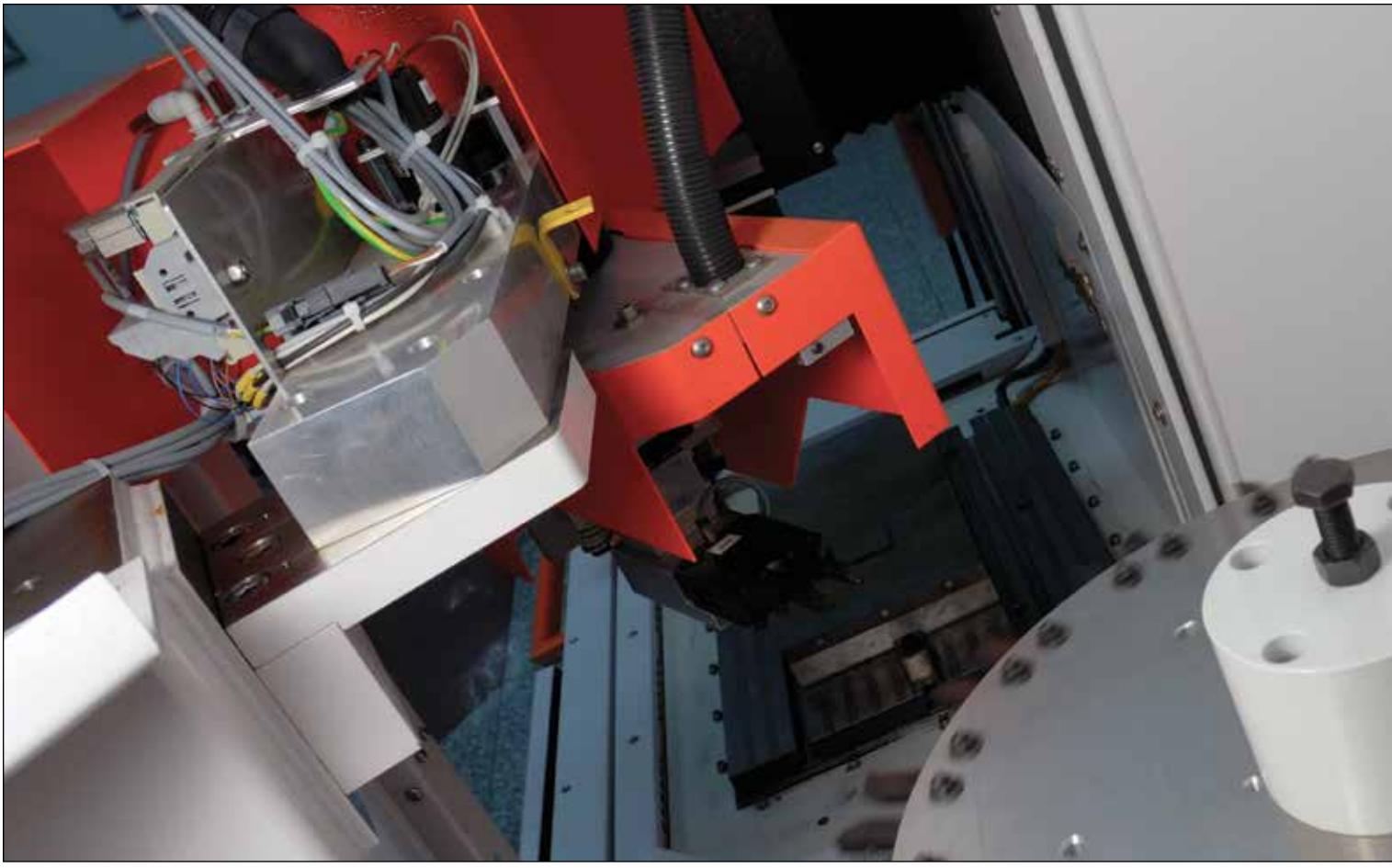
## FLANGED BEARING MOUNTS - PILOT FACING OUT
### EZF (DOUBLE BEARING AND SINGLE BEARING)




**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) |
| **12x2** | 83.0 | 137.3 | 142 | 92.0 | 146.3 | 151 | 83.0 | 137.3 | 142 |
| **12x5** | 87.5 | 129.4 | 134 | 93.5 | 135.4 | 140 | 84.5 | 126.4 | 131 |
| **12x10** | 87.5 | 129.4 | 134 | 92.5 | 134.4 | 139 | 84.5 | 126.4 | 131 |
| **16x5** | 118.1 | 189.4 | 195 | 118.1 | 189.4 | 195 | 106.1 | 177.4 | 183 |
| **16x10** | 106.1 | 177.4 | 183 | 106.1 | 177.4 | 183 | 106.1 | 177.4 | 183 |
| **16x16** | 94.1 | 165.4 | 171 | 94.1 | 165.4 | 171 | 94.1 | 165.4 | 171 |
| **20x5** | 118.9 | 197.3 | 203 | 118.9 | 197.3 | 203 | 106.9 | 185.3 | 191 |
| **20x10** | 121.9 | 200.3 | 206 | 121.9 | 200.3 | 206 | 121.9 | 200.3 | 206 |
| **20x20** | 97.9 | 176.3 | 182 | 97.9 | 176.3 | 182 | 97.9 | 176.3 | 182 |
| **25x5** | 125.2 | 216.4 | 222 | 131.2 | 222.4 | 228 | 114.2 | 205.4 | 211 |
| **25x10** | 132.2 | 223.4 | 229 | 132.2 | 223.4 | 229 | 132.2 | 223.4 | 229 |
| **25x25** | 108.2 | 199.4 | 205 | 108.2 | 199.4 | 205 | 108.2 | 199.4 | 205 |
| **32x5** | 134.9 | 229.8 | 237 | 134.9 | 229.8 | 237 | 125.9 | 220.8 | 228 |
| **32x10** | 158.9 | 253.8 | 261 | 158.9 | 253.8 | 261 | 154.9 | 249.8 | 257 |
| **32x32** | 127.9 | 222.8 | 230 | 127.9 | 222.8 | 230 | 127.9 | 222.8 | 230 |
| **40x5** | 149.9 | 256.3 | 263 | 143.9 | 250.3 | 257 | 131.9 | 238.3 | 245 |
| **40x10** | 170.9 | 277.3 | 284 | 170.9 | 277.3 | 284 | 152.9 | 259.3 | 266 |
| **40x40 (6)** | 159.9 | 266.3 | 273 | — | — | — | — | — | — |
| **40x40 (8)** | 179.9 | 286.3 | 293 | 179.9 | 286.3 | 293 | 179.9 | 286.3 | 293 |

# EZZE-MOUNT™
# MOTOR MOUNTS



# MOTOR MOUNTS



**NOOK/THOMSON MOTOR EZZE-MOUNTS™** are ruggedly designed specifically to connect to virtually any servo motor, stepper motor, or planetary gearbox with Nook/Thomson Ball Screws. Standard NEMA and ISO frames are available, however specific mounting dimensions are required. Nook/Thomson' 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/Thomson 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

# MOTOR MOUNTS

## NOOK/THOMSON 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

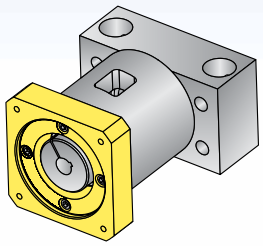
EZM-2020-34

EXAMPLES OF EZM DESIGNATIONS:

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

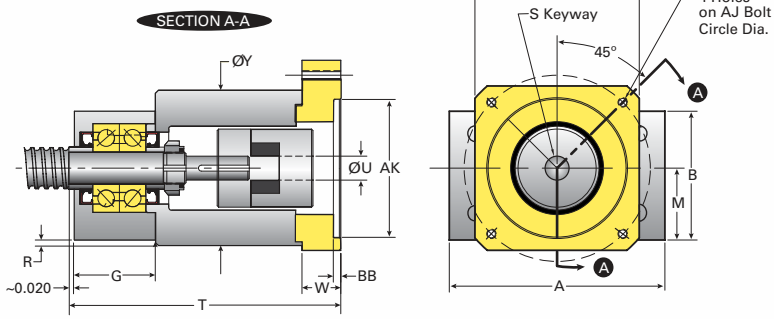
UX = modified, further explanation needed (i.e.: Special Frame)

| PART NO. | REF. CODE | AA (in) | PILOT DEPTH BB (in) | T (in) | SHAFT DIAMETER U (in) | S (in) | Y (in) | W (in) |
|---|---|---|---|---|---|---|---|---|
| EZM-1008-17 | U1 | 1.75 | 0.25 | 3.35 | 0.25 | 0.094 | 1.75 | 0.52 |
| EZM-1009-23 | U2 | 2.50 | 0.19 | 4.10 | 0.38 | 0.125 | 2.50 | 0.38 |
| EZM-3010-23 | U2 | 2.50 | 0.19 | 4.10 | 0.38 | 0.125 | 2.50 | 0.38 |
| EZM-3012-23 | U2 | 2.50 | 0.19 | 4.48 | 0.38 | 0.125 | 2.50 | 0.38 |
| EZM-3012-34 | U3 | 3.25 | 0.16 | 4.92 | 0.50 | 0.125 | 2.50 | 0.81 |
| EZM-3015-23 | U2 | 2.50 | 0.19 | 4.69 | 0.38 | 0.125 | 2.50 | 0.38 |
| EZM-3015-34 | U3 | 3.25 | 0.16 | 5.13 | 0.50 | 0.125 | 2.50 | 0.81 |
| EZM-3017-34 | U3 | 3.25 | 0.16 | 5.56 | 0.50 | 0.125 | 3.12 | 0.81 |
| EZM-3017-42 | U4 | 4.50 | 0.19 | 6.31 | 0.63 | 0.188 | 3.12 | 1.56 |
| EZM-2020-34 | U3 | 3.44 | 0.16 | 5.96 | 0.50 | 0.125 | 3.44 | 0.81 |
| EZM-2020-42 | U4 | 4.50 | 0.19 | 6.71 | 0.63 | 0.188 | 3.44 | 1.56 |
| EZM-3025-34 | U3 | 4.00 | 0.16 | 6.44 | 0.50 | 0.125 | 4.38 | 0.81 |
| EZM-3025-42 | U4 | 4.50 | 0.19 | 7.17 | 0.63 | 0.188 | 4.38 | 1.56 |
| EZM-2030-34 | U3 | 4.00 | 0.16 | 6.97 | 0.50 | 0.125 | 4.38 | 0.81 |
| EZM-2030-42 | U4 | 4.50 | 0.19 | 7.72 | 0.63 | 0.188 | 4.38 | 1.56 |
| EZM-2030-56 | U5 | Ø6.63 | 0.19 | 7.78 | 0.63 | 0.188 | 4.38 | 1.62 |



Two-piece construction for rapid mounting flange development.

| PILOT DIAMETER AK (in) | BOLT CIRCLE DIAMETER AJ (in) | TAP (in) | R (in) |
|---|---|---|---|
| .868/.871 | 1.725 | #8-32 | 0.19 |
| 1.503/1.506 | 2.625 | #10-32 | 0.26 |
| 1.503/1.506 | 2.625 | #10-32 | 0.26 |
| 1.503/1.506 | 2.625 | #10-32 | 0.10 |
| 2.878/2.882 | 3.875 | #10-32 | 0.10 |
| 1.503/1.506 | 2.625 | #10-32 | – |
| 2.878/2.882 | 3.875 | #10-32 | 0.19 |
| 2.878/2.882 | 3.875 | #10-32 | 0.13 |
| 2.504/2.508 | 5.000 | ¼"-20 | 0.13 |
| 2.878/2.882 | 3.875 | #10-32 | 0.10 |
| 2.504/2.508 | 5.000 | ¼"-20 | 0.10 |
| 2.878/2.882 | 3.875 | #10-32 | 0.31 |
| 2.504/2.508 | 5.000 | ¼"-20 | 0.31 |
| 2.878/2.882 | 3.875 | #10-32 | 0.31 |
| 2.504/2.508 | 5.000 | ¼"-20 | 0.31 |
| 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.

# MOTOR MOUNTS

## NOOK/THOMSON 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

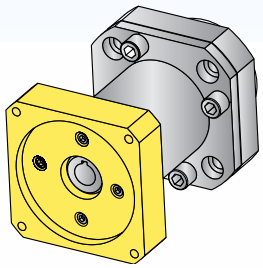
EZF-3017-34

EXAMPLES OF EZF DESIGNATIONS:

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

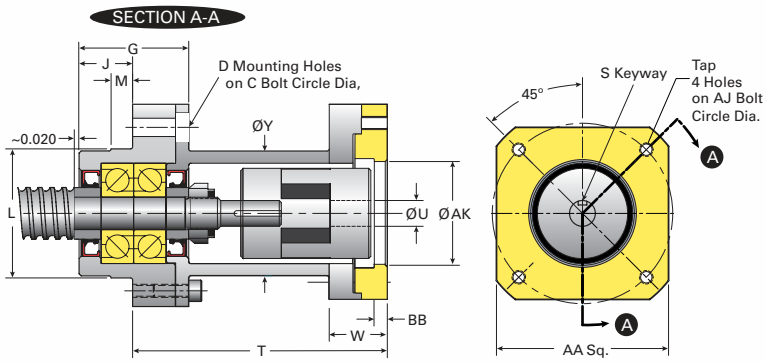
YX = modified, further description needed (i.e.: Special Frame)

| PART NO. | REF. CODE | AA (in) | PILOT DEPTH BB (in) | T (in) | SHAFT DIAMETER U (in) | S (in) | Y (in) | W (in) |
|---|---|---|---|---|---|---|---|---|
| EZF-1008-17 | Y1 | 1.75 | 0.25 | 2.84 | 0.25 | 0.094 | 2.2 | 0.52 |
| EZF-1009-23 | Y2 | 2.50 | 0.19 | 3.41 | 0.38 | 0.125 | 2.1 | 0.88 |
| EZF-3010-23 | Y2 | 2.50 | 0.19 | 3.41 | 0.38 | 0.125 | 2.1 | 0.88 |
| EZF-3012-23 | Y2 | 2.50 | 0.19 | 3.70 | 0.38 | 0.125 | 1.81 | 0.88 |
| EZF-3012-34 | Y3 | 3.25 | 0.16 | 4.14 | 0.50 | 0.125 | 1.81 | 1.31 |
| EZF-3015-23 | Y2 | 2.50 | 0.19 | 3.84 | 0.38 | 0.125 | 1.98 | 0.88 |
| EZF-3015-34 | Y3 | 3.25 | 0.16 | 4.61 | 0.50 | 0.125 | 1.98 | 1.31 |
| EZF-3017-34 | Y3 | 3.25 | 0.16 | 4.62 | 0.50 | 0.125 | 2.25 | 1.67 |
| EZF-3017-42 | Y4 | 4.50 | 0.19 | 5.37 | 0.63 | 0.188 | 2.25 | 2.41 |
| EZF-2020-34 | Y3 | 3.44 | 0.16 | 4.92 | 0.50 | 0.125 | 2.37 | 1.67 |
| EZF-2020-42 | Y4 | 4.50 | 0.19 | 5.67 | 0.63 | 0.188 | 2.37 | 2.41 |
| EZF-3025-34 | Y3 | 4.00 | 0.16 | 5.24 | 0.50 | 0.125 | 3.00 | 1.67 |
| EZF-3025-42 | Y4 | 4.50 | 0.19 | 5.98 | 0.63 | 0.188 | 3.00 | 2.41 |
| EZF-2030-34 | Y3 | 4.00 | 0.16 | 5.78 | 0.50 | 0.125 | 3.00 | 1.67 |
| EZF-2030-42 | Y4 | 4.50 | 0.19 | 6.53 | 0.63 | 0.188 | 3.00 | 2.41 |
| EZF-2030-56 | Y5 | Ø 6.63 | 0.19 | 6.60 | 0.63 | 0.188 | 3.00 | 2.42 |



Two-piece construction for rapid mount ing flange development.

| PILOT DIAMETER AK (in) | BOLT CIRCLE DIAMETER AJ (in) | TAP (in) |
|---|---|---|
| .868/.871 | 1.725 | #8-32 |
| 1.503/1.506 | 2.625 | #10-32 |
| 1.503/1.506 | 2.625 | #10-32 |
| 1.503/1.506 | 2.625 | #10-32 |
| 2.878/2.882 | 3.875 | #10-32 |
| 1.503/1.506 | 2.625 | #10-32 |
| 2.878/2.882 | 3.875 | #10-32 |
| 2.878/2.882 | 3.875 | #10-32 |
| 2.504/2.508 | 5.000 | ¼"-20 |
| 2.878/2.882 | 3.875 | #10-32 |
| 2.504/2.508 | 5.000 | ¼"-20 |
| 2.878/2.882 | 3.875 | #10-32 |
| 2.504/2.508 | 5.000 | ¼"-20 |
| 2.878/2.882 | 3.875 | #10-32 |
| 2.504/2.508 | 5.000 | ¼"-20 |
| 4.502/4.506 | 5.875 | Ø 0.41 thru |

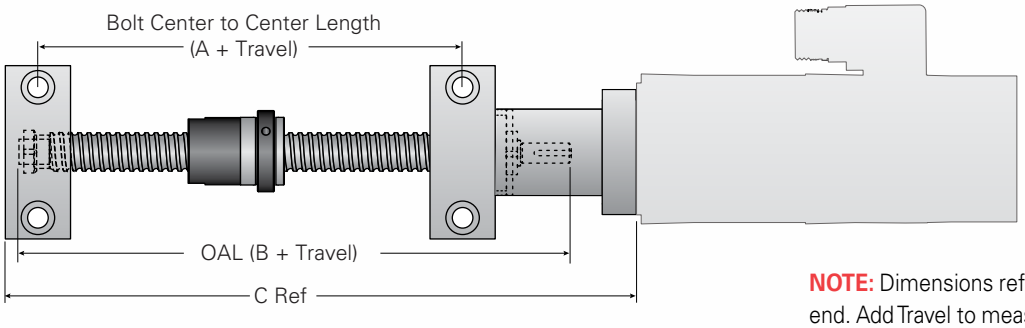



To ensure proper mounting and coupling, please supply motor drawing with your order.
* Motor Mounts require motor mounting dimensions, motor size, and manufacturer's part number, and coupling part number if applicable

# 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.

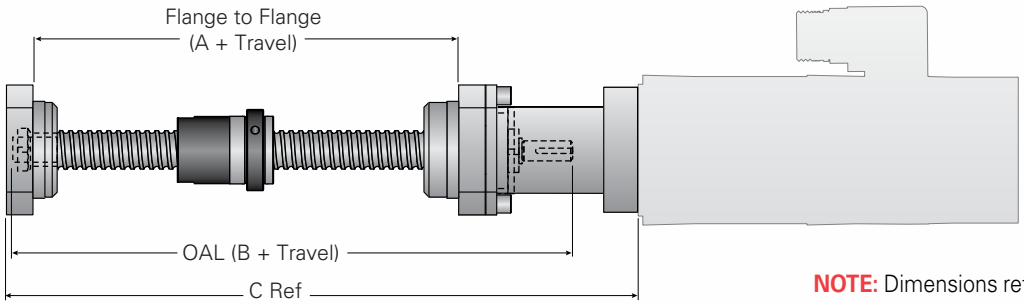
| | AVAILABLE MOTOR FRAME SIZES | FLANGE NUT | | | V-THREAD NUT | | | CYLINDRICAL KEYED NUT | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | A (mm) | B (mm) | C (mm) | A (mm) | B (mm) | C (mm) | A (mm) | B (mm) | C (mm) |
| 12x2 | 23 | 81.5 | 143.7 | 187 | 90.5 | 152.7 | 196 | 81.5 | 143.7 | 187 |
| 12x5 | 23 | 83.4 | 130.9 | 170 | 89.4 | 136.9 | 176 | 80.4 | 127.9 | 167 |
| 12x10 | 23 | 83.4 | 130.9 | 170 | 88.4 | 135.9 | 175 | 80.4 | 127.9 | 167 |
| 16x5 | 23/34 | 117.1 | 194.5 | 231 | 117.1 | 194.5 | 231 | 105.1 | 182.5 | 219 |
| 16x16 | 23/34 | 105.1 | 182.5 | 219 | 105.1 | 182.5 | 219 | 105.1 | 182.5 | 219 |
| 16x16 | 23/34 | 93.1 | 170.5 | 207 | 93.1 | 170.5 | 207 | 93.1 | 170.5 | 207 |
| 20x5 | 23/34 | 117.1 | 200.6 | 247 | 117.1 | 200.6 | 247 | 105.1 | 188.6 | 235 |
| 20x10 | 23/34 | 120.1 | 203.6 | 250 | 120.1 | 203.6 | 250 | 120.1 | 203.6 | 250 |
| 20x20 | 23/34 | 96.1 | 179.6 | 226 | 96.1 | 179.6 | 226 | 96.1 | 179.6 | 226 |
| 25x5 | 34/42 | 125.7 | 225.3 | 277 | 131.7 | 231.3 | 283 | 114.7 | 214.3 | 266 |
| 25x10 | 34/42 | 132.7 | 232.3 | 284 | 132.7 | 232.3 | 284 | 132.7 | 232.3 | 284 |
| 25x25 | 34/42 | 108.7 | 208.3 | 260 | 108.7 | 208.3 | 260 | 108.7 | 208.3 | 260 |
| 32x5 | 34/42 | 131.3 | 236.7 | 295 | 131.3 | 236.7 | 295 | 122.3 | 227.7 | 286 |
| 32x10 | 34/42 | 155.3 | 260.7 | 319 | 155.3 | 260.7 | 319 | 151.3 | 256.7 | 315 |
| 32x32 | 34/42 | 124.3 | 229.7 | 288 | 124.3 | 229.7 | 288 | 124.3 | 229.7 | 288 |
| 40x5 | 34/42/56 | 146.3 | 263.1 | 323 | 140.3 | 257.1 | 317 | 128.3 | 245.1 | 305 |
| 40x10 | 34/42/56 | 167.3 | 284.1 | 344 | 167.3 | 284.1 | 344 | 149.3 | 266.1 | 326 |
| 40x40 (6) | 34/42/56 | 156.3 | 273.1 | 333 | — | — | — | — | — | — |
| 40x40 (8) | 34/42/56 | 176.3 | 293.1 | 353 | 176.3 | 293.1 | 353 | 176.3 | 293.1 | 353 |

Nook/Thomson 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) |
| 12x2 | 23 | 82.2 | 137.3 | 165 | 91.2 | 146.3 | 174 | 82.2 | 137.3 | 165 |
| 12x5 | 23 | 80.9 | 129.4 | 156 | 86.9 | 135.4 | 162 | 77.9 | 126.4 | 153 |
| 12x10 | 23 | 80.9 | 129.4 | 156 | 85.9 | 134.4 | 161 | 77.9 | 126.4 | 153 |
| 16x5 | 23/34 | 115.0 | 189.4 | 205 | 115.0 | 189.4 | 205 | 103.0 | 177.4 | 193 |
| 16x16 | 23/34 | 103.0 | 177.4 | 193 | 103.0 | 177.4 | 193 | 103.0 | 177.4 | 193 |
| 16x16 | 23/34 | 91.0 | 165.4 | 181 | 91.0 | 165.4 | 181 | 91.0 | 165.4 | 181 |
| 20x5 | 23/34 | 120.4 | 197.3 | 224 | 120.4 | 197.3 | 224 | 108.4 | 185.3 | 212 |
| 20x10 | 23/34 | 123.4 | 200.3 | 227 | 123.4 | 200.3 | 227 | 123.4 | 200.3 | 227 |
| 20x20 | 23/34 | 99.4 | 176.3 | 203 | 99.4 | 176.3 | 203 | 99.4 | 176.3 | 203 |
| 25x5 | 34/42 | 126.5 | 216.4 | 244 | 132.5 | 222.4 | 250 | 115.5 | 205.4 | 233 |
| 25x10 | 34/42 | 133.5 | 223.4 | 251 | 133.5 | 223.4 | 251 | 133.5 | 223.4 | 251 |
| 25x25 | 34/42 | 109.5 | 199.4 | 227 | 109.5 | 199.4 | 227 | 109.5 | 199.4 | 227 |
| 32x5 | 34/42 | 131.6 | 229.8 | 258 | 131.6 | 229.8 | 258 | 122.6 | 220.8 | 249 |
| 32x10 | 34/42 | 155.6 | 253.8 | 282 | 155.6 | 253.8 | 282 | 151.6 | 249.8 | 278 |
| 32x32 | 34/42 | 124.6 | 222.8 | 251 | 124.6 | 222.8 | 251 | 124.6 | 222.8 | 251 |
| 40x5 | 34/42/56 | 146.6 | 256.3 | 286 | 140.6 | 250.3 | 280 | 128.6 | 238.3 | 268 |
| 40x10 | 34/42/56 | 167.6 | 277.3 | 307 | 167.6 | 277.3 | 307 | 149.6 | 259.3 | 289 |
| 40x40 (6) | 34/42/56 | 156.6 | 266.3 | 296 | — | — | — | — | — | — |
| 40x40 (8) | 34/42/56 | 176.6 | 286.3 | 316 | 176.6 | 286.3 | 316 | 176.6 | 286.3 | 316 |

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

# 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

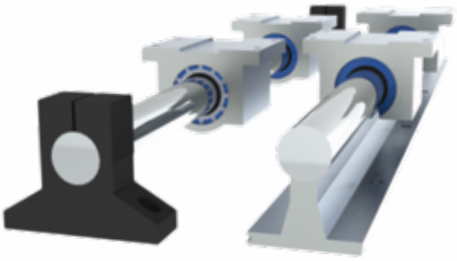
| DRIVE SYSTEM | ROLLER/BALL DIAMETER (MM) | MAX STROKE LENGTH (MM) |
|---|---|---|
| CROSS ROLLER RAILS | 3 to 12 | 492 |
| CROSS BALL RAILS | 3 to 12 | 496 |

| | 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/Thomson 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/Thomson 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/Thomson 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/Thomson 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/Thomson 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/Thomson also serves many customers in the Aerospace and Medical device markets and has complied with those Quality System Requirements as well.

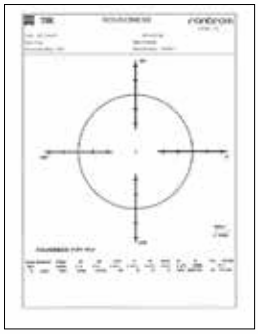
## ITAR

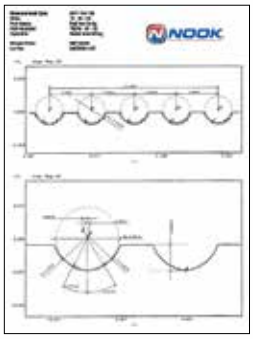

Nook Industries, Inc. is registered with the Department Of State For International Traffic In Arms Compliance.

## INSPECTION CAPABILITY

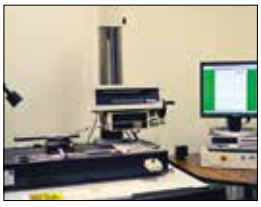
Laser Lead Measurement - Precise lead error gauging is utilized to validate processes to conform to Nook internal specifications and customer requirements.

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

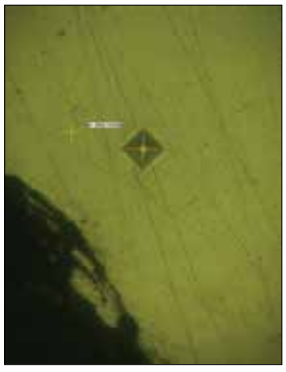




Zeiss Contour Readers - Prior to the start of any production run, thread form geometry is precisely measured to stringent engineering specifications.



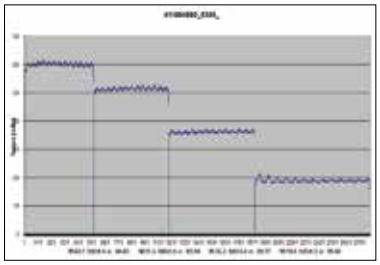
Metallurgical Lab - The metallurgical lab is capable of determining material composition from raw materials to final product. A micro hardness and case depth inspection is a routine check that validates the heat treat process.



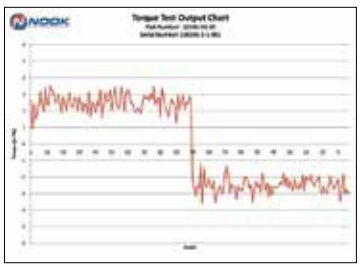
## QUALITY TOOLS:

- 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/Thomson 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/Thomson 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/Thomson 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

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