

# Round Shaft Systems

## Inch Series



# KXKBZ Round Shaft Systems

Expertise in linear motion.

For over 40 years INA has contributed to developments in linear technology. The results speak for themselves: our range of linear guidance systems is very comprehensive in scope, and we have the right linear guidance system for every application as well as a wide variety of useful accessories.

We also maintain an open and honest relationship with our customers by working with them consistently and competently - from the initial design concept right down to the delivery of the finished product. And we believe that providing expert advice on user applications and responding to customer requirements is an important part of our job.

In our line of shaft guidance systems you won't find any "one-size-fits-all" products. We also offer special designs for maximum load carrying capacity including open designs for support rails.

An extensive range of accessories supplements these designs, and together they form a versatile modular system that includes shaft support blocks, guideways, and precision shafts. And these products are tailor made. At our linear quick centers around the world we can machine shaft ends individually to meet the most demanding customer specifications: threaded or stepped, with radial or axial bores, with or without threads... you name it. The components you receive are ready to install.

Our modular system thus gives you plenty of options when planning your own personal design solutions. Of course, you can also get all our shaft guidance systems as complete ready-to-install units. Whatever the case, the most important thing for us is that you are fully satisfied with our product.

Schaeffler Group USA Inc.  
Fort Mill, South Carolina 29715

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# Product Descriptions

INA Linear ball bearings of series KX MAX<sup>3</sup>, KBZ, KNZ are recirculating linear ball bearings which are designed to provide the following features:

- ❑ Low friction
- ❑ High rigidity
- ❑ High accuracy
- ❑ Light weight
- ❑ Low noise

Linear ball bearings of series KX MAX<sup>3</sup>, KBZ, KNZ are available in a variety of designs and sizes.

## Series KX MAX<sup>3</sup> / KNZ - Self-Aligning Linear Ball Bearings

Linear ball bearings of series KX / KNZ.. consist of a precision molded retainer of a high strength engineered resin and hardened and ground bearing races. Series KXO / KNZ..OP.. bearings have a segment removed for applications requiring supported shafts.

### The KX MAX<sup>3</sup> / KNZ series offers:

- ❑ Ground races for smoothest operation
- ❑ Self-aligning in any housing
- ❑ Interchangeable with other standard makes
- ❑ Lower noise level
- ❑ Lighter weight
- ❑ Cost effective bearing for round shaft rails

### In addition, the KX MAX<sup>3</sup> series offers:

- ❑ Larger load capability due to increased number of ball rows
- ❑ Greater misalignment capability
- ❑ Longer bearing life due to internal lubrication reservoirs
- ❑ Double lip seal floats with the shaft

## KBZ Series - Precision Linear Ball Bearings

Linear ball bearings of series KBZ and KBZ..OP consist of a hardened and ground solid outer ring and a retainer. The outer ring is machined from high-carbon bearing steel. The retainer is manufactured from a high strength engineered resin. Series KBZ..OP have a segment removed from the outer ring for applications with supported shafts.

## Series KGX / KGNZ

### Self-Aligning Linear Ball Bearings With Housings

Series KGX..PP / KGNZ..PP mounted units are manufactured of a high-strength aluminum alloy, and are supplied with a series KX / KNZ linear bearing sealed on both ends.

Series KGXO..PP / KGNZ..OP PP mounted units are supplied with a Series KNZ..OP bearing sealed on both ends for use with supported shafts.

## Series KTX / KTNZ

### Self-Aligning Tandem Linear Ball Bearings With Housings

Series KTX..PP / KTNZ..PP and KTXO..PP / KTNZ..OP PP mounted units are similar to the mounted units described above (KGX..PP / KGNZ..PP and KGXO..PP / KGNZ..OP PP) but are supplied with a longer housing and (2) KX..PP / KNZ..PP or (2) KXO..PP / KNZ..OP PP bearings installed in tandem within the housing.

## Series WZ - Precision Shafts

Linear shafts of series WZ are manufactured to the most precise standards which meet or exceed all industry standards (ABMA). Series WZ shafts are manufactured from a high strength steel, AISI 1055 (Cf53). They are hardened (670 840HV) and ground to precision roundness, straightness and surfaces finish specifications. Refer to dimension table on page 21.

INA Linear shafts are available in lengths up to 17' (5.18m) depending on the diameter. The shafts can be supplied cut to length and chamfered, or machined to your drawing including journals, threaded diameters, etc. If longer lengths are needed please inquire with INA Linear Engineering.

## Series TSWZ / TSUZ - Shaft Support Rails

Series TSWZ shaft support rails are manufactured from a high-strength aluminum alloy and are available in four foot lengths. The rails can be mounted in tandem for long-length applications. Series TSWZ..PD are supplied with drilled-through holes to standard dimensions for mounting the shaft and mounting rail to a base.

Preassembled shaft and support rail are available for ease of handling and installation. Shaft is Class L, hardened and ground steel and support rail is high strength aluminum alloy.

Series TSUZ and TSUZ..PD are similar to series TSWZ and TSWZ..PD for those applications requiring a lower height centerline to base.

## Series GWZ - Shaft End Support Blocks

Constructed of high strength aluminum alloy for shaft sizes 1/4" to 2" in diameter.

# Calculations

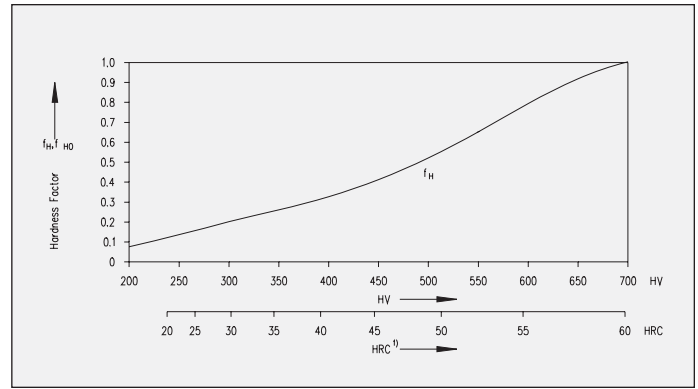


Figure 1 Raceway Hardness Factors <sup>1)</sup> converted per DIN 50 150

## Load carrying capacity and operating life

The selection of a linear ball bearing size depends on the requirements in terms of load carrying capacity, operating life and reliability in operation. When calculating the bearing life, the basic load ratings are used as a measure. The dynamic load rating applies to moving bearings as compared to applications where motion does not occur or occurs only very infrequently.

## Operating life

The basic rating life for linear ball bearings is calculated as follows:

or with the help of the graph on the following page.

$$L = \left( \frac{C}{P} \right)^3 \times 2 \times 10^6 \text{ (inches)}$$

L (inches)

Basic rating life reached or exceeded by 90% of a sufficiently large group of apparently identical bearings before the first evidence of material fatigue develops.

C (Lbs)

Basic dynamic load rating

P (Lbs)

Equivalent bearing load

## NOTE:

Rated life expectancy and load ratings are based on conditions which require a shaft with a surface hardness of HRC 59 minimum.

## Load safety factor

For linear ball bearings which are subject to static or shock loads, the load safety factor in terms of permissible deformation of the bearing at the ball contact points, and is defined as follows:

$S_o$  (—)

$$S_o = \frac{C_o}{F}$$

Load safety factor

$C_o$  (Lbs)

Basic static load rating

F (Lbs)

Maximum bearing load

For bearing arrangements with high requirements for accuracy and smooth running, the values for S should not be less than 3.

## Influences on the load carrying capacity

The basic load ratings given in the dimension tables apply under certain predefined conditions regarding raceway hardness, load direction and guidance accuracy. Other operating conditions must be evaluated using corresponding correction factors.

If shafts with a surface hardness lower than 59 HRC are used, then the basic load rating must be corrected according to the equations below:

$C_H$  (Lbs)

Effective dynamic load rating

$$C_H = f_H \cdot C$$

$f_H$  (—)

Dynamic hardness factor according to Figure 1

C (Lbs)

Basic dynamic load rating

$C_{oH}$  (Lbs)

Effective static load rating

$$C_{oH} = f_{Ho} \cdot C_o$$

$f_{Ho}$  (—)

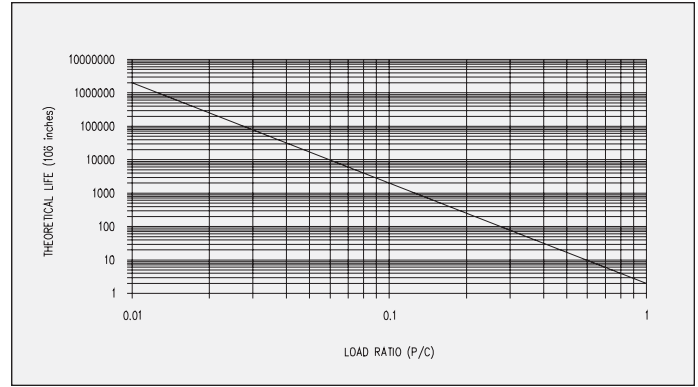
Static hardness factor according to Figure 1

$C_o$  (Lbs)

Basic static load rating



# Calculations



Theoretical Life

## Load Direction

The effective load rating of a linear ball bearing is dependent upon the orientation of the ball rows with respect to the load direction.

The load ratings in the dimension tables are indicative of the minimum load rating orientation (load case I for KNZ..., KBZ... and load case II for KNZ...OP, KBZ...OP see Figure 2).

If the bearing orientation changes, the effective load rating can be calculated with the following formula:

$C_W$  (Lbs)

$$C_W = f_s \cdot C$$

Effective dynamic load rating

$f_s$   
Dynamic load direction factor (Table 1)

$C_{oW}$  (Lbs)

$$C_{oW} = f_{oS} \cdot C_o$$

Effective static load rating

$f_{oS}$   
Static load direction factor (Table 1)

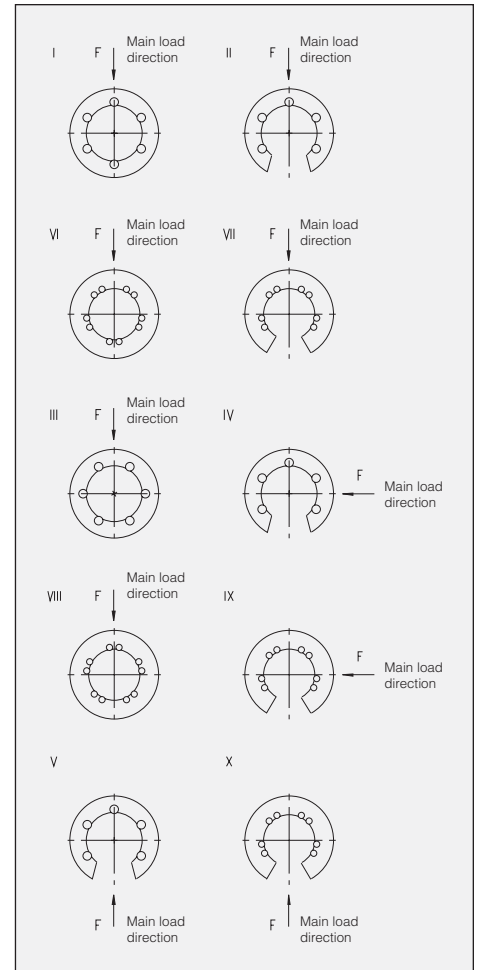


Figure 2 Load Cases

Table 1 • LOAD DIRECTION FACTORS

Part Number	Load Cases													
	$f_{sIII}$	$f_{oSIII}$	$f_{sIV}$	$f_{oSIV}$	$f_{sV}$	$f_{oSv}$	$f_{sVI}$	$f_{oSvI}$	$f_{sVIII}$	$f_{oSvIII}$	$f_{sIX}$	$f_{oSIX}$	$f_{sX}$	$f_{oSX}$
KBZ / KNZ o4, o6, o8, KBZ1o	1.15	1.4												
KNZ1o, KBZ12	1.2	1.45												
KNZ 12, KBZ / KNZ 16, 20, 24, 32	1.05	1.3												
KBZ / KNZ o8OP, KBZ1oOP			0.87	0.87	0.81	1								
KNZ1oOP, KBZ12OP			1	1.05	0.4	0.35								
KNZ12OP, KBZ / KNZ 16OP, 2oOP, 24OP, 32OP			1.05	1.15	0.6	0.6								
KXo8							0.79	0.79						
KX1o, 12, 16, 20, 24, 32									0.89	0.82				
KXOo8											0.6	0.48		
KXO1o, 12, 16, 20, 24, 32											0.93	0.83		
KXOo8													0.66	0.66
KXO1o, 12, 16, 20, 24, 32													0.38	0.35

# Design & Installation

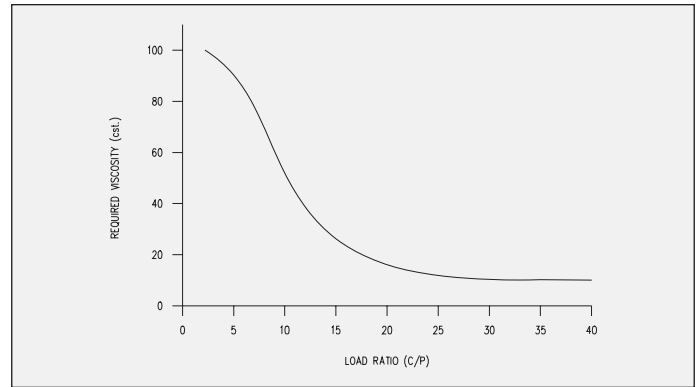


Figure 3 Required Lubricant Viscosity For KBZ, KNZ Bearings

## Lubrication

Proper lubrication is an important prerequisite for long service life of any anti-friction bearing.

For non-sealed bearings oil lubrication is preferred in order to guarantee adequate lubrication of all rolling contact areas and to wash away contaminants if necessary.

Grease lubrication is also possible, providing economic advantages as compared to oil lubrication. Greases to NLGI 3 are recommended. To ensure that adequate lubrication of the rolling elements is provided refer to INA recommendations in Figure 3.

## Operating data

Linear ball bearings of series KBZ, KNZ can withstand acceleration up to  $50\text{m/sec}^2$  (5g) and speeds of  $4\text{m/s}$  (13ft./sec).

The ball bearing series KX can withstand the same acceleration but speeds up to  $5\text{m/sec}$ .

Continuous operating temperatures of  $-20^\circ\text{C}$  ( $-4^\circ\text{F}$ ) to  $+80^\circ\text{C}$  ( $+176^\circ\text{F}$ ) are permissible.

## Installation

Assembly and location of linear ball bearings KBZ, KNZ. These bearings are easy to install. Smaller bearings can be pushed into their housing bores by hand, but for larger bearings, it is advisable to use a fitting arbor as shown on Figure 4. Housing bores should be chamfered.

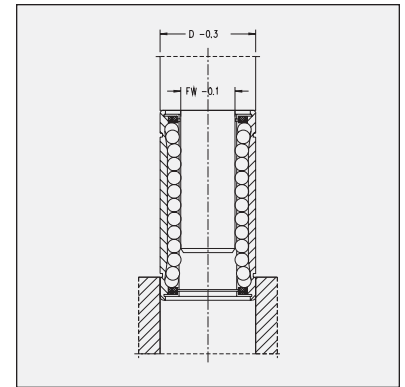


Figure 4 Assembly Of Linear Ball Bearings Series KBZ, KNZ

# Design & Installation

## Axial location of closed linear ball bearings

Bearings of series KX, KBZ, KNZ are installed with a clearance fit and should be axially located. The simplest method of location is with the use of retaining rings as shown in Figure 5.

## Axial and rotary location of linear ball bearings

Linear ball bearings of series KXO., KBZ..OP, KNZ..OP must be located against axial and rotary displacement.

If set screws are used, they should be secured by adhesive to prevent rotation.

## Operating clearance and its adjustment

Depending on the bearing design, the desired operating clearance of a bearing arrangement can be achieved either by adjusting the bearing enveloping circle or by matching the bearing to suitable housing and/or shaft diameters.

An appropriate clearance between the bearing and the shaft is required for operation. The proper clearance is obtained when the bearings are mounted with our shafts Class L and housing dimensions in shown in the Mounting Dimensions table below.

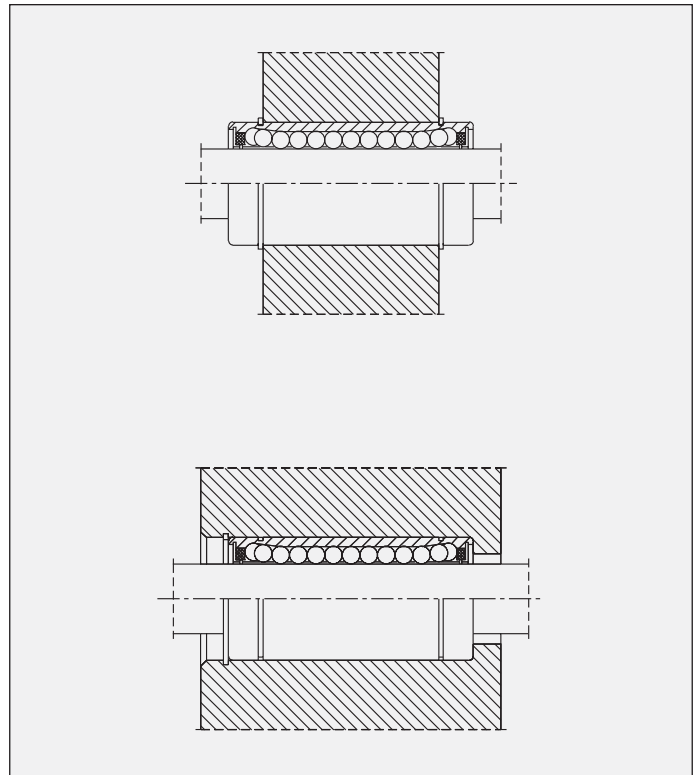


Figure 5 Series KNZ Linear Ball Bearings - Possible Methods Of Axial Location

## MOUNTING DIMENSIONS

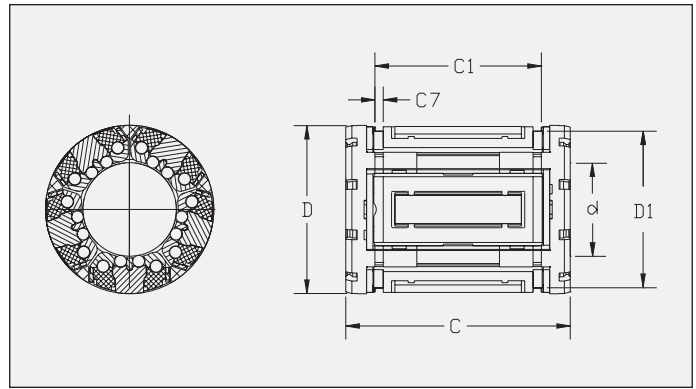
INA Part Number	Seal suffix	Mounting Dimensions				INA Part Number	Seal suffix	Mounting Dimensions	
		Normal fit		Press fit				Housing bore	Tol. -.0000
		Housing bore	Tol. -.0000	Housing bore	Tol. -.0000				
KBZ 04	PP	0.5000	+0.0005	0.4990	+0.0005	KNZ 04	PP	0.5000	+0.0007
KBZ 06	PP	0.6250	+0.0005	0.6240	+0.0005	KNZ 06	PP	0.6250	+0.0007
KBZ 08	PP	0.8750	+0.0005	0.8740	+0.0005	KX / KNZ 08	PP	0.8750	+0.0008
KBZ 10	PP	1.1250	+0.0005	1.1240	+0.0005	KX / KNZ 10	PP	1.1250	+0.0008
KBZ 12	PP	1.2500	+0.0005	1.2490	+0.0005	KX / KNZ 12	PP	1.2500	+0.0010
KBZ 16	PP	1.5625	+0.0005	1.5615	+0.0005	KX / KNZ 16	PP	1.5625	+0.0010
KBZ 20	PP	2.0000	+0.0010	1.9983	+0.0010	KX / KNZ 20	PP	2.0000	+0.0012
KBZ 24	PP	2.3750	+0.0010	2.3733	+0.0010	KX / KNZ 24	PP	2.3750	+0.0012
KBZ 32	PP	3.0000	+0.0010	2.9982	+0.0010	KX / KNZ 32	PP	3.0000	+0.0012

# MAX<sup>3</sup> Self-Aligning Linear Ball Bearing

Series KX, KX..PP

Series KXO, KXO..PP

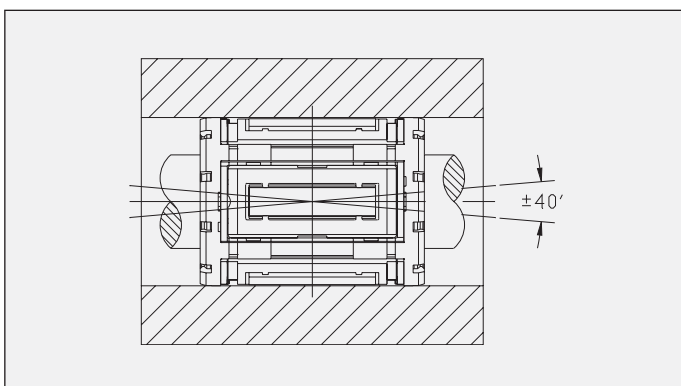
- MAX<sup>3</sup> Maximum Performance
- Closed and open
- With gap seal or floating contact seal on both sides



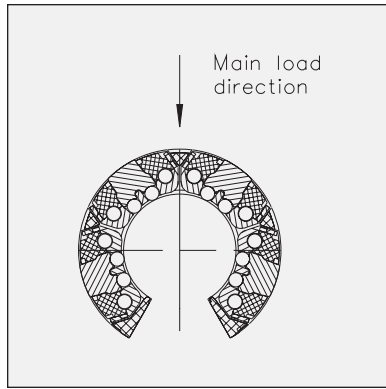
KX, KX..PP

Shaft Dia.	Part Number <sup>1)</sup>	Wt. lbs.	Dimensions in inches		
			d	D	C
1/2	KX 08	0.11	0.500 <sup>-0.0005</sup>	0.875	1.250 <sup>-0.020</sup>
	KXO 08	0.066	0.500 <sup>-0.0005</sup>	0.875	1.250 <sup>-0.020</sup>
5/8	KX 10	0.183	0.625 <sup>-0.0005</sup>	1.125	1.500 <sup>-0.020</sup>
	KXO 10	0.183	0.625 <sup>-0.0005</sup>	1.125	1.500 <sup>-0.020</sup>
3/4	KX12	0.243	0.750 <sup>-0.0005</sup>	1.250	1.625 <sup>-0.020</sup>
	KXO 12	0.243	0.750 <sup>-0.0005</sup>	1.250	1.625 <sup>-0.020</sup>
1	KX 16	0.243	1.000 <sup>-0.0005</sup>	1.563	2.250 <sup>-0.020</sup>
	KXO 16	0.243	1.000 <sup>-0.0005</sup>	1.563	2.250 <sup>-0.020</sup>
1 1/4	KX 20	0.419	1.250 <sup>-0.0006</sup>	2.000	2.625 <sup>-0.025</sup>
	KXO 20	0.419	1.250 <sup>-0.0006</sup>	2.000	2.625 <sup>-0.025</sup>
1 1/2	KX 24	0.661	1.500 <sup>-0.0006</sup>	2.375	3.000 <sup>-0.030</sup>
	KXO 24	0.661	1.500 <sup>-0.0006</sup>	2.375	3.000 <sup>-0.030</sup>
2	KX 32	1.235	2.000 <sup>-0.0008</sup>	3.000	4.000 <sup>-0.040</sup>
	KXO 32	0.992	2.000 <sup>-0.0008</sup>	3.000	4.000 <sup>-0.040</sup>

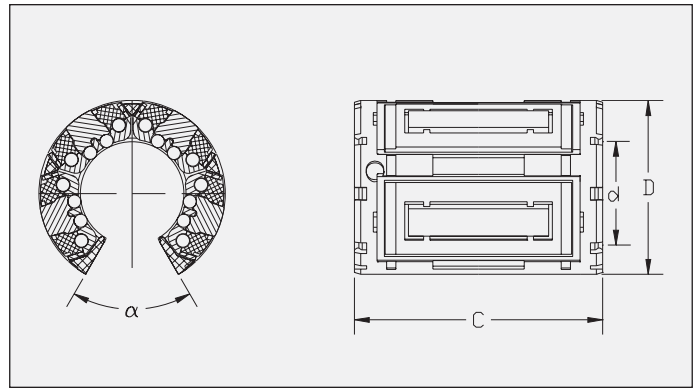
- 1) Linear ball bearings sealed on both sides: suffix "PP"
- 2) Load ratings apply only for hardened (670 to 840 HV) and ground shaft raceways.
- 3) Load rating in main load direction
- 4) Load ratings to ISO/C 14 728-1 (maximum values)



Misalignment compensation  $\pm 40'$

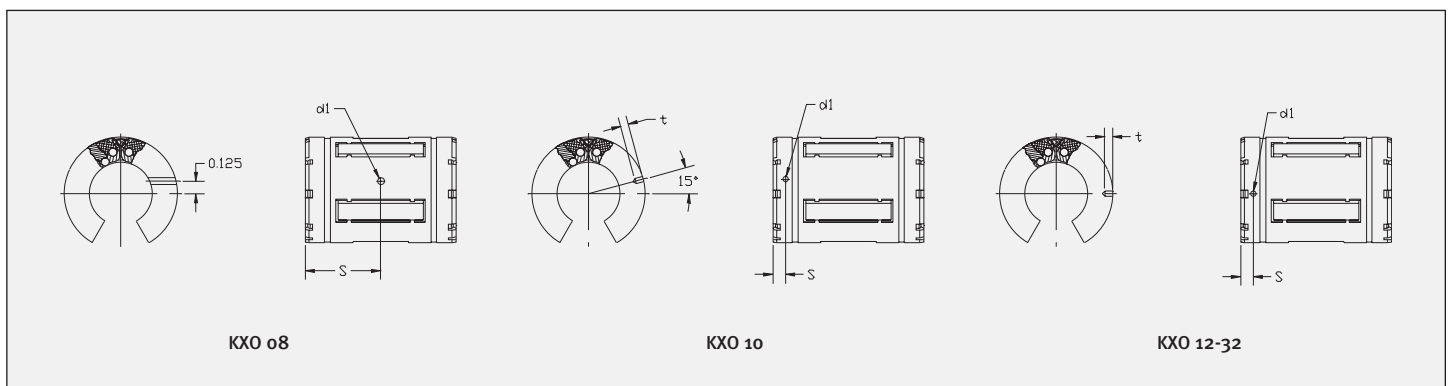


KXO, KXO..PP Main Load Direction<sup>4)</sup>



KXO, KXO..PP

Mounting Dimension							Number of ball rows	Load Ratings <sup>2)4)</sup> (lbs)		Accessories	
D <sub>i</sub>	C <sub>r</sub>	C <sub>i</sub>	α deg.	d <sub>i</sub>	t	S		Dyn. C <sub>o</sub>	Static C <sub>o</sub>	Suitable Snap Rings	Shaft Diameter
0.821	0.046	1.032 <sub>-0.020</sub>	-	-	-	-	6	275	200	DIN 471 22x1.2	1/2
-	-	1.032 <sub>-0.020</sub>	60	0.136	-	0.625	4	260 <sup>3)</sup>	190 <sup>3)</sup>	DIN 471 22x1.2	-
1.059	0.056	1.112 <sub>-0.020</sub>	-	-	-	-	10	290	260	DIN 471 30x1.5	5/8
-	-	1.112 <sub>-0.020</sub>	60	0.105	0.039	0.125	8	290 <sup>3)</sup>	260 <sup>3)</sup>	DIN 471 30x1.5	-
1.176	0.056	1.272 <sub>-0.020</sub>	-	-	-	-	10	430	370	DIN 471 33x1.5	3/4
-	-	1.272 <sub>-0.020</sub>	60	0.136	0.059	0.125	8	430 <sup>3)</sup>	370 <sup>3)</sup>	DIN 471 33x1.5	-
1.469	0.068	1.886 <sub>-0.020</sub>	-	-	-	-	10	810	720	DIN 471 41x1.75	1
-	-	1.886 <sub>-0.020</sub>	64	0.136	0.047	0.125	8	810 <sup>3)</sup>	720 <sup>3)</sup>	DIN 471 41x1.75	-
1.886	0.068	2.011 <sub>-0.025</sub>	-	-	-	-	10	1490	1190	SHR-193 1.938x.125	1 1/4
-	-	2.011 <sub>-0.025</sub>	64	0.201	0.090	0.188	8	1490 <sup>3)</sup>	1190 <sup>3)</sup>	SHR-193 1.938x.125	-
2.239	0.086	2.422 <sub>-0.030</sub>	-	-	-	-	10	2090	1550	DIN 471 62x2	1 1/2
-	-	2.422 <sub>-0.030</sub>	64	0.201	0.090	0.188	8	2090 <sup>3)</sup>	1550 <sup>3)</sup>	DIN 471 62x2	-
2.838	0.103	3.206 <sub>-0.040</sub>	-	-	-	-	10	3500	2750	DIN 471 78x2.5	2
-	-	3.206 <sub>-0.040</sub>	60	0.265	0.090	0.312	8	3500 <sup>3)</sup>	2750 <sup>3)</sup>	DIN 471 78x2.5	-



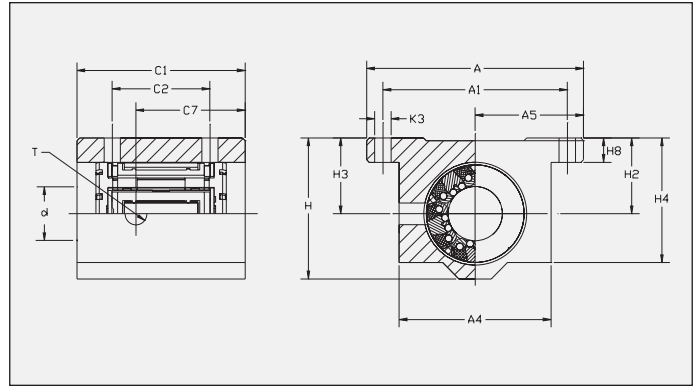
Location Holes

# MAX<sup>3</sup> Self-Aligning Linear Ball Bearing With Housing

Series KGX, KGX..PP

Series KGXO, KGXO..PP

- MAX<sup>3</sup> Maximum Performance
- Closed and open
- Linear ball bearing with gap seal or floating contact seal on both sides



KGX, KGX..PP

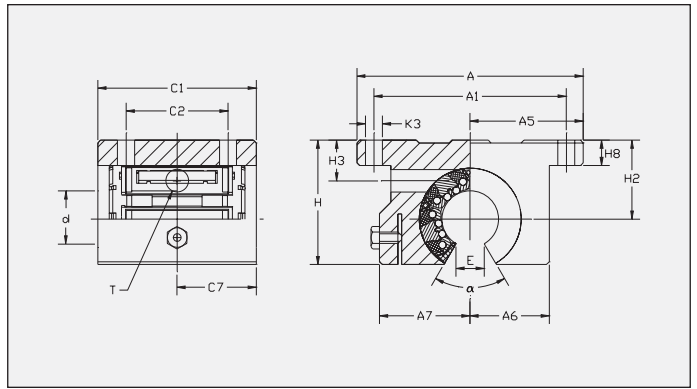
Shaft Diameter	Part Number <sup>1)</sup>	Part Number <sup>1)</sup>	Weight lbs	Dimensions				Mounting Dimensions			
				d	A	C <sub>i</sub>	H	A <sub>5</sub>	A <sub>6</sub> ±.001	A <sub>6</sub>	A <sub>7</sub>
1/2	KGX 08	KGX 08 PP	0.249	0.500	2.000	1.688	1.250	1.375	1.000	-	-
	KGXO 08	KGXO 08 PP	0.216	0.500	2.000	1.500	1.100	-	1.000	0.688	0.905
5/8	KGX 10	KGX 10 PP	0.464	0.625	2.500	1.938	1.625	1.750	1.250	-	-
	KGXO 10	KGXO 10 PP	0.395	0.625	2.500	1.750	1.375	-	1.250	0.875	1.095
3/4	KGX 12	KGX 12 PP	0.581	0.750	2.750	2.063	1.750	1.875	1.375	-	-
	KGXO 12	KGXO 12 PP	0.495	0.750	2.750	1.875	1.535	-	1.375	0.937	1.161
1	KGX 16	KGX 16 PP	1.213	1.000	3.250	2.813	2.188	2.375	1.625	-	-
	KGXO 16	KGXO 16 PP	1.053	1.000	3.250	2.625	1.975	-	1.625	1.188	1.457
1 1/4	KGX 20	KGX 20 PP	2.430	1.250	4.000	3.625	2.813	3.000	2.000	-	-
	KGXO 20	KGXO 20 PP	2.104	1.250	4.000	3.375	2.458	-	2.000	1.500	1.831
1 1/2	KGX 24	KGX 24 PP	3.573	1.500	4.750	4.000	3.250	3.500	2.375	-	-
	KGXO 24	KGXO 24 PP	3.154	1.500	4.750	3.750	2.910	-	2.375	1.750	2.087
2	KGX 32	KGX 32 PP	7.196	2.000	6.000	5.000	4.063	4.500	3.000	-	-
	KGXO 32	KGXO 32 PP	6.306	2.000	6.000	4.750	3.660	-	3.000	2.250	2.638

1) Linear ball bearings sealed on both sides: suffix "PP"

2) Load ratings apply only for hardened (670 to 840 HV) and ground shaft raceways.

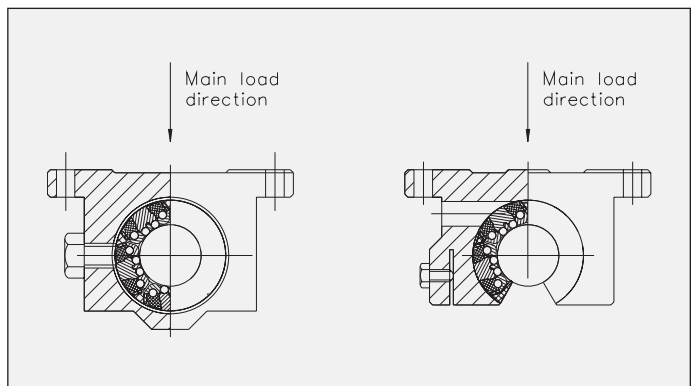
3) Load rating in main load direction

4) Load ratings to ISO/C 14 728-1 (maximum values)



KGXO, KGXO..PP

Mounting Dimensions											Load Ratings <sup>3)</sup> (lbs)		Shaft Diameter
C <sub>1</sub>	H <sub>2</sub> ±.001	H <sub>3</sub>	H <sub>4</sub>	H <sub>5</sub>	T	E	α deg.	A <sub>1</sub> ±.01	C <sub>2</sub> ±.01	K <sub>3</sub>	Dyn. C	Stat. C <sub>0</sub>	
0.844	0.687	0.690	1.125	0.250	NIP A1	-	-	1.688	1.000	0.156	275	200	1/2
0.520	0.687	0.370	-	0.250	NIP A1	0.313	60	1.688	1.000	0.156	260 <sup>3)</sup>	190 <sup>3)</sup>	
1.260	0.875	0.700	1.437	0.281	1/4-28	-	-	2.125	1.125	0.188	290	260	5/8
0.875	0.875	0.450	-	0.281	1/4-28	0.375	60	2.125	1.130	0.188	290 <sup>3)</sup>	260 <sup>3)</sup>	
1.340	0.937	0.937	1.563	0.313	1/4-28	-	-	2.375	1.250	0.188	430	370	3/4
0.937	0.937	0.510	-	0.313	1/4-28	0.438	60	2.375	1.250	0.188	430 <sup>3)</sup>	370 <sup>3)</sup>	
1.950	1.187	1.187	1.938	0.375	1/4-28	-	-	2.875	1.750	0.218	810	720	1
1.312	1.187	0.730	-	0.375	1/4-28	0.563	60	2.875	1.750	0.218	810 <sup>3)</sup>	720 <sup>3)</sup>	
2.430	1.500	1.500	2.500	0.437	1/4-28	-	-	3.500	2.000	0.218	1490	1190	1 1/4
1.688	1.500	0.800	-	0.437	1/4-28	0.625	60	3.500	2.000	0.218	1490 <sup>3)</sup>	1190 <sup>3)</sup>	
2.750	1.750	1.750	2.875	0.500	1/4-28	-	-	4.125	2.500	0.281	2090	1550	1 1/2
1.875	1.750	0.840	-	0.500	1/4-28	0.750	60	4.125	2.500	0.281	2090 <sup>3)</sup>	1550 <sup>3)</sup>	
3.420	2.125	2.125	3.625	0.625	1/4-28	-	-	5.250	3.250	0.406	3500	2750	2
2.375	2.125	1.100	-	0.625	1/4-28	1.000	60	5.250	3.250	0.406	3500 <sup>3)</sup>	2750 <sup>3)</sup>	



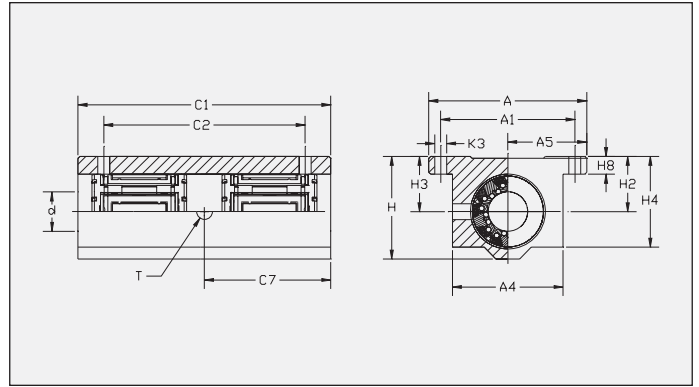
KGX, KGX..PP, KGXO, KGXO..PP Main Load Direction<sup>4)</sup>

# MAX<sup>3</sup> Tandem Linear Ball Bearing With Housing

Series KTX, KTX..PP

Series KTXO, KTXO..PP

- MAX<sup>3</sup> Maximum Performance
- Closed and open
- Linear ball bearing with gap seal or floating contact seal on both sides



KTX, KTX..PP

Shaft Diameter	Part Number <sup>1)</sup>	Part Number <sup>1)</sup>	Weight lbs	Dimensions				Mounting Dimensions			
				d	A	C <sub>i</sub>	H	A <sub>5</sub>	A <sub>5</sub> ±.001	A <sub>6</sub>	A <sub>7</sub>
1/2	KTX 08	KTX 08 PP	0.443	0.500	2.000	3.50	1.250	1.375	1.000	-	-
	KTXO 08	KTXO 08 PP	0.369	0.500	2.000	3.50	1.100	-	1.000	0.688	0.905
5/8	KTX 10	KTX 10 PP	1.065	0.625	2.500	4.00	1.625	1.750	1.250	-	-
	KTXO 10	KTXO 10 PP	0.887	0.625	2.500	4.00	1.375	-	1.250	0.875	1.095
3/4	KTX 12	KTX 12 PP	1.253	0.750	2.750	4.50	1.750	1.875	1.375	-	-
	KTXO 12	KTXO 12 PP	1.071	0.750	2.750	4.50	1.535	-	1.375	0.937	1.161
1	KTX 16	KTX 16 PP	2.597	1.000	3.250	6.00	2.188	2.375	1.625	-	-
	KTXO 16	KTXO 16 PP	2.228	1.000	3.250	6.00	1.975	-	1.625	1.188	1.457
1 1/4	KTX 20	KTX 20 PP	5.529	1.250	4.000	7.50	2.813	3.000	2.000	-	-
	KTXO 20	KTXO 20 PP	4.774	1.250	4.000	7.50	2.485	-	2.000	1.500	1.831
1 1/2	KTX 24	KTX 24 PP	8.316	1.500	4.750	9.00	3.250	3.500	2.375	-	-
	KTXO 24	KTXO 24 PP	7.378	1.500	4.750	9.00	2.910	-	2.375	1.750	2.087

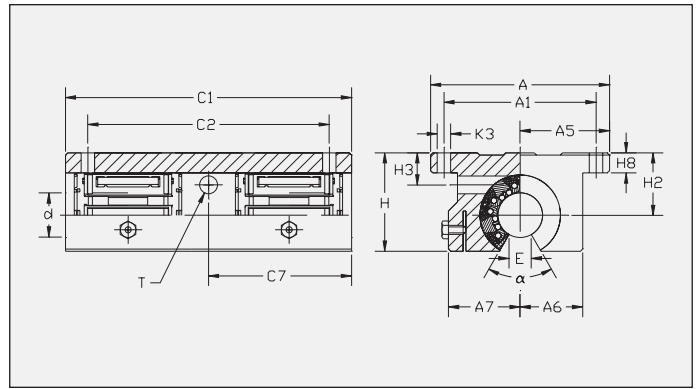
1) Linear ball bearings sealed on both sides: suffix "PP"

2) Load ratings apply only for hardened (670 to 840 HV) and ground shaft raceways.

3) Load rating in main load direction

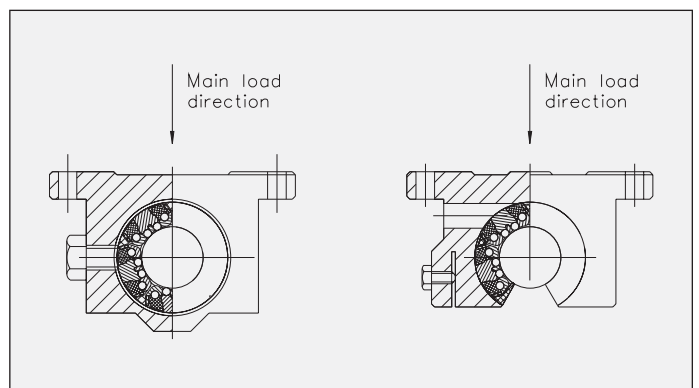
4) Load ratings to ISO/C 14 728-1 (maximum values)





KTXO, KTXO..PP

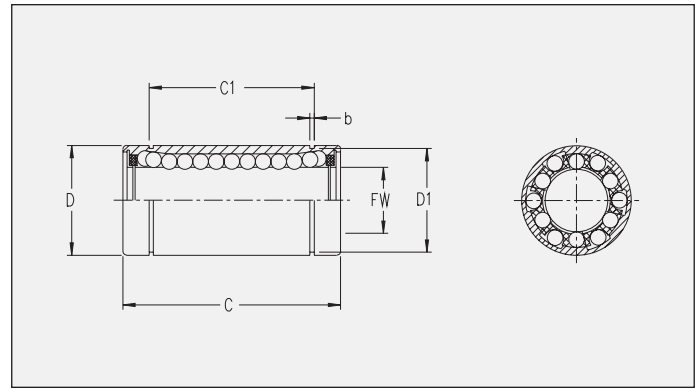
Mounting Dimensions											Load Ratings <sup>(3)</sup> (lbs)		Shaft Diameter
C <sub>7</sub>	H <sub>2</sub> ±.001	H <sub>3</sub>	H <sub>4</sub>	H <sub>8</sub>	T	E	α deg.	A <sub>1</sub> ±.01	C <sub>2</sub> ±.01	K <sub>3</sub>	Dyn. C	Stat. C <sub>0</sub>	
1.750	0.687	0.687	1.125	0.250	NIP A1	-	-	1.688	2.500	0.156	550	400	1/2
1.750	0.687	0.370	-	0.250	NIP A1	0.313	60	1.688	2.500	0.156	520 <sup>(3)</sup>	380 <sup>(3)</sup>	
2.000	0.875	0.875	1.437	0.281	1/4-28	-	-	2.125	3.000	0.188	580	520	5/8
2.000	0.875	0.450	-	0.281	1/4-28	0.375	60	2.125	3.000	0.188	580 <sup>(3)</sup>	520 <sup>(3)</sup>	
2.250	0.937	0.937	1.563	0.313	1/4-28	-	-	2.375	3.500	0.188	860	740	3/4
2.250	0.937	0.510	-	0.313	1/4-28	0.438	60	2.375	3.500	0.188	860 <sup>(3)</sup>	740 <sup>(3)</sup>	
3.000	1.187	1.187	1.938	0.375	1/4-28	-	-	2.875	4.500	0.218	1620	1440	1
3.000	1.187	0.730	-	0.375	1/4-28	0.563	60	2.875	4.500	0.218	1620 <sup>(3)</sup>	1440 <sup>(3)</sup>	
3.750	1.500	1.500	2.500	0.437	1/4-28	-	-	3.500	5.500	0.218	3000	2380	1 1/4
3.750	1.500	0.800	-	0.437	1/4-28	0.625	60	3.500	5.500	0.218	3000 <sup>(3)</sup>	2380 <sup>(3)</sup>	
4.500	1.750	1.750	2.875	0.500	1/4-28	-	-	4.125	6.500	0.281	4200	3100	1 1/2
4.500	1.750	0.800	-	0.500	1/4-28	0.750	60	4.125	6.500	0.281	4200 <sup>(3)</sup>	3100 <sup>(3)</sup>	



KTX, KTX..PP, KTXO, KTXO..PP Main Load Direction<sup>(4)</sup>

# Precision Linear Ball Bearing

Series KBZ, KBZ..PP

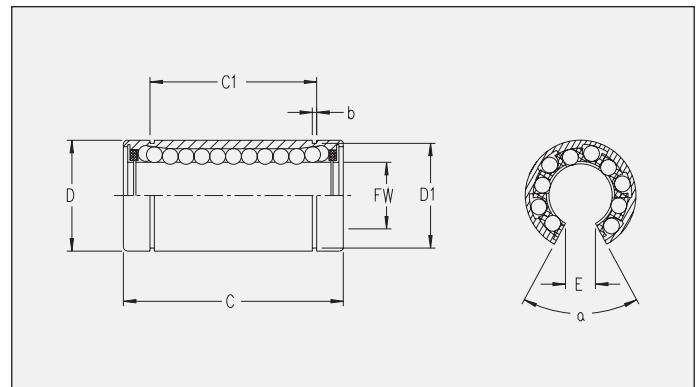


Shaft dia.	Part Number	Seal suffix	Wt. lbs.	Dimension in inches												No. of Ball Rows	Load Ratings (Lbs)	
				F <sub>w</sub>	Tol. +.0000	Concen- tricity	D	Tol. +.0000	C	Tol. +.0000	D <sub>i</sub>	b	C <sub>i</sub>	Tol. +.0000	Dynamic C		Static C <sub>s</sub>	
1/4	KBZ 04	PP	0.02	0.250	-.0002	.0003	0.500	-.0004	0.750	-.008	0.469	0.039	0.511	-.008	4	46	60	
3/8	KBZ 06	PP	0.03	0.375	-.0002	.0003	0.625	-.0005	0.875	-.008	0.588	0.039	0.636	-.008	4	51	71	
1/2	KBZ 08	PP	0.08	0.500	-.0002	.0003	0.875	-.0005	1.250	-.008	0.821	0.046	0.963	-.008	4	115	176	
5/8	KBZ 10	PP	0.17	0.625	-.0002	.0003	1.125	-.0005	1.500	-.008	1.059	0.056	1.104	-.008	4	174	265	
3/4	KBZ 12	PP	0.21	0.750	-.0003	.0004	1.250	-.0006	1.625	-.008	1.176	0.056	1.166	-.008	5	194	308	
1	KBZ 16	PP	0.66	1.000	-.0003	.0004	1.563	-.0006	2.250	-.012	1.469	0.068	1.755	-.012	6	220	353	
1 1/4	KBZ 20	PP	0.97	1.250	-.0003	.0005	2.000	-.0007	2.625	-.012	1.886	0.068	2.005	-.012	6	353	616	
1 1/2	KBZ 24	PP	1.48	1.500	-.0003	.0005	2.375	-.0007	3.000	-.012	2.239	0.086	2.412	-.012	6	490	904	
2	KBZ 32	PP	2.51	2.000	-.0003	.0007	3.000	-.0008	4.000	-.012	2.838	0.103	3.192	-.012	6	859	1,785	

The dynamic load rating is based on a travel life expectancy of 2x10<sup>6</sup> inches

# Precision Linear Ball Bearing, Open

Series KBZ..OP, KBZ..OP PP

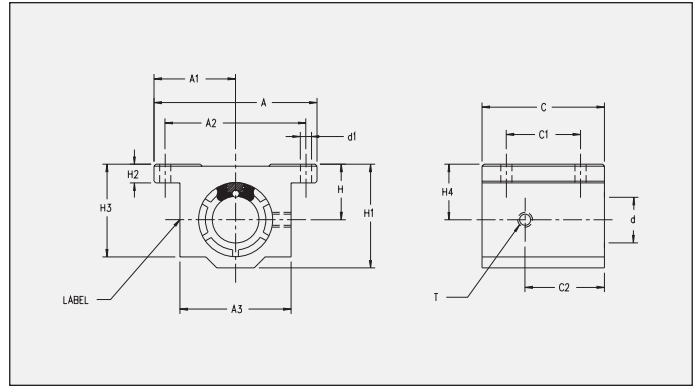


Shaft dia.	Part Number	Seal suffix	Wt. lbs.	Dimension in inches												α Deg.	No. of Ball Rows	Load Ratings (Lbs)	
				F <sub>w</sub> Nom. Dim.	F <sub>w</sub> Tol. +.0000	D Nom. Dim.	D Tol. +.0000	C Nom. Dim.	C Tol. +.0000	D <sub>i</sub>	b	C <sub>i</sub> Nom. Dim.	C <sub>i</sub> Tol. +.0000	E	Dyn C			Stat C <sub>s</sub>	
1/2	KBZ 08 OP	PP	0.06	0.500	-.0002	0.875	-.0004	0.750	-.008	0.821	.046	0.963	-.008	0.313	80	3	115	176	
5/8	KBZ 10 OP	PP	0.13	0.625	-.0002	1.125	-.0005	0.875	-.008	1.059	.056	1.104	-.008	0.375	80	3	174	265	
3/4	KBZ 12 OP	PP	0.17	0.750	-.0003	1.250	-.0005	1.250	-.008	1.176	.056	1.166	-.008	0.438	60	4	194	308	
1	KBZ 16 OP	PP	0.37	1.000	-.0003	1.563	-.0005	1.500	-.008	1.469	.068	1.755	-.012	0.563	50	5	220	353	
1 1/4	KBZ 20 OP	PP	1.26	1.250	-.0003	2.000	-.0006	1.625	-.008	1.886	.068	2.005	-.012	0.625	50	5	353	616	
1 1/2	KBZ 24 OP	PP	1.26	1.500	-.0003	2.375	-.0006	2.250	-.012	2.239	.086	2.412	-.012	0.75	50	5	490	904	
2	KBZ 32 OP	PP	2.16	2.000	-.0003	3.000	-.0007	2.625	-.012	2.838	.103	3.192	-.012	1	50	5	859	1,785	

The dynamic load rating is based on a travel life expectancy of 2x10<sup>6</sup> inches

# Precision Linear Ball Bearing With Housing

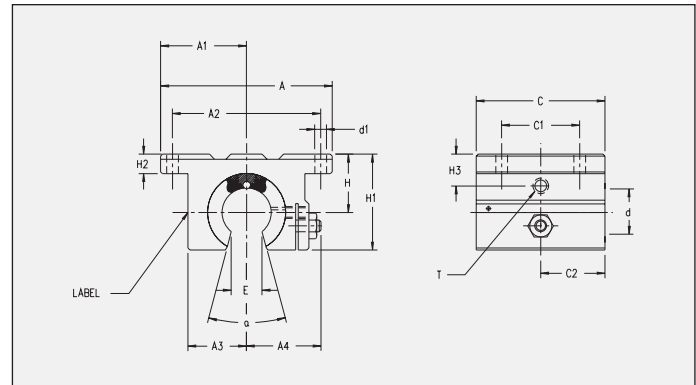
Series KGBZ, KGBZ..PP



Shaft dia.	Part Number	Seal suffix	Wt lbs.	Dimension in inches															Load Ratings (Lbs)	
				d	A	C	A1 ±.001	H ±.001	A3	H1	H2	H3	C2	H4	T	A2 ±.01	C1 ±.01	d1	Dynamic C	Static C <sub>c</sub>
1/4	KGBZ 04	PP	.112	0.250	1.63	1.188	0.813	0.437	1.000	0.813	0.188	0.750	0.590	0.437	NIP A1	1.312	0.750	.156	46	60
3/8	KGBZ 06	PP	.157	0.375	1.75	1.313	0.875	0.500	1.125	0.938	0.188	0.875	0.660	0.500	NIP A1	1.437	0.875	.156	51	71
1/2	KGBZ 08	PP	.328	0.500	2.00	1.688	1.000	0.687	1.375	1.250	0.250	1.125	0.844	0.690	NIP A1	1.688	1.000	.156	115	176
5/8	KGBZ 10	PP	.599	0.625	2.50	1.938	1.250	0.875	1.750	1.625	0.281	1.437	1.260	0.700	1/4-28	2.125	1.125	.188	174	265
3/4	KGBZ 12	PP	.727	0.750	2.75	2.063	1.375	0.937	1.875	1.750	0.313	1.563	1.340	0.937	1/4-28	2.375	1.250	.188	194	308
1	KGBZ 16	PP	1.755	1.000	3.25	2.813	1.625	1.187	2.375	2.188	0.375	1.938	1.950	1.187	1/4-28	2.875	1.750	.218	220	353
1 1/4	KGBZ 20	PP	3.345	1.250	4.00	3.625	2.000	1.500	3.000	2.813	0.437	2.500	2.430	1.500	1/4-28	3.500	2.000	.218	353	616
1 1/2	KGBZ 24	PP	4.920	1.500	4.75	4.000	2.375	1.750	3.500	3.250	0.500	2.875	2.750	1.750	1/4-28	4.125	2.500	.281	490	904
2	KGBZ 32	PP	9.03	2.000	6.00	5.000	3.000	2.125	4.500	4.063	0.625	3.625	3.420	2.125	1/4-28	5.250	3.250	.406	859	1,785

# Precision Linear Ball Bearing With Housing, Open

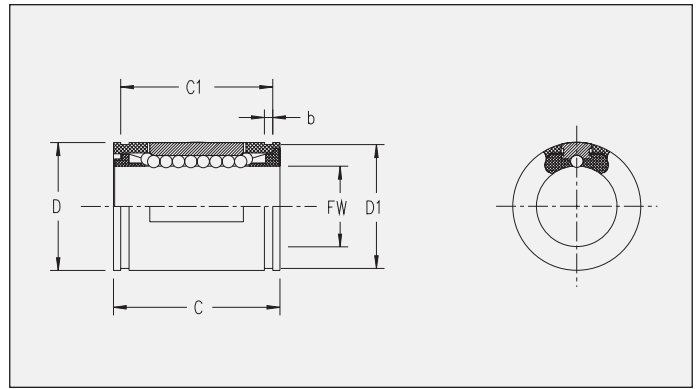
Series KGBZ, KGBZ..OP PP



Shaft dia.	Part Number	Seal suffix	Wt lbs.	Dimension in inches													Mounting Dimensions			Load Ratings (Lbs)		
				d	A	C	A1 ±.001	H ±.001	A3	A4	H1	H2	H3	C2	T	E	α deg.	A2 ±.01	C1 ±.01	d1	Dyn C	Stat C <sub>c</sub>
1/2	KGBZ 08 OP	PP	.247	0.500	2.000	1.500	1.000	0.687	0.688	0.905	1.100	.250	0.370	0.520	NIP A1	0.313	80	1.688	1.00	.156	115	176
5/8	KGBZ 10 OP	PP	.458	0.625	2.500	1.750	1.250	0.875	0.875	1.095	1.375	.281	0.450	0.875	1/4-28	0.375	80	2.125	1.13	.188	174	265
3/4	KGBZ 12 OP	PP	.589	0.750	2.750	1.875	1.375	0.937	0.937	1.161	1.535	.313	0.510	0.937	1/4-28	0.438	60	2.375	1.25	.188	194	308
1	KGBZ 16 OP	PP	1.320	1.000	3.250	2.625	1.625	1.187	1.188	1.457	1.975	.375	0.730	1.312	1/4-28	0.563	50	2.875	1.75	.218	220	353
1 1/4	KGBZ 20 OP	PP	3.240	1.250	4.000	3.375	2.000	1.500	1.500	1.831	2.485	.437	0.800	1.688	1/4-28	0.625	50	3.500	2.00	.218	353	616
1 1/2	KGBZ 24 OP	PP	4.210	1.500	4.750	3.750	2.375	1.750	1.750	2.087	2.910	.500	0.840	1.875	1/4-28	0.750	50	4.125	2.50	.281	490	904
2	KGBZ 32 OP	PP	7.382	2.000	6.000	4.750	3.000	2.125	2.125	2.638	3.660	.625	1.100	2.375	1/4-28	1.000	50	5.520	3.25	.406	859	1,785

# Self-Aligning Linear Ball Bearing

Series KNZ, KNZ..PP

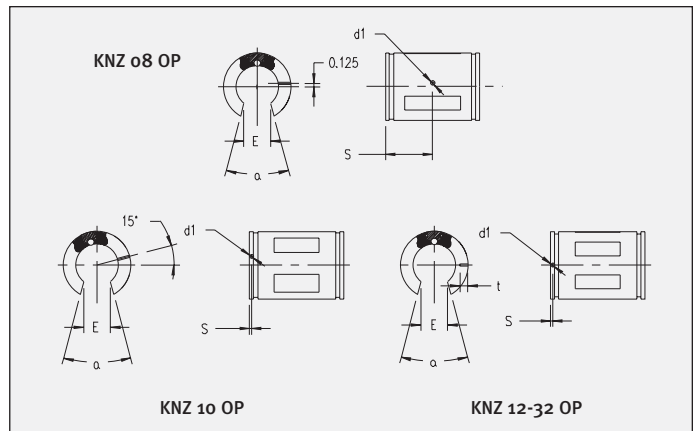


Shaft dia.	Part Number	Seal suffix	Wt lbs.	Dimension in inches										No. of Ball Rows	Load Ratings (Lbs)	
				F <sub>w</sub>	Tol. +.0000	D	C	Tol. +.000	D <sub>i</sub>	b	C <sub>i</sub>	Tol. +.000	Dynamic C		Static C <sub>0</sub>	
1/4	KNZ 04	PP	0.008	0.250	-.0005	0.500	0.750	-.015	0.469	0.039	0.515	-.015	4	39	27	
3/8	KNZ 06	PP	0.013	0.375	-.0005	0.625	0.875	-.015	0.588	0.039	0.703	-.015	4	59	43	
1/2	KNZ 08	PP	0.042	0.500	-.0005	0.875	1.250	-.020	0.821	0.046	1.032	-.020	4	152	112	
5/8	KNZ 10	PP	0.101	0.625	-.0005	1.125	1.500	-.020	1.059	0.056	1.112	-.020	5	273	187	
3/4	KNZ 12	PP	0.123	0.750	-.0005	1.250	1.625	-.020	1.176	0.056	1.272	-.020	6	383	274	
1	KNZ 16	PP	0.265	1.000	-.0005	1.563	2.250	-.020	1.469	0.068	1.886	-.020	6	684	492	
1 1/4	KNZ 20	PP	0.485	1.250	-.0006	2.000	2.625	-.025	1.886	0.068	2.011	-.025	6	1,017	712	
1 1/2	KNZ 24	PP	0.750	1.500	-.0006	2.375	3.000	-.030	2.239	0.086	2.422	-.030	6	1,298	852	
2	KNZ 32	PP	1.400	2.000	-.0008	3.000	4.000	-.040	2.838	0.103	3.206	-.040	6	2,104	1,458	

The dynamic load rating is based on a travel life expectancy of 2x10<sup>6</sup> inches

# Self-Aligning Linear Ball Bearing, Open

Series KNZ..OP, KNZ..OP PP



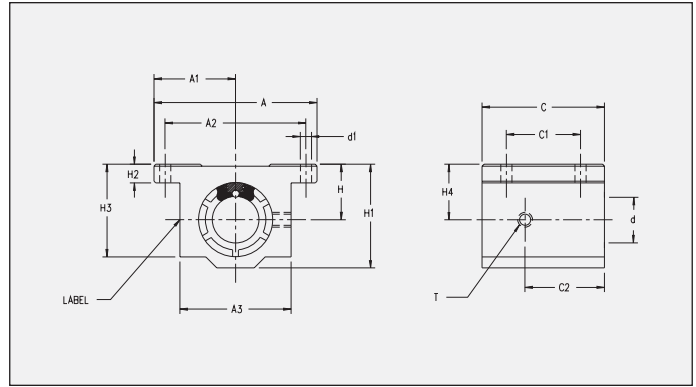
Shaft dia.	Part Number	Seal suffix	Wt lbs.	Dimension in inches															No. of Ball Rows	Load Ratings (Lbs)	
				F <sub>w</sub> *	Tol. +.0000	D*	C*	Tol. +.000	D <sub>i</sub> *	b*	C <sub>i</sub> *	Tol. +.000	d <sub>i</sub>	E	α deg.	t	s	Dynamic C		Static C <sub>0</sub>	
1/2	KNZ o8 OP	PP	0.033	0.500	-.0005	0.875	1.250	-.020	0.821	.046	1.032	-.020	.136	0.313	30	—	.625	3	152	112	
5/8	KNZ 10 OP	PP	0.082	0.625	-.0005	1.125	1.500	-.020	1.059	.056	1.112	-.020	.105	0.375	30	.039	.125	4	315	229	
3/4	KNZ 12 OP	PP	0.101	0.750	-.0005	1.250	1.625	-.020	1.176	.056	1.272	-.020	.136	0.438	30	.059	.125	5	386	279	
1	KNZ 16 OP	PP	0.220	1.000	-.0005	1.563	2.250	-.020	1.469	.068	1.886	-.020	.136	0.563	30	.047	.125	5	690	501	
1 1/4	KNZ 20 OP	PP	0.400	1.250	-.0006	2.000	2.625	-.025	1.886	.068	2.011	-.025	.201	0.625	30	.090	.188	5	1,025	726	
1 1/2	KNZ 24 OP	PP	0.620	1.500	-.0006	2.375	3.000	-.030	2.239	.086	2.422	-.030	.201	0.750	30	.090	.188	5	1,307	867	
2	KNZ 32 OP	PP	1.158	2.000	-.0008	3.000	4.000	-.040	2.838	.103	3.206	-.040	.265	1.000	30	—	.312	5	2,121	1,485	

The dynamic load rating is based on a travel life expectancy of 2x10<sup>6</sup> inches

\*Refer to KNZ,KNZ..PP drawing at top of page for dimensional reference

# Self-Aligning Linear Ball Bearing With Housing

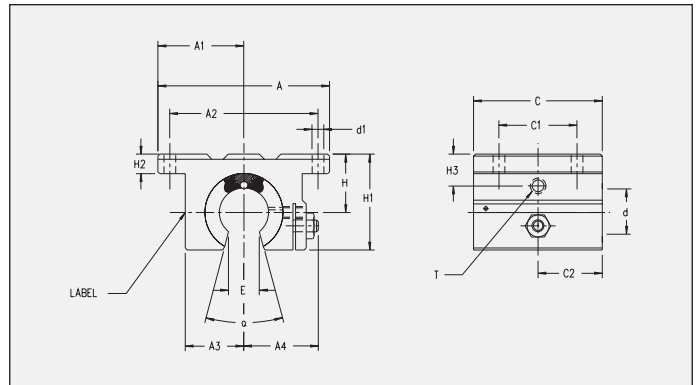
Series KGNZ, KGNZ..PP



Shaft Dia.	Part Number	Seal suffix	Wt. lbs.	Dimensions in inches															Load Ratings (Lbs)	
				d	A	C	A1 ±.001	H ±.001	A3	H1	H2	H3	C2	H4	T	A2 ±.01	C1 ±.01	d1	Dynamic C	Static C <sub>c</sub>
1/4	KGNZ 04	PP	0.10	0.250	1.63	1.188	0.813	0.437	1.000	0.813	0.188	0.750	0.590	0.437	NIP A1	1.312	0.750	.156	39	27
3/8	KGNZ 06	PP	0.14	0.375	1.75	1.313	0.875	0.500	1.125	0.938	0.188	0.875	0.660	0.500	NIP A1	1.437	0.875	.156	59	43
1/2	KGNZ 08	PP	0.29	0.500	2.00	1.688	1.000	0.687	1.375	1.250	0.250	1.125	0.844	0.690	NIP A1	1.688	1.000	.156	152	112
5/8	KGNZ 10	PP	0.53	0.625	2.50	1.938	1.250	0.875	1.750	1.625	0.281	1.437	1.260	0.700	1/4-28	2.125	1.125	.188	273	187
3/4	KGNZ 12	PP	0.64	0.750	2.75	2.063	1.375	0.937	1.875	1.750	0.313	1.563	1.340	0.937	1/4-28	2.375	1.250	.188	383	274
1	KGNZ 16	PP	1.36	1.000	3.25	2.813	1.625	1.187	2.375	2.188	0.375	1.938	1.950	1.187	1/4-28	2.875	1.750	.218	684	492
1 1/4	KGNZ 20	PP	2.86	1.250	4.00	3.625	2.000	1.500	3.000	2.813	0.437	2.500	2.430	1.500	1/4-28	3.500	2.000	.218	1,017	712
1 1/2	KGNZ 24	PP	4.19	1.500	4.75	4.000	2.375	1.750	3.500	3.250	0.500	2.875	2.750	1.750	1/4-28	4.125	2.500	.281	1,298	852
2	KGNZ 32	PP	7.92	2.000	6.00	5.000	3.000	2.125	4.500	4.063	0.625	3.625	3.420	2.125	1/4-28	5.250	3.250	.406	2,104	1,458

# Self-Aligning Linear Ball Bearing With Housing, Open

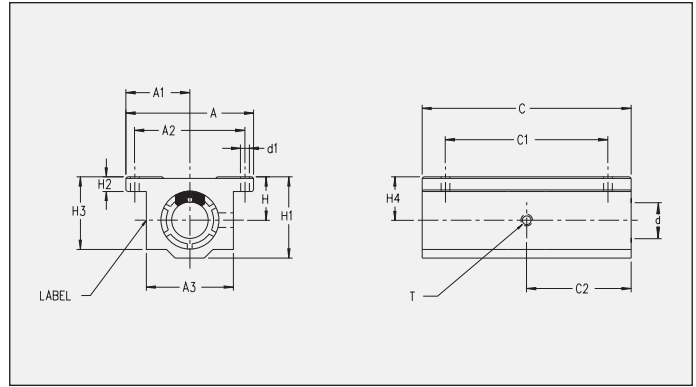
Series KGNZ..OP, KGNZ..OP PP



Shaft dia.	Part Number	Seal suffix	Wt. lbs.	Dimension in inches																	Load Ratings (Lbs)	
				d	A	C	A1 ±.001	H ±.001	A3	A4	H1	H2	H3	C2	T	E	α deg.	A2 ±.01	C1 ±.01	d1	Dyn C	Stat C <sub>c</sub>
1/2	KGNZ 08 OP	PP	0.22	0.500	2.000	1.500	1.000	0.687	0.688	0.905	1.100	.250	0.370	0.520	NIP A1	0.313	30	1.688	1.00	.156	152	112
5/8	KGNZ 10 OP	PP	0.41	0.625	2.500	1.750	1.250	0.875	0.875	1.095	1.375	.281	0.450	0.875	1/4-28	0.375	30	2.125	1.13	.188	315	229
3/4	KGNZ 12 OP	PP	0.52	0.750	2.750	1.875	1.375	0.937	0.937	1.161	1.535	.313	0.510	0.937	1/4-28	0.438	30	2.375	1.25	.188	386	279
1	KGNZ 16 OP	PP	1.17	1.000	3.250	2.625	1.625	1.187	1.188	1.457	1.975	.375	0.730	1.312	1/4-28	0.563	30	2.875	1.75	.218	690	501
1 1/4	KGNZ 20 OP	PP	2.38	1.250	4.000	3.375	2.000	1.500	1.500	1.831	2.485	.437	0.800	1.688	1/4-28	0.625	30	3.500	2.00	.218	1,025	726
1 1/2	KGNZ 24 OP	PP	3.57	1.500	4.750	3.750	2.375	1.750	1.750	2.087	2.910	.500	0.840	1.875	1/4-28	0.750	30	4.125	2.50	.281	1,307	867
2	KGNZ 32 OP	PP	6.38	2.000	6.000	4.750	3.000	2.125	2.125	2.638	3.660	.625	1.100	2.375	1/4-28	1.000	30	5.250	3.25	.406	2,121	1,485

# Self-Aligning Tandem Linear Ball Bearing With Housing

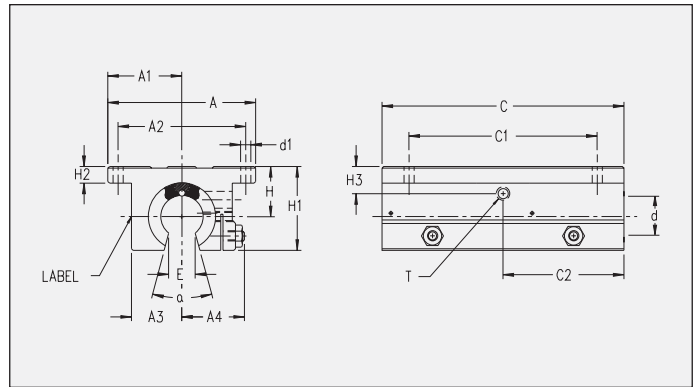
Series KTNZ, KTNZ..PP



Shaft Dia.	Part Number	Seal suffix	Wt. lbs.	Dimensions in inches														Basic Load Ratings		
				d	A	C	A1 ±.001	H ±.001	A3	H1	H2	H3	C2	H4	T	A2 ±.01	C1 ±.01	d1	Dynamic C	Static C <sub>e</sub>
1/4	KTNZ 04	PP	0.21	0.250	1.63	2.50	0.813	0.437	1.000	0.813	0.188	0.750	1.250	0.437	NIP A1	1.312	2.000	.156	63	54
3/8	KTNZ 06	PP	0.27	0.375	1.75	2.75	0.875	0.500	1.125	0.938	0.188	0.875	1.375	0.500	NIP A1	1.437	2.250	.156	96	86
1/2	KTNZ 08	PP	0.51	0.500	2.00	3.50	1.000	0.687	1.375	1.250	0.250	1.125	1.750	0.687	NIP A1	1.688	2.500	.156	247	224
5/8	KTNZ 10	PP	0.97	0.625	2.50	4.00	1.250	0.875	1.750	1.625	0.281	1.437	2.000	0.875	1/4-28	2.125	3.000	.188	281	374
3/4	KTNZ 12	PP	1.25	0.750	2.75	4.50	1.375	0.937	1.875	1.750	0.313	1.563	2.250	0.937	1/4-28	2.375	3.500	.188	622	548
1	KTNZ 16	PP	2.58	1.000	3.25	6.00	1.625	1.187	2.375	2.188	0.375	1.938	3.000	1.187	1/4-28	2.875	4.500	.218	1,111	984
1 1/4	KTNZ 20	PP	4.94	1.250	4.00	7.50	2.000	1.500	3.000	2.813	0.437	2.500	3.750	1.500	1/4-28	3.500	5.500	.218	1,652	1,424
1 1/2	KTNZ 24	PP	7.73	1.500	4.75	9.00	2.375	1.750	3.500	3.250	0.500	2.875	4.500	1.750	1/4-28	4.125	6.500	.281	2,109	1,704

# Self-Aligning Tandem Linear Ball Bearing With Housing, Open

Series KTNZ..OP, KTNZ..OP PP

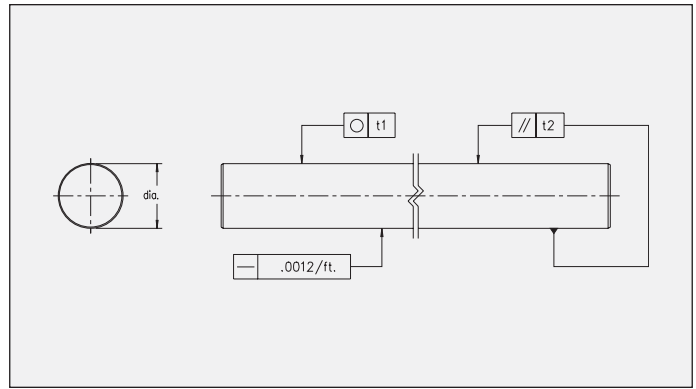


Shaft dia.	Part Number	Seal suffix	Wt lbs.	Dimension in inches														Mounting Dimensions			Load Ratings (Lbs)	
				d	A	C	A1 ±.001	H ±.001	A3	A4	H1	H2	H3	C2	T	E	α deg.	A2 ±.01	C1 ±.01	d1	Dynamic C	Static C <sub>e</sub>
1/2	KTNZ 08 OP	PP	0.49	0.500	2.000	3.50	1.000	0.687	0.688	0.905	1.100	.250	.370	1.75	NIP A1	0.313	30	1.688	2.50	.156	247	224
5/8	KTNZ 10 OP	PP	0.90	0.625	2.500	4.00	1.250	0.875	0.875	1.095	1.375	.281	.450	2.00	1/4-28	0.375	30	2.125	3.00	.188	315	458
3/4	KTNZ 12 OP	PP	1.15	0.750	2.750	4.50	1.375	0.937	0.937	1.161	1.535	.313	.510	2.25	1/4-28	0.438	30	2.375	3.50	.188	386	558
1	KTNZ 16 OP	PP	2.38	1.000	3.250	6.00	1.625	1.187	1.188	1.457	1.975	.375	.730	3.00	1/4-28	0.563	30	2.875	4.50	.218	690	1,002
1 1/4	KTNZ 20 OP	PP	4.61	1.250	4.000	7.50	2.000	1.500	1.500	1.831	2.485	.437	.800	3.75	1/4-28	0.625	30	3.500	5.50	.218	1,025	1,452
1 1/2	KTNZ 24 OP	PP	7.28	1.500	4.750	9.00	2.375	1.750	1.750	2.087	2.910	.500	.800	4.50	1/4-28	0.750	30	4.125	6.50	.281	1,307	1,734

# Precision Hardened & Ground Shafting

Series WZ - Class L, S

Series WZ..PDT - Predrilled & Tapped, Class L, S



Series WZ..L, WZ..PDT

## Dimension Table Series WZ • Dimension in inches

Shaft dia. nom	Part Number			Tolerance		Roundness $t_1$	Taper $t_2^{1)}$	Hardness depth min	Surface finishing max
	Standard "L" class	Standard "S" class	Stainless Steel	Standard Tolerance "L" class	Standard Tolerance "S" class				
1/4	WZ 1/4" L	WZ 1/4" S	WZ 1/4" L-X90CRMOV18	-.0005/-0.0010	-.0010/-0.0015	0.0002	0.0002	0.016	RMS 12
3/8	WZ 3/8" L	WZ 3/8" S	WZ 3/8" L-X46CR13	-.0005/-0.0010	-.0010/-0.0015	0.0002	0.0002	0.016	RMS 12
1/2	WZ 1/2" L	WZ 1/2" S	WZ 1/2" L-X46CR13	-.0005/-0.0010	-.0010/-0.0015	0.0002	0.0002	0.024	RMS 12
5/8	WZ 5/8" L	WZ 5/8" S	WZ 5/8" L-X46CR13	-.0005/-0.0010	-.0010/-0.0015	0.0002	0.0003	0.024	RMS 12
3/4	WZ 3/4" L	WZ 3/4" S	WZ 3/4" L-X46CR13	-.0005/-0.0010	-.0010/-0.0015	0.0002	0.0003	0.035	RMS 12
1	WZ 1" L	WZ 1" S	WZ 1" L-X46CR13	-.0005/-0.0010	-.0010/-0.0015	0.0002	0.0003	0.035	RMS 12
1 1/8	WZ 1-1/8" L	WZ 1-1/8" S	WZ 1-1/8" L-X46CR13	-.0005/-0.0010	—	0.0002	0.0003	0.059	RMS 12
1 1/4	WZ 1-1/4" L	WZ 1-1/4" S	WZ 1-1/4" L-X46CR13	-.0005/-0.0010	-.0010/-0.0015	0.0002	0.0004	0.059	RMS 12
1 1/2	WZ 1-1/2" L	WZ 1-1/2" S	WZ 1-1/2" L-X46CR13	-.0006/-0.0011	-.0011/-0.0016	0.0002	0.0004	0.059	RMS 12
2	WZ 2" L	WZ 2" S	WZ 2" L-X46CR13	-.0006/-0.0013	-.0013/-0.0020	0.0003	0.0005	0.059	RMS 12

1) Measurement of diameter difference

### Ordering Examples:

Cut to length only: 3 pcs., 1 inch Class (L,S) x 39 inches

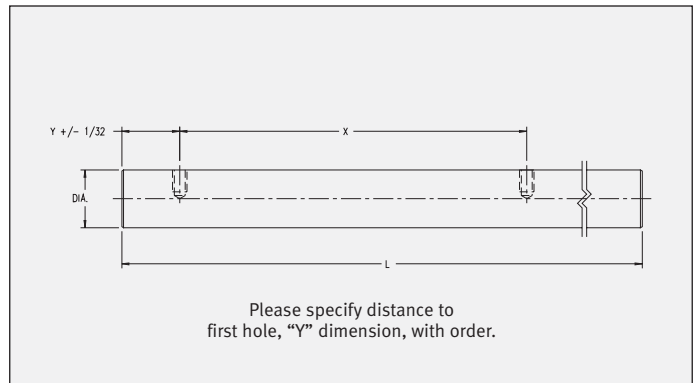
Machined to drawing: 3 pcs., 1 inch x 45 inches per drawing#...(attach drawing)

## Dimension Table Series WZ..PDT • Dimension in inches

Shaft dia. nom	INA Part Number		Hole Spacing X	Thread Size d
	Standard "L" class	Stainless Steel		
1/2	WZ 1/2" L-PDT	WZ 1/2" L-X46CR13-PDT	4	6-32
5/8	WZ 5/8" L-PDT	WZ 5/8" L-X46CR13-PDT	4	8-32
3/4	WZ 3/4" L-PDT	WZ 3/4" L-X46CR13-PDT	6	10-32
1	WZ 1" L-PDT	WZ 1" L-X46CR13-PDT	6	1/4-20
1 1/4	WZ 1-1/4" L-PDT	—	6	5/16-18
1 1/2	WZ 1-1/2" L-PDT	WZ 1-1/2" L-X46CR13-PDT	8	3/8-16
2	WZ 2" L-PDT	—	8	1/2-13

### Ordering Examples:

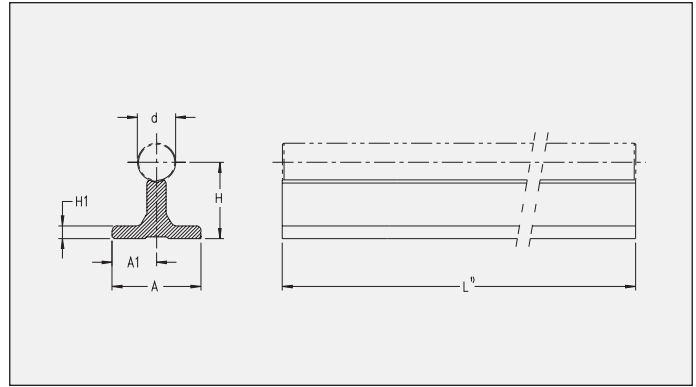
PDT shafting: 1 x PDT x 36 inches  
y = 4 inches



Special tolerances may be available, please contact your INA Sales Representative

# Shaft Support Rails

Series TSWZ

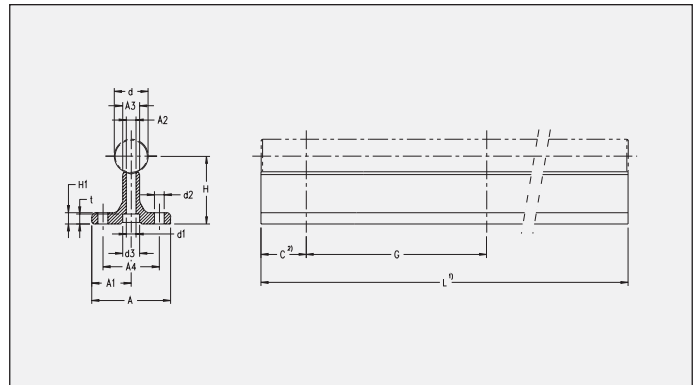


Shaft dia.	Part Number	Wt. lbs/ft	Dimension in inches			
			A	H <sup>1)</sup> ±.002	H <sub>1</sub>	A <sub>1</sub> <sup>2)</sup>
1/2	TSWZ 08	0.60	1.50	1.125	.188	0.750
5/8	TSWZ 10	0.78	1.63	1.125	.250	0.813
3/4	TSWZ 12	1.01	1.75	1.500	.250	0.875
1	TSWZ 16	1.37	2.13	1.750	.250	1.063
1 1/4	TSWZ 20	1.98	2.50	2.125	.313	1.250
1 1/2	TSWZ 24	3.03	3.00	2.500	.375	1.500
2	TSWZ 32	4.80	3.75	3.250	.500	1.875

- 1) Maximum length L = 48
- 2) With reference to the nominal shaft diameter, measured while clamped

# Shaft Support Rails & Assemblies Drilled To Standard Dimensions

Series TSWZ..PD / TSWWZ



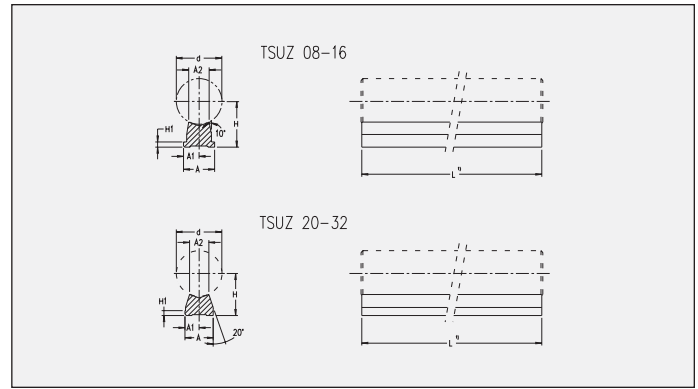
Shaft dia.	Part Number Rail only	Part Number Shaft & Rail Assembly	Wt lbs/ft	Dimension in inches						Mounting Dimensions					
				A	H <sup>1)</sup> ±.002	H <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	d <sub>3</sub>	t	d <sub>1</sub>	d <sub>2</sub>	A <sub>6</sub>	G
1/2	TSWZ 08 PD	TSWWZ 08	0.60	1.50	1.125	.188	.208	.250	0.750	.281	.134	.169	.169	1.000	4
5/8	TSWZ 10 PD	TSWWZ 10	0.78	1.63	1.125	.250	.251	.313	0.813	.312	.159	.193	.193	1.125	4
3/4	TSWZ 12 PD	TSWWZ 12	1.01	1.75	1.500	.250	.294	.375	0.875	.375	.185	.221	.221	1.250	6
1	TSWZ 16 PD	TSWWZ 16	1.37	2.13	1.750	.250	.379	.500	1.063	.437	.244	.281	.281	1.500	6
1 1/4	TSWZ 20 PD	TSWWZ 20	1.98	2.50	2.125	.313	.465	.563	1.250	.531	.306	.343	.343	1.875	6
1 1/2	TSWZ 24 PD	TSWWZ 24	3.03	3.00	2.500	.375	.550	.688	1.500	.625	.368	.406	.343	2.250	8
2	TSWZ 32 PD	TSWWZ 32	4.8	3.75	3.250	.500	.721	.875	1.875	.812	.492	.531	.406	2.750	8

- 1) Maximum length L = 48
- 2) The dimension C is dependent on the length of the support rail. It should always be equal at both ends
- 3) With reference to the nominal shaft diameter, measured while clamped



# Shaft Support Rails Low Profile

Series TSUZ

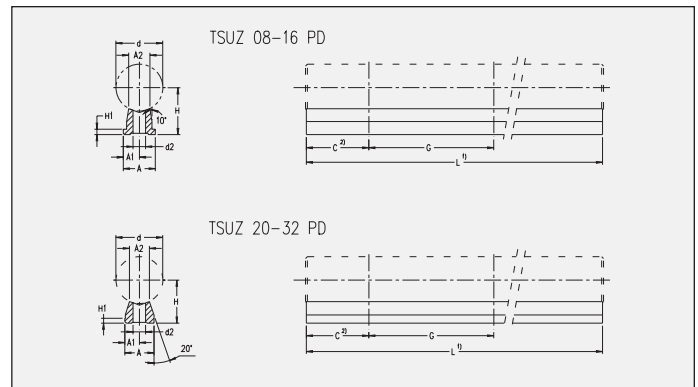


Shaft dia.	INA Part Number	Wt lbs/ft	Dimension in inches					
			d	A	H <sup>1)</sup> ±.002	H <sub>1</sub>	A <sub>1</sub> <sup>2)</sup>	A <sub>2</sub>
1/2	TSUZ 08	.11	0.50	0.37	0.562	.120	.185	.216
5/8	TSUZ 10	.17	0.63	0.45	0.687	.120	.225	.269
3/4	TSUZ 12	.20	0.75	0.51	0.750	.120	.225	.317
1	TSUZ 16	.35	1.00	0.69	1.000	.120	.345	.422
1 1/4	TSUZ 20	.44	1.25	0.78	1.187	.200	.390	.523
1 1/2	TSUZ 24	.58	1.50	0.93	1.375	.200	.465	.625
2	TSUZ 32	.89	2.00	1.18	1.750	.250	.590	.824

- 1) Maximum length L = 48
- 2) With reference to the nominal shaft diameter, measured while clamped

# Shaft Support Rails Low Profile Drilled To Standard Dimensions

Series TSUZ..PD

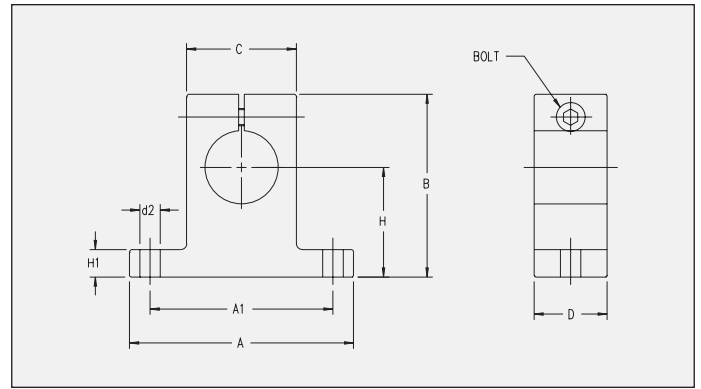


Shaft dia.	INA Part Number	Wt lbs/ft	Dimension in inches				Mounting Dimensions			G
			d	A	H <sup>1)</sup>	H <sub>1</sub> ±.002	A <sub>1</sub> <sup>2)</sup>	A <sub>2</sub>	d <sub>2</sub>	
1/2	TSUZ 08 PD	0.11	0.50	0.37	.562	.120	.185	.216	.169	4
5/8	TSUZ 10 PD	0.17	0.63	0.45	.687	.120	.225	.269	.193	4
3/4	TSUZ 12 PD	0.20	0.75	0.51	.750	.120	.255	.317	.221	6
1	TSUZ 16 PD	0.35	1.00	0.69	1.000	.120	.345	.422	.281	6
1 1/4	TSUZ 20 PD	0.44	1.25	0.78	1.187	.200	.390	.523	.343	6
1 1/2	TSUZ 24 PD	0.58	1.50	0.93	1.375	.200	.465	.623	.406	8
2	TSUZ 32 PD	0.89	2.00	1.18	1.750	.250	.590	.824	.531	8

- 1) Maximum length L = 48
- 2) The dimension C is dependent on the length of the support rail. It should always be equal at both ends
- 3) With reference to the nominal shaft diameter, measured while clamped

# Shaft End Support Blocks

Series GWZ



Series GWZ

Shaft dia.	Part Number	Wt oz.	Dimension in inches					Mounting Dimensions			
			H ±.002	A	B	C	D	H1	A1	d2	Bolt
1/4	GWZ 04	0.53	.6875	1.500	1.063	.500	.500	.250	1.125	.156	#6
3/8	GWZ 06	0.74	.7500	1.625	1.187	.688	.563	.250	1.250	.156	#6
1/2	GWZ 08	1.24	1.000	2.000	1.625	.875	.625	.250	1.500	.188	#8
5/8	GWZ 10	1.84	1.000	2.500	1.750	1.00	.688	.313	1.875	.218	#10
3/4	GWZ 12	2.61	1.250	2.500	2.063	1.25	.750	.313	2.000	.218	#10
1	GWZ 16	4.80	1.500	3.063	2.500	1.50	1.00	.375	2.500	.281	1/4
1 1/4	GWZ 20	8.97	1.750	3.750	3.000	2.00	1.13	.438	3.000	.346	5/16
1 1/2	GWZ 24	12.00	2.000	4.375	3.437	2.25	1.25	.500	3.500	.346	5/16
2	GWZ 32	23.65	2.500	5.500	4.375	3.00	1.50	.625	4.500	.406	3/8

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