Section 1 — An Introduction to Reali-Slim Thin Section Bearings

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Product Line Overview

The inch family of Reali-Slim thin section bearings includes seven open series (Figure 1-2) and five sealed series (Figure 1-3), ranging in bore diameters from 1.000 inch to 40.000 inches. Series range from .187 x .187 inch to 1.000 x 1.000 inch in cross-section. Open bearings are available from stock in three configurations (Types A, C & X). Stock sealed bearings are available in Types C & X only.

We can provide internal fit up, lubricants, separators and other features to meet the most demanding specifications. To obtain corrosion resistance consider using the Kaydon stainless steel Reali-Slim or Endura-Slim® series of bearings. Endurakote plating provides corrosion protection equal to or better than a full AISI 440C stainless steel bearing and can be supplied with very quick delivery.

Additional product line variants include Reali-Slim MM metric series bearings (Figure 1-4), Ultra-Slim bearings (Figure 1-1), Reali-Slim TT series turntable bearings, BB metric ball bearings (all found in Section 2), Bearings for Demanding Applications, and KT thin section taper bearings (Section 6).

Within these families, you can generally choose between open bearings for applications where bearings will not be exposed to damaging particulates and sealed bearings for applications where bearings need to be kept clean and well-lubricated.

To support various load scenarios, Reali-Slim bearings are available in three basic types: radial contact (Type C), angular contact (Type A), and four-point contact (Type X)—see pages 10 and 11 for explanations of each type—and in a variety of sizes, or series (e.g., KA, KB, KC, etc.).

Reali-Slim bearings are available with various separator options to space the rolling elements uniformly and prevent contact between them. Separator types available include: continuous ring "snap-over pocket", continuous ring circular pocket, formed wire, toroid, PTFE spacers, and spacer ball separators. See Section 4 for complete details.

Specification Control

In today's world, product traceability is extremely important. To satisfy these requirements, requesting a "specification control drawing" for a Reali-Slim bearing is a valuable option to consider.

A specification control drawing provides the user a concise description of the important bearing features and parameters for a specific bearing. A specification control drawing request will generate a unique part number for the standard Reali-Slim bearing, including the commercially available options you have selected. This provides the customer quick and easy identification of product in the field as well as a concise receiving and inspection document for the factory.

Reali-Slim Bearings Improve Design Efficiency

In Reali-Slim bearings, each series is based on a single cross-section which remains constant as the bore diameter is increased. This is in sharp contrast to standard bearings in which the cross-section increases as the bore diameter increases. The constant cross-section of a Reali-Slim bearing is of particular value when designing a product which will be manufactured in various sizes based on shaft diameter and power requirements (Figure 1-5). By using the same series of Reali-Slim bearings throughout a product line, the designer can standardize on common components. For all diameters of this rotary table your bearing envelope stays the same.

Figure 1-1, Ultra-Slim Bearings

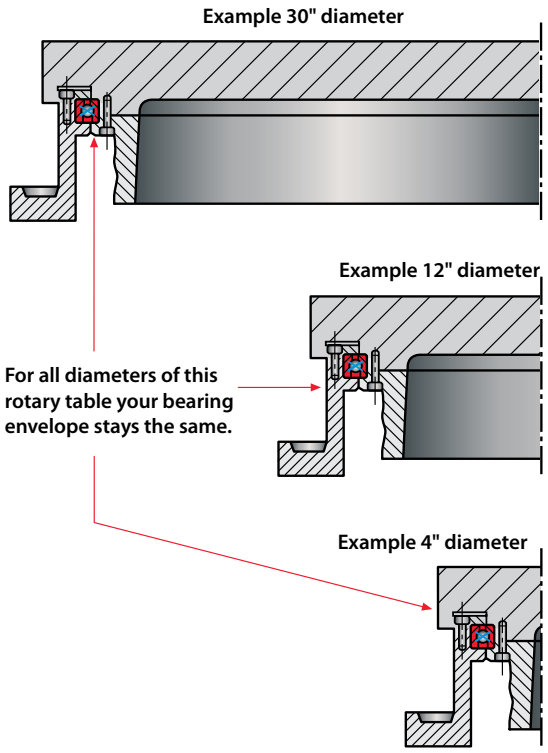
Ultra-Slim
2.5mm x 3mm

Figure 1-2, Inch Bearings, Open

Series AA 3/16" x 3/16"
Series A 1/4" x 1/4"
Series B 5/16" x 5/16"
Series C 3/8" x 3/8"
Series D 1/2" x 1/2"
Series F 3/4" x 3/4"
Series G 1" x 1"

Product Line Overview (continued)

Figure 1-5



Reali-Slim Bearings Make a More Compact Design

Additional advantages in application design made possible by Reali-Slim bearings can be seen by referring to Figures 1-6, 1-7, and 1-8. A large bore, small cross-section Reali-Slim bearing permits the use of a large diameter hollow shaft (Figure 1-7) in place of a smaller diameter solid shaft (Figure 1-6), king-post design. Components such as air and hydraulic lines or electrical wiring and slip rings can then be accommodated within the hollow shaft, resulting in a neater, more efficient design.

In many applications, a single four-point contact Reali-Slim bearing (Figure 1-8) can replace two bearings (Figures 1-6 and 1-7) compacting the design and simplifying the bearing mounting. Besides the obvious cost savings of eliminating one bearing, this arrangement also creates space and saves weight. The use of Reali-Slim bearings also provides a stiffer structure by using large diameter hollow tubes to replace solid shafts and by supporting the rotating structure (table) at the periphery.

Figure 1-6

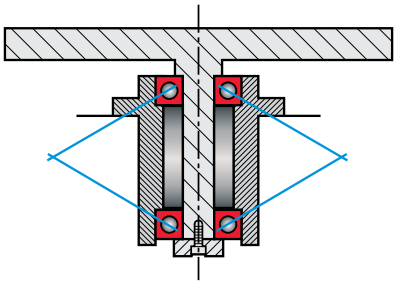


Figure 1-7

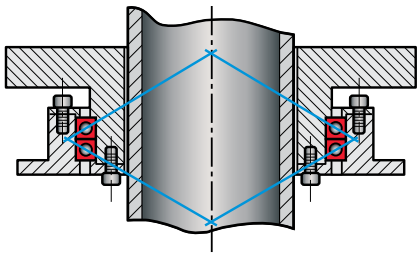


Figure 1-8

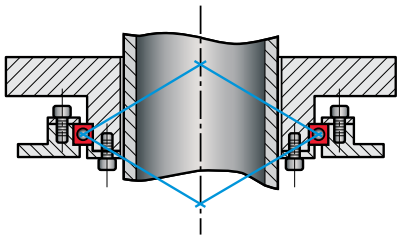


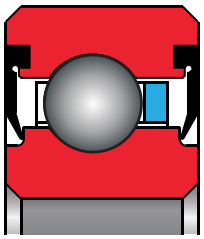
Figure 1-3, Inch Bearings, Sealed

Series JHA 3/16" x 1/4"

Series JA 1/4" x 1/4"

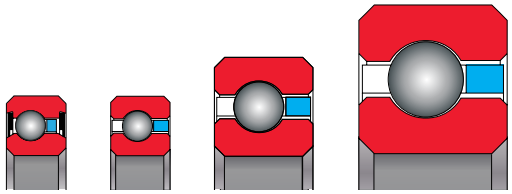
Series JB 5/16" x 5/16"

Series JU 1/2" x 3/8"



Series JG 1" x 1"

Figure 1-4, Metric Bearings



Sealed 8mm x 8mm

Open 8mm x 8mm

Open 13mm x 13mm

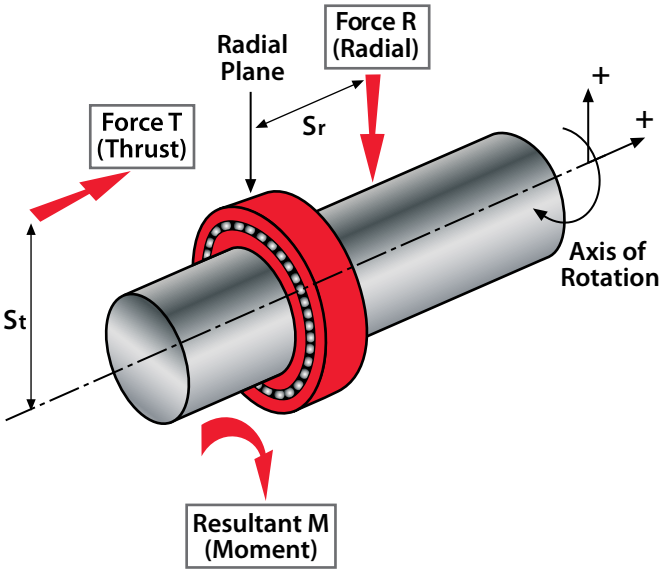
Open 20mm x 20mm

Reali-Slim Bearing Types Support All Load Scenarios

Radial and Axial (Thrust) Loads

Bearings support a shaft or housing to permit their free motion about an axis of rotation. Load can be applied to bearings in either of two basic directions (Figure 1-9). Radial loads act at right angles to the shaft (bearing's axis of rotation). Axial (thrust) acts parallel to the axis of rotation. When these loads are offset from either the bearing axis (distance St) or radial plane (distance Sr), a resulting moment load (M) will be created. Reali-Slim bearings are available in a variety of types to handle radial loads, axial loads and moment loads.

Figure 1-9



The resultant moment load (M) equation:
$M = (\pm T)(S_t) + (\pm R)(S_r)$

Types of Reali-Slim Bearings

Reali-Slim bearings are available in three basic configurations: radial (Type C), angular contact (Type A), and four-point contact (Type X).

Reali-Slim Bearing Types
A = angular
C = radial
X = four-point

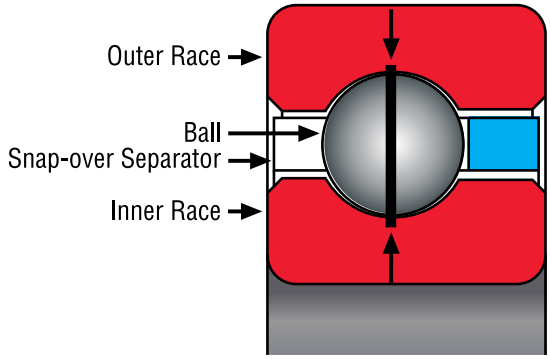
By using these three types, the customer has a wider choice of mounting arrangements to meet load, stiffness and accuracy requirements in the most efficient manner.

Radial Contact Bearing (Type C)

The Type C Radial Contact Bearing (Figure 1-10) is a single row radial ball bearing of conventional design. It is a Conrad-type assembly, which means that it is assembled by eccentric displacement of the inner race within the outer race which permits insertion of about half of a full complement of balls.

Reali-Slim Type C

Figure 1-10



Although the Type C bearing is designed primarily for radial load application, it can be configured to accept some axial (thrust) load in either direction. But, if thrust is a concern, a set of angular contact bearings should be considered for the specific application.

Reali-Slim Bearing Types Support All Load Scenarios (continued)

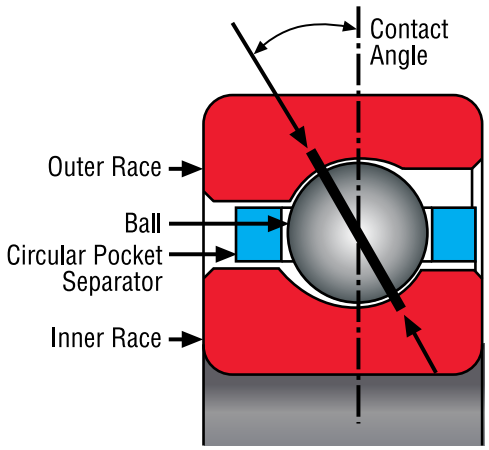
Angular Contact Bearing (Type A)

The Type A bearing is also a conventional design. It features a circular pocket separator and a 30° contact angle (see Figure 1-11) along with approximately 67% of a full complement of balls.

The chief benefit of the Type A bearing is that it provides greater thrust capacity than a Type C or Type X bearing. Because of its counterbored outer race, a Type A bearing has unidirectional thrust capacity. Thus, this bearing should be mounted opposed to another bearing to establish and maintain the contact angle, and to support reversing thrust loads.

Reali-Slim Type A

Figure 1-11



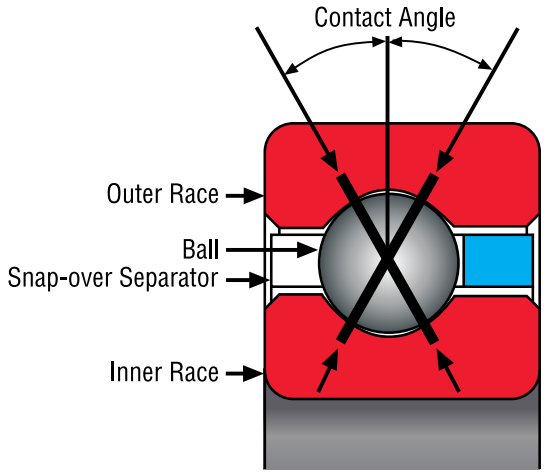
Four-Point Contact Bearing (Type X)

Standard bearing lines are most often designed to handle either radial or axial load conditions. The unique feature of the Reali-Slim Type X four-point contact bearing line (see Figure 1-12) is that the gothic arch geometry of the inner and outer races enables a single bearing to carry three types of loading (radial, axial and moment) simultaneously. This makes it the bearing of choice for many applications since a single four-point contact bearing can often replace two bearings, providing a simplified design.

Type X bearings may also be furnished with an internal diametral preload for those applications requiring greater stiffness or zero free play. This is accomplished by using balls that are larger than the space provided between the raceways. The balls and raceways, therefore, have some elastic deformation in the absence of an external load.

Reali-Slim Type X

Figure 1-12



NOTE: Kaydon does not recommend the use of two Type X bearings on a common shaft, as it could result in objectionable friction torque.

General Information and Availability Chart

Standard Reali-Slim Bearings—are those listed in the Series Data Tables. They are manufactured to Kaydon Precision Class 1 and the specifications on page 13. New sizes are added to stock periodically and updated on our website. Be sure to visit www.kaydonbearings.com for latest information.

Options

Reali-Slim Bearings—can be optimized for your special requirements. Standard commercial options include: changes in diametral clearance, preloading, lubricants, packaging, etching of high points, tagging bearings with actual dimensions as requested, separators, duplexing, data sheets, acceptance testing, etc.

Reali-Slim Bearings—can be ordered with non-standard materials, sizes, tolerances, specifications, and features as well as custom packaging and lubrication options. We also have ISO Class 7 facilities for applications requiring cleanroom assembly. We will be pleased to quote on your requirements.

Order Reali-Slim Bearings—by bearing numbers shown in Series Data Tables.

Assistance—in bearing selection will be furnished by our regional sales managers or the Kaydon Engineering Department upon request.

Changes—Due to Kaydon's continuing program of product improvement, we reserve the right to change specifications and other information included in this catalog without notice.

Figure 1-13

The following table shows the availability of AISI 52100 standard Reali-Slim bearings. For the availability of Reali-Slim MM bearings, please see page 72. For stainless steel bearings, please see Section 2.

Series	Type	Bore Diameter In Inches																																		
		¾	1	1½	1¾	2	2½	3	3½	4	4¼	4½	4¾	5	5½	6	6½	7	7½	8	9	10	11	12	14	16	18	20	21	22	25	30	35	40
JHA Series	A																																			
3/16" Radial	C	■	■	■	■																															
Section	X	■	■	■	■																															
KAA Series	A	■	■	■	■																															
3/16" Radial	C	■	■	■	■																															
Section	X	■	■	■	■																															
JA Series	A																																			
1/4" Radial	C					■	■	■	■	■	■	■	■	■	■	■																				
Section	X					■	■	■	■	■	■	■	■	■	■	■																				
KA Series	A					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■												
1/4" Radial	C					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■												
Section	X					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■												
JB Series	A																																			
5/16" Radial	C					■	■	■	■	■	■	■	■	■	■	■																				
Section	X					■	■	■	■	■	■	■	■	■	■	■																				
KB Series	A					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
5/16" Radial	C					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
Section	X					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								
KC Series	A									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
3/8" Radial	C									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Section	X									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
JU Series	A																																			
3/8" Radial	C									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
Section	X									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■											
KD Series	A									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
1/2" Radial	C									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Section	X									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
KF Series	A									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3/4" Radial	C									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Section	X									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
JG Series	A																																			
1" Radial	C																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Section	X																	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
KG Series	A									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1" Radial	C									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Section	X									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Many bore diameters are available from stock; call Kaydon for details.

Specifications for Standard Reali-Slim Bearings

ITEM	DESCRIPTION	REFERENCE SPECIFICATION
	MATERIAL ANALYSIS	
RACES & BALLS	SAE-AISI 52100 Type Steel AISI 440C Stainless Steel	ASTM A-295 AMS-5630
SEPARATORS C, X BEARINGS	P Type—Brass or Non-metallic composite L Type—Nylon, Fiberglass Reinforced	ASTM B-36
A BEARINGS	R Type—Brass or Non-metallic composite G Type—Nylon, Fiberglass Reinforced	ASTM B-36
SEALS	Nitrile Rubber	
	HEAT TREATMENT	
RACES AND BALLS	Through hardened and dimensionally stabilized for use from -65°F to +250°F (-54°C to +121°C)	
	PRECISION	
RACE DIMENSIONS	Kaydon Precision Class 1	ABMA ABEC-1F or better, per ABMA Standard 26.2
RACE RUNOUTS	Kaydon Precision Class 1	ABMA ABEC-1F or better, per ABMA Standard 26.2
BALLS	ABMA Grade 10	ANSI/ABMA/ISO 3290
	DIAMETRAL CLEARANCE AND CONTACT ANGLE	
TYPE C BEARING	Sufficient diametral clearance to provide small amount of running clearance after installation with recommended fits.	
TYPE X BEARING	Gothic Arch Form for two 30° contact angles under light radial gaging load. Sufficient diametral clearance to provide clearance after installation with recommended fits.	
TYPE A BEARING	Diametral clearance for 30° contact angle in single unmounted bearing under light axial gaging load. Wide range of preload or running clearance for matched sets.	
	SEPARATOR DESIGN	
P & L TYPES C, X BEARINGS	Circular Ring, Snapped Over Balls for Retention	
R & G TYPES A BEARINGS	Circular Ring, Circular Pockets, Self Retained	
	OTHER	
QUALITY CONTROL	Kaydon Quality Control procedures have been approved by major aerospace industries and agencies of the U.S. Government	ISO 9001, AS 9100
IDENTIFICATION	Marked on Bearing O.D.: CAGE Code, "Kaydon"®, Part Number and Date Code	MIL-STD-130
CLEANING	Multiple cycle immersion and agitation in solvents and/or aqueous cleaners	
PRESERVATIVE	Preservative Oil	
PACKAGING	Typically, smaller bearings are heat-sealed in a plastic bag and boxed; larger bearings are "tire-wrapped."	