

# BARDEN

## Ball Screw Support Bearings



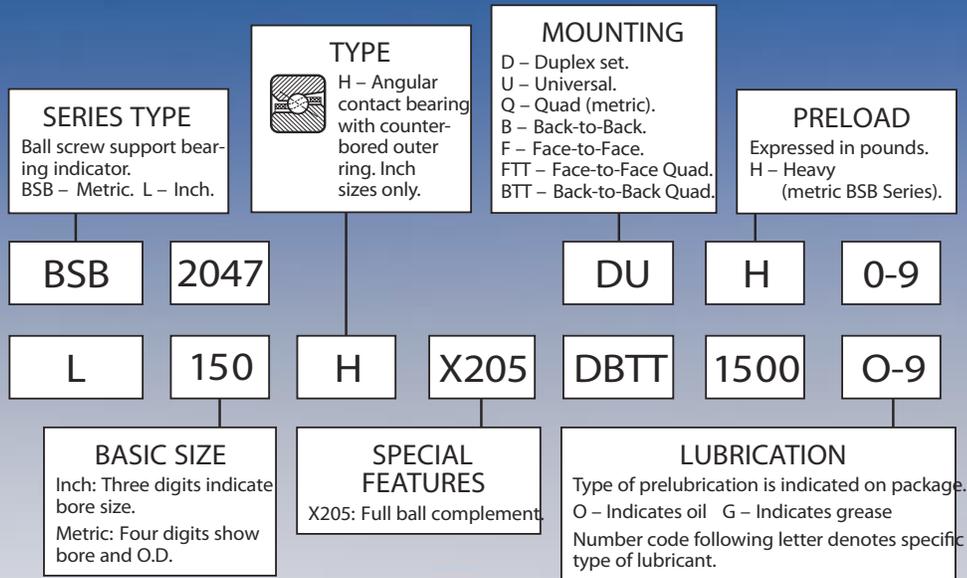
**The Barden Corporation**

FAG Aerospace and Super Precision Bearings Division

# BEARING NOMENCLATURE

**Series BSB Example: BSB2047DUH 0-9**

**Series L Example: L150HX205DBTT1500 0-9**



# SERIES L AND BSB SERIES

## Design/Applications

Barden Series L and BSB Series ball screw support bearings are manufactured specifically for high performance ball screw applications, where extreme rigidity requirements preclude the use of standard angular contact bearings. The internal configuration has been designed to provide an optimum combination of high rigidity, low drag torque, exceptional control of axial runout, higher running speeds and longer life.

Series L and BSB Series nonseparable angular contact bearings have cutaway shoulders on both the inner and outer rings. They can support very high thrust loads in one direction or combinations of radial and thrust loads, but not radial loading alone. Series L and BSB Series bearings are designed to provide machine tool drive systems with extreme axial rigidity, low drag torque and minimal axial runout. They are intended for specific applications in machine tools, e.g., ball screw supports, cross slides, X-Y table positioners and transfer tables. They should not be used in place of standard angular contact spindle bearings.

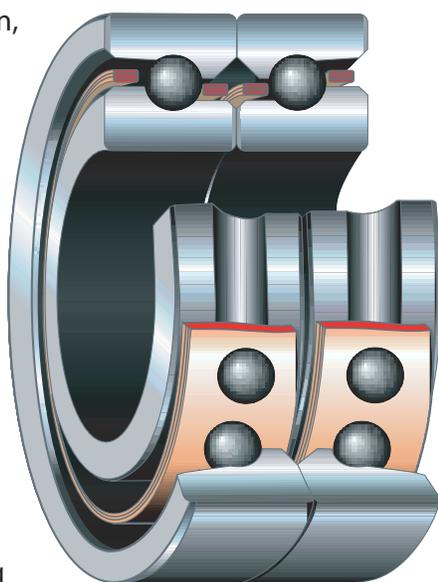
These bearings are available in standard duplex or quadruplex sets. In addition, we will supply custom combination sets to meet specialized application needs.

## Limiting Speeds

Limiting speeds shown in table are useful guidelines. Actual speed limits must be based on the application characteristics. Life requirements, heat transfer conditions, loading and lubrication methods are typical influential factors.

## Preloads

Standard values (heavy) shown in table will be supplied unless otherwise specified. Barden recognizes that some applications do not require the full axial stiffness (compliance) of the standard preload and will supply bearings with custom-ground preloads if required.



## Seals

Some ball screw support bearings may also be available in sealed versions. Ask your Barden sales engineer for details.

## Cages

BSB Series bearings have a molded nylon, glass fiber reinforced polyamide cage with spherical ball pockets. Series L bearings have a land-piloted cage of reinforced phenolic, precision-machined, with evenly spaced ball pockets.

All metric (BSB Series) ball screw support bearings come with the molded nylon cage, standard. Series L bearings are equipped with the phenolic cage, standard.



BSB Series Molded Nylon Cage

Series L Phenolic Cage

## Mounting and Fitting

Normal fitting practice is line-to-line to loose for both shaft and housing fits, as shown in table at right.

All bearing pairs and sets are match-marked on their outside diameter surfaces to indicate correct positioning of each bearing. Barden packaging also contains detailed instructions for proper installation.

Recommendations for shaft and housing shoulder diameters are based on maximum support of duplex-mounted bearings (see table). In circumstances with other mounting arrangements, consult Barden Product Engineering.

## Life Calculations

Most ball screw support bearing applications are subject to duty-cycle loading with constantly changing feeds, speeds and operating loads. These factors, in combination with the heavy preloads built into the bearings, make life calculations difficult. Consult Barden Product Engineering for information which can be used in specific cases.

## Materials

All ball screw support bearings (rings and balls) are made from 52100 steel. Bearings are also available with X-life ultra rings and ceramic (silicon nitride) balls for

# ENGINEERING DATA SUMMARY

## Configurations

Standard configuration includes a cage; some sizes are also available in a full complement version (X205 suffix). Please consult Barden.

**Maximum Shaft/Housing Fillet Radius Which Bearing Corner Will Clear**  
 .040" (1.00 mm)

## Attainable Speeds

Limits given are for DU mounted sets with standard heavy preload.

## Material

SAE 52100 bearing steel is standard.

## Duplexing

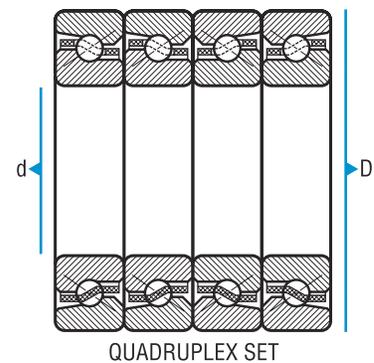
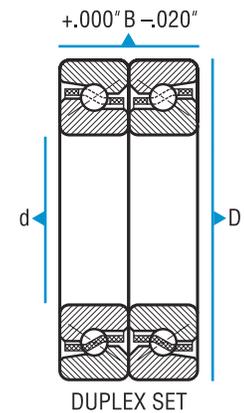
All bearings are universally ground D and can be mounted DU (Universal), DF (Face-to-Face), or DB (Back-to-Back), in pairs or in various combinations — three, four or more bearings as required. Standard preloads for pairs are shown. For quads (DUH), multiply the duplex preload indicated by 2.

## Tolerances

Standard precision class for Series L and BSB Series is ABEC 7, except for a tighter maximum raceway runout with side .0001" (2.5 μm).

## Lubricant:

Desired lubrication should be specified when ordering, based on torque, speed and temperature conditions of the application. Barden strongly recommends G-73, a NLGI Class 2 grease with EP additives. Consult Barden for details.



Bore Diameter d		Outside Diameter D		Width B		DUPLEX SET*** Basic Bearing Nomenclature*	ATTAINABLE SPEEDS (RPM)		Standard Preloads (lbs.)**	Shaft and Housing Shoulder Diameters (in.) ±.005"		Fitting Practice (Line-to-Line to Lo)
							Oil	Grease		Shaft	Housing	
20	.7874	47	1.8504	30	1.181	BSB2047DUH	6700	5000	500	1.065	1.520	.0004
20	.7874	47	1.8504	31.75	1.2500	L078HDF	4000	2800	750	1.065	1.520	.0004
23.838	.9385	62	2.4409	31.75	1.2500	L093HDF	2400	1680	1000	1.590	2.130	.0004
25	.9843	62	2.4409	30	1.181	BSB2562DUH	5000	3800	750	1.590	2.130	.0004
30	1.1811	62	2.4409	30	1.181	BSB3062DUH	5000	3800	650	1.590	2.130	.0004
35	1.3780	72	2.8346	30	1.181	BSB3572DUH	4300	3200	750	1.880	2.430	.0004
38.1	1.5000	72	2.8346	31.75	1.2500	L150HDF	1600	1100	1500	1.880	2.430	.0004
38.1	1.5000	72	2.8346	31.75	1.2500	L150HX4DF	1600	1100	1500	1.880	2.480	.0004
40	1.5748	72	2.8346	30	1.181	BSB4072DUH	4000	3000	650	1.880	2.430	.0004
44.475	1.7510	76.2	3.0000	31.75	1.2500	L175HDF	1400	1000	1500	2.140	2.680	.0004
57.150	2.2500	90	3.5433	31.75	1.2500	L225HDF	1200	850	1750	2.610	3.145	.0004
76.2	3.0000	110	4.3307	31.75	1.2500	L300HDF	800	600	2250	3.385	3.915	.0005

\* Certain sizes listed in table may not be in current production. Check for availability. \*\* Duplex preloads. For quad sets multiply by 2.



Operating Life (in.) to-10 <sup>6</sup> (at 1000 rpm)	Axial Spring Constant (×10 <sup>6</sup> lbs./in.)	Drag Torque (in.- lbs.)	Dynamic Thrust Capacity (lbs.)	Static Thrust Capacity (lbs.)
Housing	Duplex	Duplex	Duplex	Duplex
.0005	4.28	0.44	4,300	5,600
.0005	5.0	2.00	3,300	4,700
.0005	6.6	2.80	3,850	6,500
.0005	5.42	0.75	6,400	9,300
.0005	5.14	0.75	5,800	8,800
.0005	6.0	1.02	6,700	11,200
.0005	8.4	4.00	4,000	7,500
.0005	7.8	4.00	5,500	10,000
.0005	6.0	1.02	6,300	11,000
.0005	9.1	4.50	4,100	8,200
.0005	11.6	6.00	4,400	10,000
.0007	14.3	8.00	4,850	12,900



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