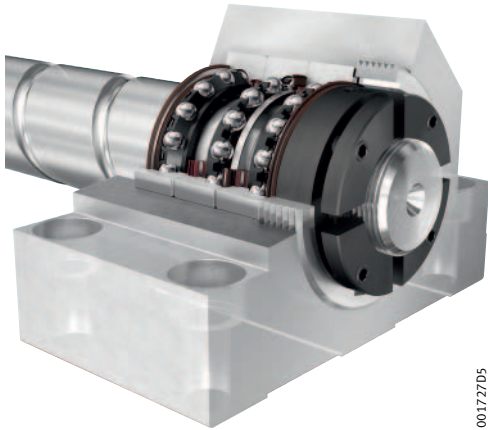




High Speed, High Load Capacity: Bearings for Screw Drives BSB..-SU-XL

Single row axial angular contact ball bearings in X-life design,
universal, with 60° contact angle

Universal bearings BSB...-SU-XL for high speed screw drives



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Figure 1: Screw drive bearing arrangement with one bearing set, comprising three sealed and greased universal bearings BSB...-2Z-SU-XL, located by means of a precision locknut AM

The highly dynamic operating conditions associated with screw drives call for accurate, rigid and low-friction bearing arrangements with a high radial and axial load carrying capacity. For some time, Schaeffler has been offering single row axial angular contact ball bearings BSB...-SU for use here. Schaeffler has now improved these high precision bearings of universal design further in the X-life design BSB...-SU-XL, Figure 2.

Features of the new X-life design

Through the use of state-of-the-art manufacturing techniques, axial angular contact ball bearings BSB...-SU-XL in X-life design have the following features:

- Optimised contact face between the rolling elements and raceway
- Increased raceway accuracy and raceway quality, with a resulting reduction in the stress conditions present on the rolling elements and raceways.

Technical advantages of the new X-life design

The improved features offer a range of advantages:

- High dynamic load carrying capacity and high speeds due to optimised contact faces
- Long grease operating life as less strain is placed on the lubricant
- Low bearing temperatures and high limiting speeds due to reduced friction
- High energy efficiency of the bearing arrangement due to lower frictional power.

High Performance Capacity

X-life



High dynamic load carrying capacity



Longer rating life



High speeds



Quieter running



Reduced heat generation



Longer grease operating life

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Figure 2: Technical advantages of axial angular contact ball bearings BSB-SU-XL

High basic load ratings C, longer rating life L_{hr}

Thanks to the technical changes, the basic dynamic load ratings C are around 10% higher than those of the previous bearing designs, *Figure 3*.

This also has the effect of increasing the basic reference rating life L_{hr} by up to 33%. As a result, the operating life of the bearings is extended under identical operating conditions.

If the rating life values are maintained, alternatively, higher loads can be applied to the bearing arrangement.

Long grease operating life

In addition to the improvement to the surfaces, the material used for the bearing rings is also subjected to special heat treatment.

As a result, the raceways of the inner and outer rings are more resistant to solid particles and under mixed friction.

This in turn extends the grease operating life, as less strain is placed on the lubricant. In short, this heat treatment measure leads to a significant increase in bearing rating life in the X-life design compared to the previous design.

Low bearing temperatures and high speeds

The reduced bearing friction in axial angular contact ball bearings BSB..-SU-XL of X-life design and the associated reduction in heat generation in the bearing permit high speeds.

Customer benefits of the new X-life design

The specified technical advantages of axial angular contact ball bearings BSB..-SU-XL in the X-life design result in a variety of customer benefits:

- Increased productivity
- Extended maintenance intervals for higher machine availability
- Reduced energy consumption and lower operating costs
- Additional degrees of freedom and design possibilities for the new design of the bearing arrangement: Choice between a longer rating life or a higher load.

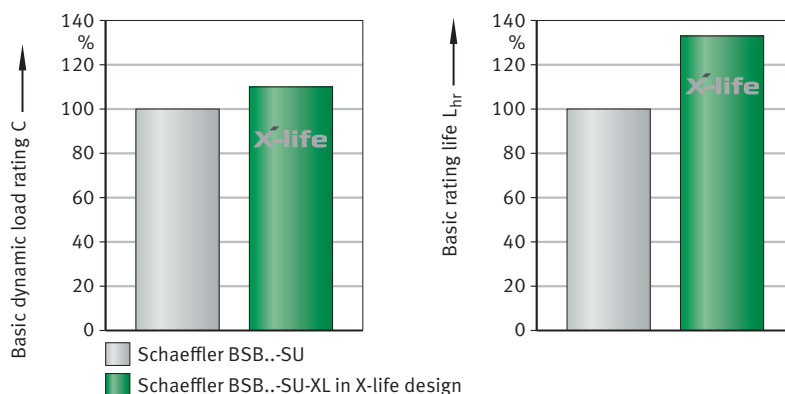


Figure 3: Increase in basic rating life due to higher basic dynamic load ratings in a comparison between BSB..-SU and BSB..-SU-XL

Modular concept offers standard designs

The customer can select three different designs from one modular concept:

- Open bearings, not greased, suitable for oil lubrication or grease filling by the user
- Bearings with minimal gap seal on both sides, greased for life
- Open bearings, greased with multi-purpose grease Arcanol MULTITOP (available by agreement).

Sealed bearings BSB..-2Z-SU-XL

Schaeffler offers all sizes in an X-life design with integral minimal gap seal (suffix 2Z).

Advantages in detail:

- They are supplied greased with the multi-purpose grease Arcanol MULTITOP for optimum running characteristics, low friction and long operating life.
- Protection against the loss of grease and ingress of contaminants.

- Protection against contamination of bearings during mounting. In contrast to open bearings, initial greasing by manual means is not necessary.
- The FKM minimal gap seals have strong chemical resistance to environmental influences, such as synthetic cooling lubricants, oils and greases.

Bearing sets with variants of axial angular contact ball bearings

Axial angular contact ball bearings BSB..-SU-XL can be combined individually by the user in bearing sets, *Figure 1* and *Figure 4*.

As a result, they offer considerable advantages in terms of availability, stockholding and inventory optimisation.

Simple mounting of bearings

The arrow markings on the lateral surface of the bearing outer rings indicate the contact angle arrangement and give the fitter a simple means of assembling the bearings in the correct combination, *Figure 4*.

The correct mounting position can be seen not only from the arrow markings but also from the different seal colours. As a result, the contact angle pattern can be seen and checked at any time even in the mounted condition.

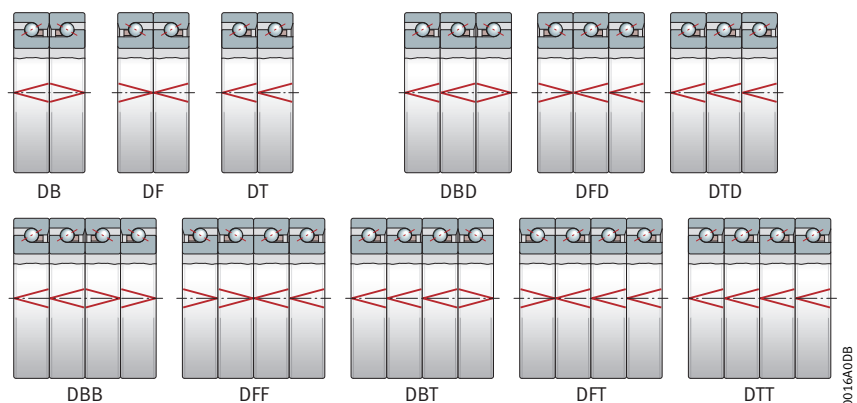


Figure 4: Bearing sets combined individually by the user from universal bearings BSB..-SU-XL

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Bearing designations

The designations of the universal bearings BSB...-SU-XL are constructed as follows, *Figure 5*.

Marking of bearings

The measured actual deviations of the inside and outside diameter are indicated not only on the box but also on the bearing itself, *Figure 6*.

This means that grouping of bearings can be carried out, if necessary, even when the packaging is not present.

Further information:

- Technical Product Information
TPI 123, Bearings for Screw Drives
- Fitting and maintenance manual
TPI 100, Bearings for Screw Drives
- Calculation of screw drive bearings using BEARINX-online Easy Ballscrew.

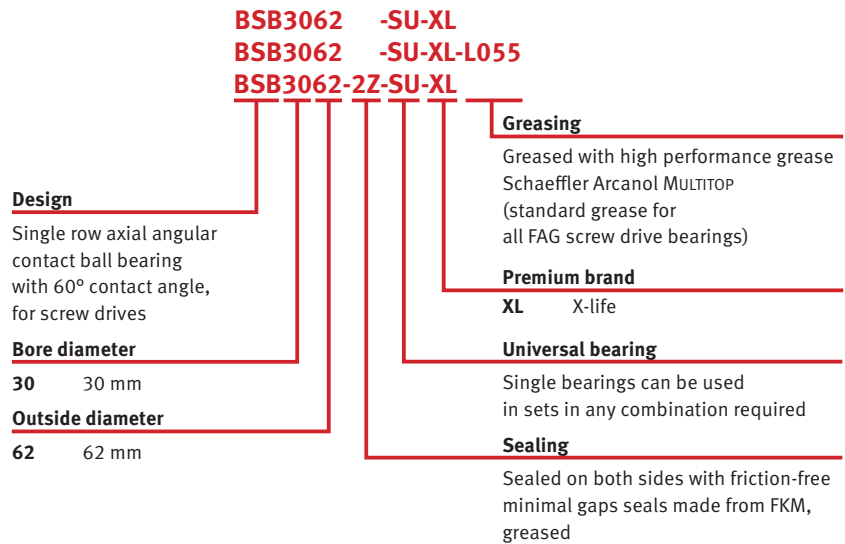


Figure 5: Structure of the bearing designation

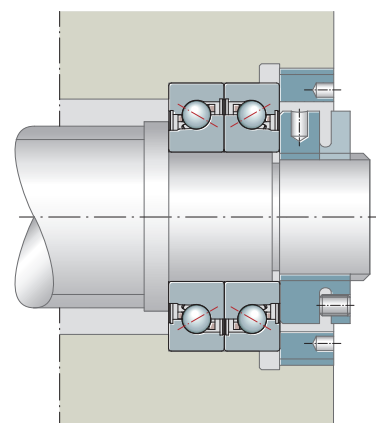
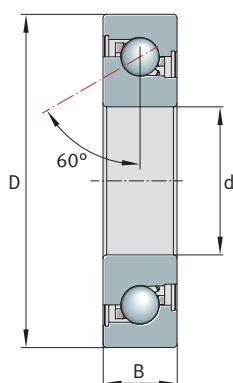


Figure 6: Marking of bearings

Axial angular contact ball bearings

Universal bearings for screw drives

X-life



Dimension table - Dimensions in mm

Designation ¹⁾	Dimensions			Basic load ratings		Fatigue limit load C_{ua} N	Limiting speed		Rigidity axial C_{aL} N/ μ m	Bearing frictional torque ²⁾ M_{RL} Nm	Axial runout Inner ring μ m
	d	D	B	dyn. C_a N	stat. C_{0a} N		n_G grease min^{-1}	$n_{\text{g}}^3)$ min^{-1}			
BSB1547-SU-XL	15 $^0_{-0,004}$	47 $^0_{-0,006}$	15	28 500	47 000	2 850	8 700	6 200	764	0,08	2
BSB1547-2Z-SU-XL											
BSB1747-SU-XL	17 $^0_{-0,004}$	47 $^0_{-0,006}$	15	28 500	47 000	2 850	8 700	6 200	764	0,08	2
BSB1747-2Z-SU-XL											
BSB2047-SU-XL	20 $^0_{-0,005}$	47 $^0_{-0,006}$	15	28 500	47 000	2 850	8 700	6 200	764	0,08	2
BSB2047-2Z-SU-XL											
BSB2562-SU-XL	25 $^0_{-0,005}$	62 $^0_{-0,007}$	15	32 000	64 000	3 850	6 700	5 400	1 001	0,13	2
BSB2562-2Z-SU-XL											
BSB3062-SU-XL	30 $^0_{-0,005}$	62 $^0_{-0,007}$	15	32 000	64 000	3 850	6 700	5 400	1 034	0,13	2,5
BSB3062-2Z-SU-XL											
BSB3572-SU-XL	35 $^0_{-0,006}$	72 $^0_{-0,007}$	15	40 500	89 000	5 400	5 400	4 700	1 196	0,18	2,5
BSB3572-2Z-SU-XL											
BSB4072-SU-XL	40 $^0_{-0,006}$	72 $^0_{-0,007}$	15	40 500	89 000	5 400	5 400	4 700	1 235	0,18	2,5
BSB4072-2Z-SU-XL											

¹⁾ All sizes are available with greasing by agreement. Ordering example: BSB2562-SU-XL-L055.

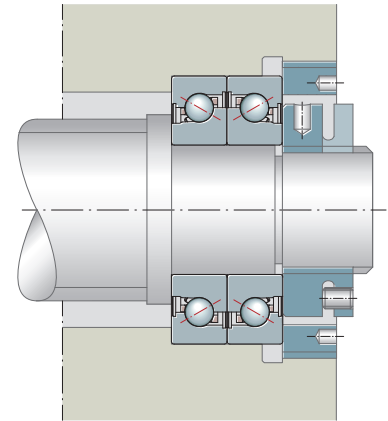
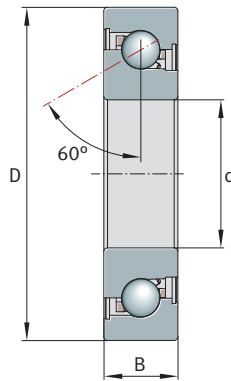
²⁾ Based on a preloaded bearing set comprising two greased bearings.

³⁾ Guide value proven in practice for maximum speeds in applications for machine tools (approx. +50 °C bearing temperature for a proportion of 25% of the operating duration and at room temperature. The bearing is preloaded and free from external load).

Axial angular contact ball bearings

Universal bearings for screw drives

X-life



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Dimension table (continued) · Dimensions in mm

Designation ¹⁾	Dimensions			Basic load ratings axial		Fatigue limit load C_{ua} N	Limiting speed		Rigidity axial C_{aL} N/ μ m	Bearing frictional torque ²⁾ M_{RL} Nm	Axial runout Inner ring μ m
	d	D	B	dyn. C_a N	stat. C_{0a} N		n_G grease min ⁻¹	n_D ³⁾ min ⁻¹			
	BSB4090-SU-XL BSB4090-ZZ-SU-XL	40 ⁰ _{-0,006}	90 ⁰ _{-0,008}	20 ⁰ _{-0,12}	65 000	153 000	9 300	4 500	3 100	1 390	0,23
BSB45100-SU-XL BSB45100-ZZ-SU-XL	45 ⁰ _{-0,006}	100 ⁰ _{-0,008}	20 ⁰ _{-0,12}	68 000	172 000	10 400	4 000	2 700	1 473	0,33	2,5
BSB50100-SU-XL BSB50100-ZZ-SU-XL	50 ⁰ _{-0,006}	100 ⁰ _{-0,008}	20 ⁰ _{-0,12}	68 000	172 000	10 400	4 000	2 700	1 473	0,33	2,5
BSB55120-SU-XL BSB55120-ZZ-SU-XL	55 ⁰ _{-0,007}	120 ⁰ _{-0,008}	20 ⁰ _{-0,15}	71 000	196 000	11 900	3 800	2 300	1 623	0,38	2,5
BSB60120-SU-XL BSB60120-ZZ-SU-XL	60 ⁰ _{-0,007}	120 ⁰ _{-0,008}	20 ⁰ _{-0,15}	71 000	196 000	11 900	3 800	2 300	1 623	0,38	3

¹⁾ All sizes are available with greasing by agreement. Ordering example: BSB2562-SU-XL-L055.

²⁾ Based on a preloaded bearing set comprising two greased bearings.

³⁾ Guide value proven in practice for maximum speeds in applications for machine tools (approx. +50 °C bearing temperature for a proportion of 25% of the operating duration and at room temperature. The bearing is preloaded and free from external load).

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