

Mounting instructions

General

To provide proper bearing performance and prevent premature failure, all relevant procedures and cautions should be observed when mounting SKF Food Line ball bearing units.

As precision components, they should be kept clean and handled carefully when mounting. It is also important to choose the appropriate method of mounting and to use the correct tools.

The method used for mounting SKF Food Line ball bearing units depends on the:

- overall machine design
- bearing housing design
- method used to attach the unit to the shaft.

Tools

To mount or dismount SKF Food Line ball bearing units, the following tools are required:

- a hexagonal key (hex wrench) to tighten or loosen grub (set) screws
- a spanner to tighten or loosen the mounting bolts.

Mounting bolts

To attach SKF Food Line ball bearing units to the support surface and to increase the hygienic safety for the overall product, SKF recommends using hygienic design bolts and rubberised washers, **fig 1**.

In order to assure the ball bearing unit correct positioning and load withstanding, SKF advises to not exceed the machine wall through holes diameters as per **table 4, 5 and 7**, and to follow the tightening torque values highlighted in **table 2**.

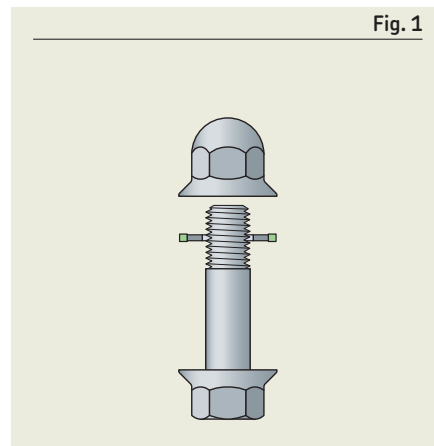


Fig. 1

Table 1

Recommended fits

Operating conditions	Tolerance class ¹⁾
$P > 0,05 C$ and/or high speeds	h6
$0,035 C < P \leq 0,05 C$ and/or low speeds	h7
$0,02 C < P \leq 0,035 C$ and/or low speeds	h8
Simple bearing arrangement or $P \leq 0,02 C$	h9–11

¹⁾ All ISO tolerance classes are valid with the envelope requirements (such as h7(ES)) in accordance with ISO 14405-1.

⚠ WARNING

Failure to carefully follow applicable mounting instructions and not to have the metallic bushes in contact with machine frame on composite housing, may results in premature bearing failure or improper performance. For further information, contact the SKF application engineering service.

Back Seal

The unit with back seal already mounted has to be placed without end cover on the shaft for Pillow block and on the machine frame for flanged units (**fig. 2**).

End cover is mounted in order to complete the unit mounting on the machine position (**fig. 3**).

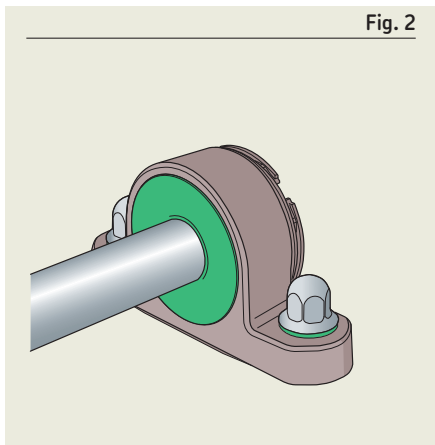


Fig. 2

Shaft tolerances

The recommended fits for SKF Food Line ball bearings are listed in **table 1**. For moderate loads ($0,035 C < P \leq 0,05 C$), the shaft seats should be machined to an h7 tolerance.

For light loads and low speeds, an h8 shaft tolerance is sufficient, and for very simple applications, h9 to h11 shaft tolerances may be used.

Fig. 4 illustrates the relative position of the upper and lower limits of the most commonly used ISO shaft tolerance classes. The values of these ISO tolerances are listed in **table 2**.

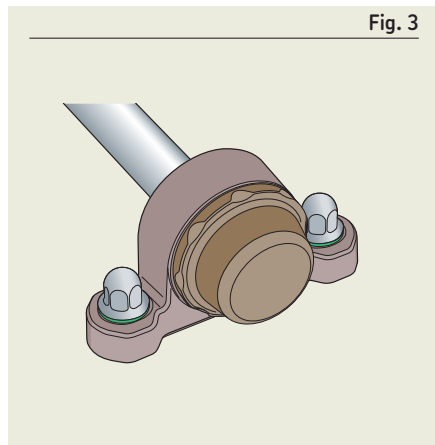


Fig. 3

Permissible speed

SKF Food Line ball bearing units should not operate at speeds above the limiting speeds listed in the product tables. Permissible speed is also influenced by the shaft diameter tolerance.

When using these bearing units on shafts with wider tolerances than h6, compare the speed values listed in the product tables with those listed in **table 3**. The lower value is the maximum or limiting permissible speed.

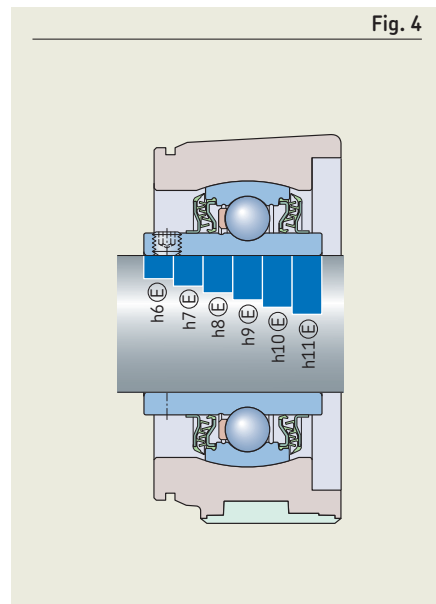


Fig. 4

Table 2

ISO shaft deviations for SKF Food Line

Shaft diameter d over incl.		Shaft diameter deviations											
		h6(Ⓔ)		h7(Ⓔ)		h8(Ⓔ)		h9(Ⓔ)		h10(Ⓔ)		h11(Ⓔ)	
		Deviation		high low		high low		high low		high low		high low	
		high low											
mm		μm											
10	18	0	-11	0	-18	0	-27	0	-43	0	-70	0	-110
18	30	0	-13	0	-21	0	-33	0	-52	0	-84	0	-130
30	50	0	-16	0	-25	0	-39	0	-62	0	-100	0	-160
50	80	0	-19	0	-30	0	-46	0	-74	0	-120	0	-190
80	120	0	-22	0	-35	0	-54	0	-87	0	-140	0	-220

Table 3

Permissible speeds for SKF Food Line

Bearing size ¹⁾	Permissible speeds for shafts machined to tolerance class			
	h7 [Ⓔ]	h8 [Ⓔ]	h9 [Ⓔ]	h11 [Ⓔ]
d	r/min			
–	r/min			
04	5 300	3 800	1 300	850
05	4 500	3 200	1 000	700
06	4 000	2 800	900	630
07	3 400	2 200	750	530
08	3 000	1 900	670	480
09	2 600	1 600	560	400

¹⁾ For example, bearing size 07 includes all bearings based on a Y207 bearings such as YAR 207-2LPW/SS, YAR 207-104-2LPW/SS, YAR 207-106-2LPW/SS, YAR 207-107-2LPW/SS.

Assembling units

In cases where SKF Food Line ball bearings and bearing housings are not supplied as a unit, the first step is to assemble the bearing into the housing.

The mounting procedure is: tighten the housing on the machine frame (**fig. 5**) and place the bearing when the housing is fixed

Insert the bearing into the filling slot in the housing bore (**fig. 6**) and rotate it by hand within the housing until the bearing and housing bore axes align as closely as possible.

NOTE

The bearing must be inserted so that the inner ring grub screws will be on the front (end cover) side of the housing.

With a round piece of wood or pipe of a suitable diameter as a dummy shaft, now rotate the bearing a few turns in each direction. Whilst exercising the bearing in this way, vary the angle of the “shaft” to encompass all orientations (**fig. 7**).

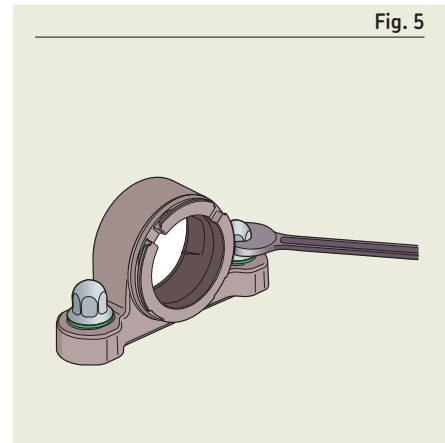


Fig. 5

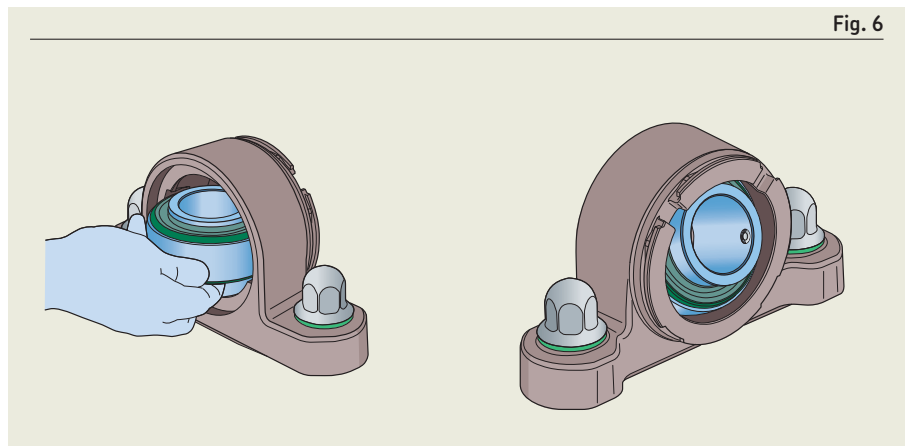


Fig. 6

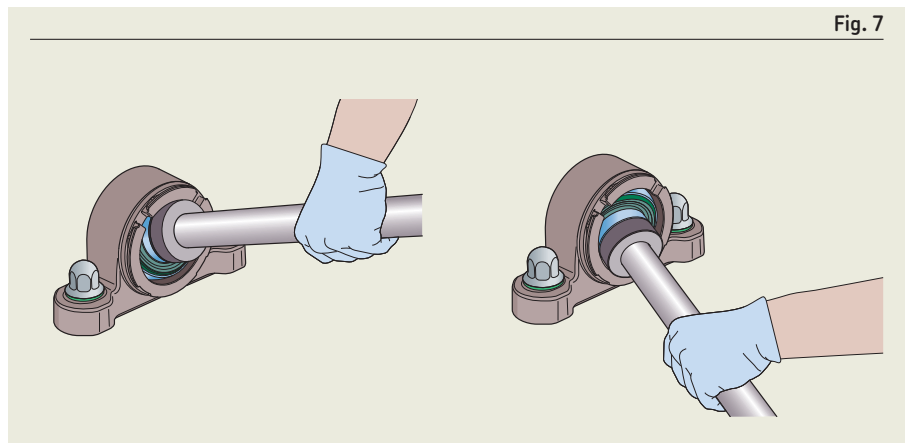


Fig. 7

Alignment

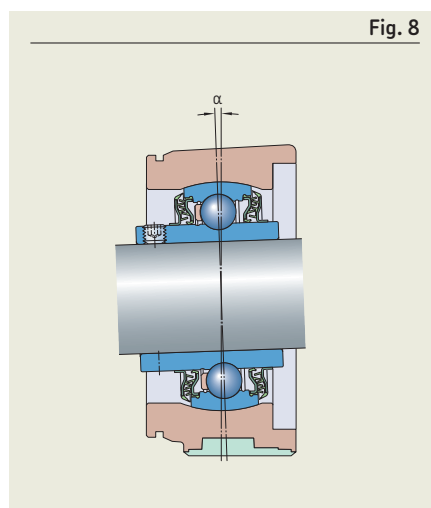
When mounting SKF Food Line ball bearing units it is important for the performance and longevity of the bearing that any misalignment is kept within acceptable limits (**fig. 8**).

In this regard, the sphered nature of the bearing outer ring and the housing bore can accommodate some static misalignment.

Static, as illustrated above, refers to any initial misalignment between housing and shaft/bearing inner ring arising from mounting errors.

For the fully sealed units this is limited, by the back seal, to ± 1 -degree, whilst for housings without the back seal, up to ± 5 -degrees can be accommodated.

By contrast, dynamic misalignment: the operational misalignment of the shaft (between bearings on the same shaft), must be limited to no more than a few minutes of arc.



Mounting procedure

1 Remove any burrs on the shaft with emery cloth or a fine file, wipe clean with a cloth. Depending on loads and speeds, define the appropriate shaft tolerance from **tables 1** and **2**, and check the shaft diameter. Mount any components that are on the shaft between the two SKF Food Line ball bearing units make sure the housing base and mating surfaces are clean and free of any debris or burrs. Ensure the supporting surface is flat. The flatness should be within the IT7 tolerance grade and the roughness should be $Ra \leq 12,5 \mu m$. If the housing requires shims or adjustment, the shims must

- extend the full length and width of the base (**fig. 9**).
- 2 Mount any components that are on the shaft between the two SKF Food Line ball bearing units.
- Slide the SKF Food Line ball bearing unit onto the shaft with grub screws facing outwards and ensure that shaft is correctly placed (**fig. 10**).
- 3 For plummer block units, fit the attachment bolts but do not tighten them (**fig 11**). For flanged units, fasten them securely to the machine wall. For composite housings assure that the metallic

NOTE

For attachment bolt hole sizes, for reference see **table 4** to **7**.

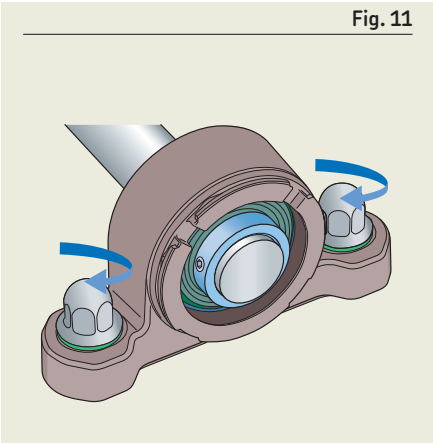
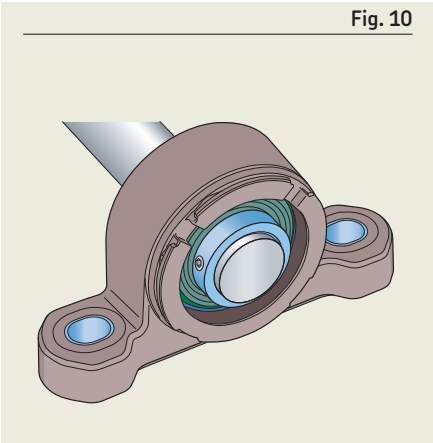
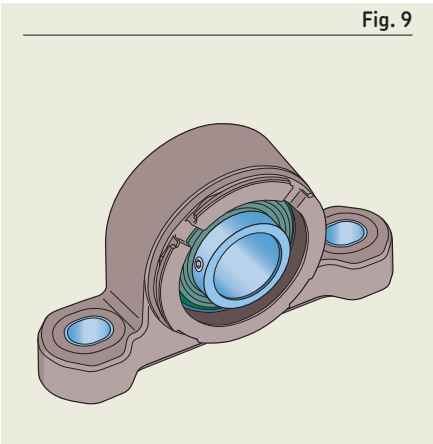


Table 4	
Attachment bolt hole sizes according to DIN EN 20273	
Units for metric shafts	
Bolt size	Trough hole diameter
G	d _m
mm	mm
8	9
10	11
12	13,5
16	17,5

Table 5	
Attachment bolt hole sizes according to ASME	
Units for inch shafts	
Bolt size	Trough hole diameter
G	d _m
in.	in.
3/8	13/32
7/16	15/32
1/2	9/16
5/8	11/16

bushes in bolt areas will be in contact with the machine wall.

4 Mount the other SKF Food Line ball bearing unit on the other end of the shaft following the phases shown in **fig. 9 to 11**.

5 Carefully align both SKF Food Line ball bearing units using the shaft. For plummer block housings, fully tighten the attachment bolts for all units to the tightening torque shown in **fig. 12** and according to **table 7, page 20**.

For flanged housings, securely fasten the second unit to the machine wall (**fig. 13**). Align the shaft in the bearing arrangement axially and – if possible – turn it a few times. Tighten the grub screws in the inner rings of both units to the tightening torque indicated in **table 7, page 20, fig. 14 and 15**. Additionally if applicable, mount the end cover(s).

6 Tighten the grub screws in the inner rings of both units to the tightening torque indicated in **table 6**.

7 If applicable, mount the end cover(s).

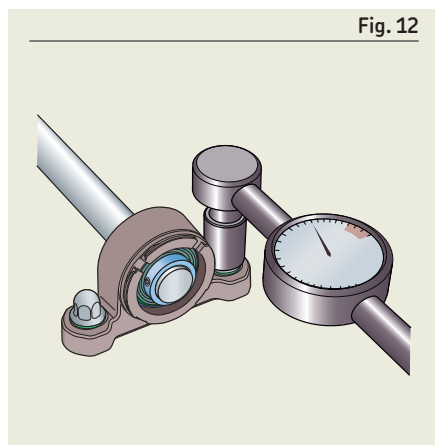


Fig. 12

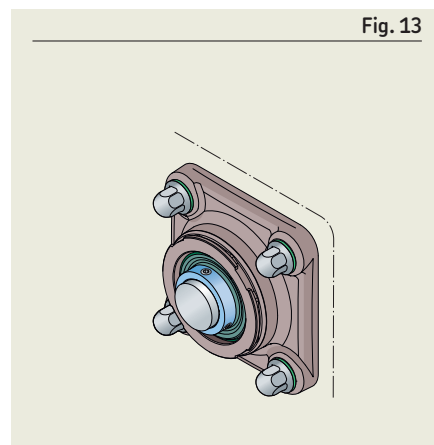


Fig. 13

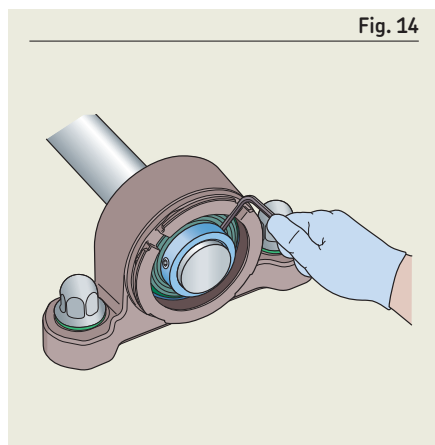


Fig. 14

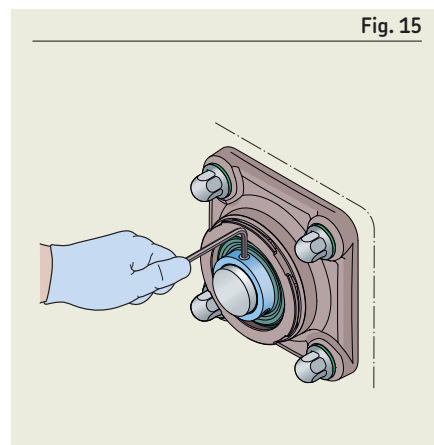
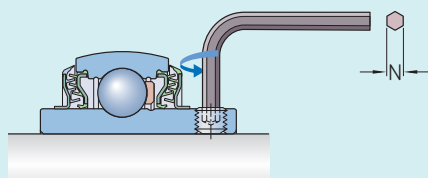


Fig. 15

Table 6

Hexagonal keys to tighten grub screws in inner rings – sizes and tightening torque



Bearing size ¹⁾	Bearing or unit with metric bore			Bearing or unit with inch bore		
	screw size	Hexagonal key size N	Tightening torque	screw size	Hexagonal key size N	Tightening torque
–	–	mm	Nm	–	in.	Nm
04	M6×0,75	3	4	1/4-28 UNF	1/8	4
05	M6×0,75	3	4	1/4-28 UNF	1/8	4
06	M6×0,75	3	4	1/4-28 UNF	1/8	4
07	M6×0,75	3	4	5/16-24 UNF	5/32	6,5
08	M8×1	4	6,5	5/16-24 UNF	5/32	6,5
09	M10×1	5	16,5	3/8-24 UNF	3/16	16,5

¹⁾ For example, bearing size 07 includes all bearings based on a Y207 bearings such as YAR 207-2LPW/SS, YAR 207-104-2LPW/SS, YAR 207-106-2LPW/SS, YAR 207-107-2LPW/SS.

Table 7

Recommended tightening torque for attachment bolts

Bolt size		Tightening torque for unit series				
G		F2BC	F3BBC	F4BC	P2BC	P2BTC
mm	in.	Nm				
M8	–	–	–	–	–	40
M10	3/8	50	40	40	50	50
M12	1/2	70	50	50	70	70
M16	5/8	100	80	80	100	100
–	3/8-16 UNC	–	–	–	–	50
–	7/16-14 UNC	–	–	–	–	60
–	1/2-13 UNC	–	–	–	–	70
–	5/8-11 UNC	–	–	–	–	100