



# Split plummer block housings SONL series

## **Bearing types**

- Self-aligning ball bearings
- Spherical roller bearings
- CARB toroidal roller bearings

## **Bearing dimension series**

- 22

## **Shaft diameter range**

- 75 to 240 mm
- 2 <sup>15</sup>/<sub>16</sub> to 8 <sup>15</sup>/<sub>16</sub> in.

## **Typical shaft-bearing combinations**

- Plain shaft with bearing on an adapter sleeve
- Stepped shaft with bearing on a cylindrical seat

## **Seals**

- Labyrinth

## **Lubrication**

- Oil bath lubrication with a pick-up ring
- Circulating oil lubrication systems

## **Materials**

- Grey cast iron
- Spheroidal graphite cast iron

## **Mounting**

- Four-bolt mounting

## **Compliance to standards**

- Not standardized

## **Supersedes**

- SOFN in the 2(00) and 5(00) series

SONL plummer (pillow) block housings are specially designed for oil lubrication. They can accommodate high temperatures and bearings operating at high speeds. They have a strong, stiff design and are characterized by a number of built-in features that maximize the effects of the lubricant and extend bearing service life.

SONL housings can be found in applications ranging from fans and flywheels to paper machines and emergency power generators.

# Split plummer block housings SONL series

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# Designations

## Designation system for SONL plummer block housings

**SONLD 215-517 RA**

### Series

**SONL** Plummer (pillow) block housing for oil lubrication

### Material

– Grey cast iron  
**D** Spheroidal graphite cast iron

### Size identification

**2(00)-5(00)** Housing for bearings on a cylindrical seat or adapter sleeve, diameter series 2  
**..(00)** Size code of the bearing,  $(00) \times 5 =$  bearing bore diameter [mm]

### Suffix

**RA** Housing for CARB toroidal roller and self-aligning ball bearings when using a circulating oil lubrication system

## Designation system for end covers

**ECO 217-517**

### Series

**ECO** End cover with two rubber O-rings for SONL plummer block housings

### Size identification

**2(00)-5(00)** Housing size identification

## Designation system for seal kits

**TSO 217 A**

### Series

**TSO 2** Seal kit for bearings on a cylindrical seat  
**TSO 5** Seal kit for bearings on an adapter sleeve

### Size identification

**(00)** Size code of the bearing,  $(00) \times 5 =$  bearing bore diameter [mm]  
**/...** Additional size identification for inch shafts, shaft diameter [in.]

### Suffixes

– Seal kit for through shafts  
**A** Seal kit for shaft ends  
**/VZ643** Seal kit for bearings on a cylindrical seat and a plain shaft

## Split plumber block housings SONL series

### Designation system for oil level gauges and oil pick up rings when sold separately

**GG-TS0 217-517/V51**

**GG-TS0** Oil level gauge

#### Size identification

**2(00)-5(00)** Housing size identification

#### Suffix

**/V51** Signifies spare part

**GH-TS0 217-517/V51**

**GH-TS0** Oil pick-up ring

#### Size identification

**2(00)-5(00)** Housing size identification

#### Suffixes

**/V51** Oil pick-up ring – steel (signifies spare parts with standard performance)  
**/MB** Oil pick-up ring – brass (replacement for standard)

### Designation system for oil cooling tubes

**AVA-0001/1**

#### Series

**AVA** Oil cooling tube

#### Size identification

**0001** Basic size to fit G 3/4 to G 1 1/2 oil outlets  
**/1** For housings SONL 217-517 and SONL 218-518  
**/2** For housings SONL 220-520 and SONL 222-522  
**/3** For housings SONL 224-524 to SONL 232-532  
**/4** For housings SONL 234-534 to SONL 248-548

### Designation system for locating rings

**FRB 11/230**

#### Series

**FRB** Locating ring for SKF bearing housings

#### Size identification

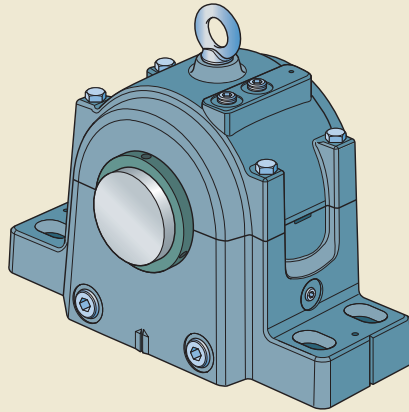
**.../...** Width and outside diameter of the locating ring [mm]

## Standard housing design

SONL plummer (pillow) block housings (→ **fig. 1**) are split housings consisting of a cap and base. They have four holes cast into the base for attachment bolts.

The housings incorporate a number of design features that make them suitable for oil lubrication in order to achieve higher speeds.

Fig. 1



### Features and benefits

SONL plummer block housings have the following features and benefits:

#### Simple mounting

To simplify mounting and make alignment more accurate, lines indicating the centre of the bearing seat and housing bore axis are cast into the housing base. Dimples indicate the position for dowel pins (→ **fig. 2**).

SONL housings have significantly fewer components than earlier SOFN housings. Their four cap bolts are loosened prior to delivery for easy removal.

Mounting instructions are supplied with each seal kit. The housings have an eye bolt on the cap for safe and easy handling.

#### Deep sump for lower operating temperatures

SONL housings have a deep sump that holds a large volume of oil so that heat can be dissipated effectively (→ **fig. 3**). This cooling effect extends the service life of both the lubricant and the bearing.

If operating conditions require it, auxiliary oil cooling tubes are available. These can be installed through the oil outlet holes in the housing base.

#### Strong, stiff and simple design

The simple, sturdy design of SONL housings provides maximum support and reduces the risk of deforming the cap or base during installation. Dowel pins between the cap and base are off-centre so that the cap can only be installed one way.

#### Comprehensive seal kits

In addition to the seals, seal kits for SONL housings are supplied standard with (→ **fig. 4**):

- an oil level gauge that makes it easy to visually check the level and condition of the oil
- a magnetic plug that screws into one of the four tapped holes in the housing base. This plug attracts metal particles, extending the service life of the lubricant and bearing.

Fig. 2

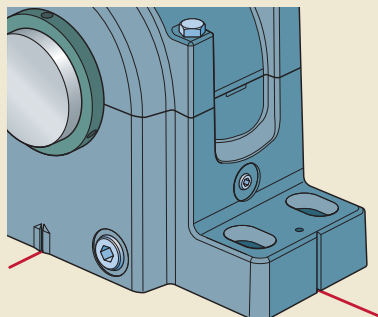


Fig. 3

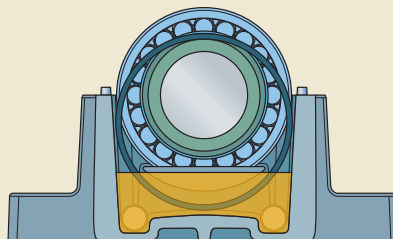
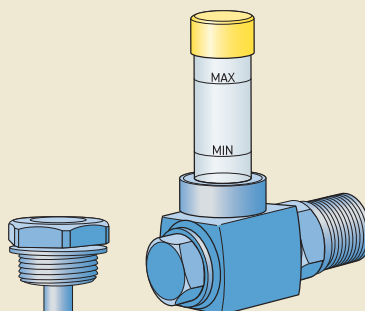


Fig. 4



**Caps and bases individually marked**

The housing cap and base are matched during manufacture and are not interchangeable with the caps and bases of other housings. To prevent any mismatches, a unique serial number is marked on both the housing cap and the base (→ fig. 5).

**Housing material**

SONL plumber block housings are made of grey cast iron.

**Paint, corrosion protection**

SONL plumber block housings are painted black (RAL 9005) using a water based alkyd/acryl paint. The paint protects the housing in accordance with ISO 12944-2, corrosivity category C2 (i.e. exterior atmospheres with low level of pollution, interior atmospheres where condensation may occur). The paint is not affected by most lubricating or engine oils, cutting fluids or alkalescent washing chemicals. Housings can be repainted with most water or solvent based 1- or 2-component paints.

Unpainted surfaces are protected by a solventless rust inhibitor.

**Dimension standards**

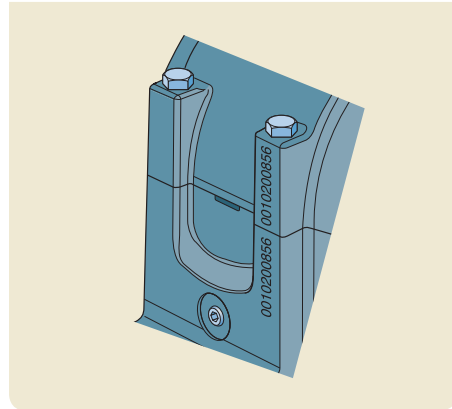
The dimensions of SONL plumber block housings are not standardized either nationally or internationally.

**Interchangeability**

SONL plumber block housings are dimensionally interchangeable with the earlier SOFN housings in the 2(00) and 5(00) series.

3(00) and 6(00) series SOFN housings are still available. For additional information, contact the SKF application engineering service.

Fig. 5





## Housing variants

In addition to standard design SONL plummer (pillow) block housings, a number of variants are also available. Variants include housings made of different materials, different bearing seat tolerance classes and additional tapped holes for circulating oil lubrication systems.

### Housing material

For applications where extra strength is needed, SONL housings are also available in spheroidal graphite cast iron.

### Bearing seat tolerance

SONL housings can be supplied with different bearing seat tolerance classes, e.g. for applications prone to vibration or with rotating outer ring load.

For additional information, contact the SKF application engineering service.

### Housings for circulating oil lubrication systems

In applications where CARB toroidal roller and self-aligning ball bearings are lubricated by a

circulating oil lubrication system, SKF recommends using SONL .. RA housings. These housings are designed for bearings that are lubricated from the side and require a slightly higher oil level than spherical roller bearings.

In SONL .. RA housings, the holes that connect the two halves of the oil sump are positioned higher than in standard housings. This enables oil to reach the rolling elements of the bearing (→ **fig. 6**).

For additional information, refer to *Using circulating oil lubrication with CARB and self-aligning ball bearings* on **page 367**.

## Sealing solutions

SONL housings are equipped with non-contact labyrinth seals (→ **fig. 7**). These seals retain the lubricating oil and prevent contaminants from entering the housing. The oil retaining effect is enhanced by oil traps that return oil that has passed through the labyrinth back to the oil reservoir. **Table 1** provides an overview of the seal characteristics and suitability. This information should be used as a guideline and does not substitute for testing the seal in its application.

A labyrinth seal consists of a shaft sleeve and a labyrinth ring, to form a multi-stage labyrinth. The sleeve has a clearance fit on the shaft while the labyrinth ring is stationary and mounted in the housing with an O-ring. To guide the oil pick-up ring, one shaft sleeve is provided with a groove.

The shaft sleeve can be locked onto the shaft in different ways:

- Shaft sleeves for bearings on an adapter sleeve (TSO 5..) are locked by grub screws in the shaft sleeve.
- Shaft sleeves for bearings on a cylindrical seat (TSO 2..) must be locked by an adapter ring, end plate or similar component (not supplied by SKF) on the shaft. Details for locking are shown in **product table 7.3** (→ **page 378**).

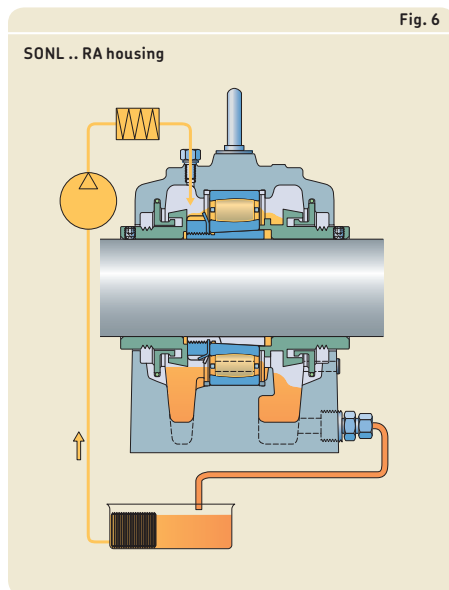
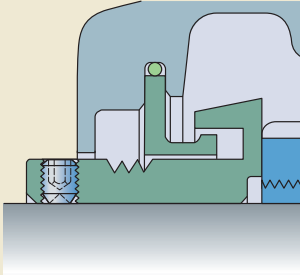


Fig. 7

Labyrinth seal



## Seal kits

The seals for SONL housings are supplied as kits and must be ordered separately.

Seal kits for housings for a through shaft, designation TSO (→ **fig. 8, page 358**), include:

- 2 labyrinth rings with O-rings
- 2 shaft sleeves, one of them for the oil pick-up ring
- 1 oil pick-up ring
- 1 oil level gauge
- 1 magnetic plug
- mounting instructions

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Table 1

### Standard seal kits for SONL plummer block housings

Seal kit	For through shaft	For shaft end
Type	Labyrinth	Labyrinth
Designation	TSO	TSO .. A
Material	grey cast iron, nitrile rubber	grey cast iron, nitrile rubber
Seals per pack	2 seals	1 seal + 1 end cover

### Application conditions and requirements

Temperature [°C]	-40 to +110
Temperature [°F]	-40 to +230
Max. misalignment [°]	0,3
Low friction	++
Axial shaft displacement	++
Shaft tolerance class	1)
Shaft roughness $R_a$ [μm]	3,2

Symbol: ++ very suitable

<sup>1)</sup> For information about shaft tolerances, refer to the section *Shaft specifications* on **page 362**.

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Seal kits for housings for a shaft end, designation TSO .. A (→ **fig. 9**), include:

- 1 labyrinth ring with O-ring
- 1 shaft sleeve
- 1 end cover with O-rings
- 1 oil pick-up ring
- 1 oil level gauge
- 1 magnetic plug
- mounting instructions

Both the oil level gauge and the oil pick-up ring can be supplied separately.

### Seal kits for bearings mounted on a cylindrical seat on plain shafts

For bearings mounted on a cylindrical seat on plain shafts, a kit with the designation TSO 2../VZ643 must be used. The seal kit includes two shaft sleeves with the same bore diameter.

### End covers

Housings at the end of a shaft should have an end cover that fits into the seal groove in the housing (→ **fig. 10**).

End covers, which are made of grey cast iron, are installed with two O-rings that hold the cover in place.

Seal kit for a through shaft

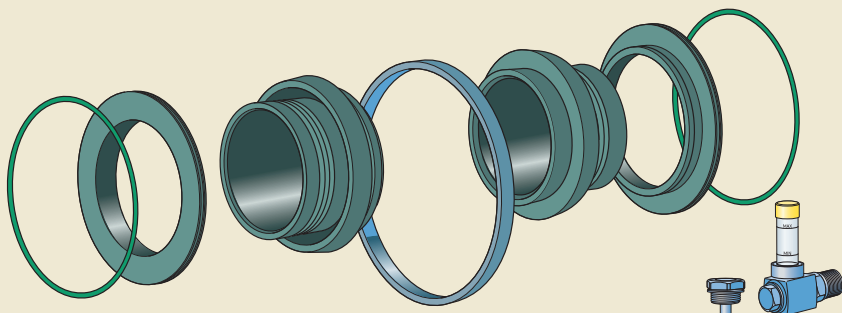


Fig. 8

Seal kit for a shaft end

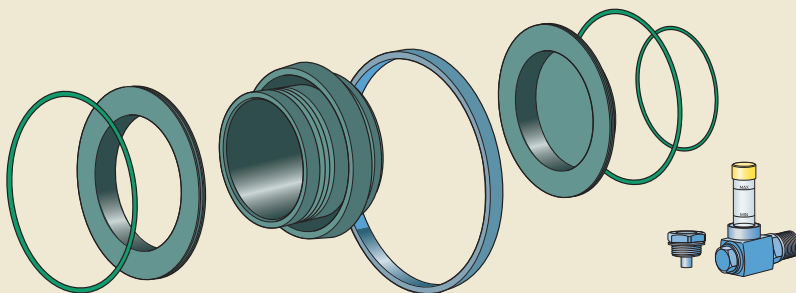


Fig. 9

Details of the permissible length of the shaft end are listed in the product tables.

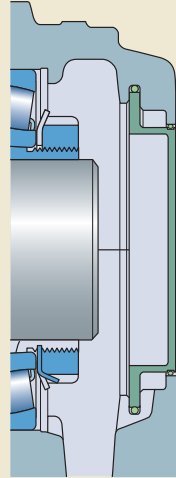
End covers are supplied as a part of the TSO .. A seal kit, but can also be ordered separately.

### High-temperature seals

SKF can supply sealing solutions for high operating temperatures. For additional information, contact the SKF application engineering service.

Fig. 10

End cover



## Design considerations

For general information about system design, refer to the following sections:

- *Typical shaft-bearing combinations* (→ **page 41**)
- *Locating/non-locating bearing arrangements* (→ **page 40**)
- *Load carrying capacity* (→ **page 44**)
- *Axial load carrying capacity for bearings on sleeves* (→ **page 44**)
- *Specifications for shafts and housing support surfaces* (→ **page 45**)

For additional information about rolling bearings and adapter sleeves, refer to the product information available online at [skf.com/bearings](http://skf.com/bearings).

### Typical shaft-bearing combinations

SONL plummer (pillow) block housings can accommodate different shaft-bearing combinations (→ **fig. 11**):

- Plain shaft with bearing on an adapter sleeve
- Stepped shaft with bearing on a cylindrical seat
- Plain shaft with bearing on a cylindrical seat

#### Plain shaft with bearing on an adapter sleeve

Housings, appropriate parts and dimensions are listed in **product tables 7.1** (→ **page 370**) and **7.2** (→ **page 374**).

#### Stepped shaft with bearing on a cylindrical seat

Housings, appropriate parts and dimensions are listed in **product table 7.3** (→ **page 378**).

The bearing is located axially by an inboard labyrinth seal shaft sleeve that abuts the shaft shoulder, and an outboard labyrinth seal shaft sleeve that is held in place by another component (not supplied by SKF). The outside diameter of this component must be at least as large as that of the sleeve.

#### Plain shaft with bearing on a cylindrical seat

When using an SONL housing for this arrangement, a VZ643 seal kit must be used. The bearing and labyrinth seal shaft sleeves must be located axially on both sides by other components (not supplied by SKF) on the shaft.

### Locating and non-locating bearing positions

SONL housings can be used for both the locating and non-locating bearing positions.

The housings are machined standard for bearings in the non-locating position. Bearings in the locating position as well as CARB toroidal roller bearings must be secured in the housing on both sides with locating rings. Appropriate locating rings are listed in the product tables.

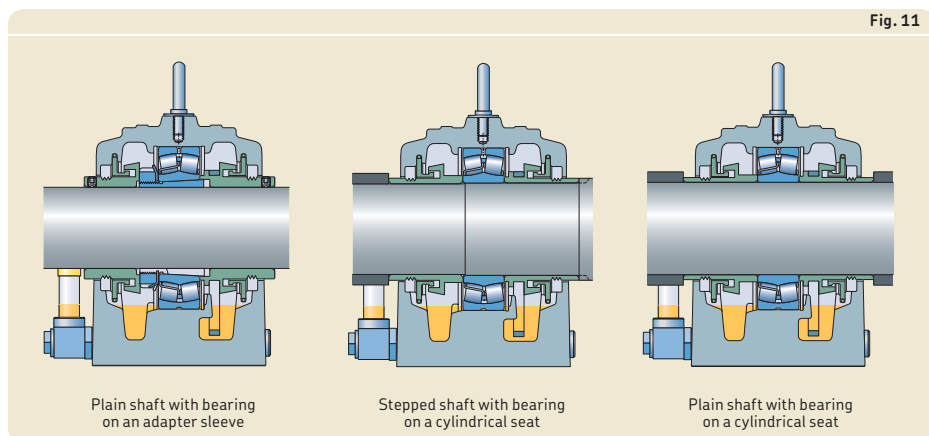


Fig. 11

## Load carrying capacity

SONL housings are intended for loads acting perpendicularly toward the support surface. The housings should always be supported over the entire base. Perpendicular loads acting towards the base are limited only by the bearing. If loads acting in other directions occur, be sure that the magnitude of the load is permissible for the housing, the cap bolts and the attachment bolts. When housings are subjected to cyclic loads or dynamic imbalance,

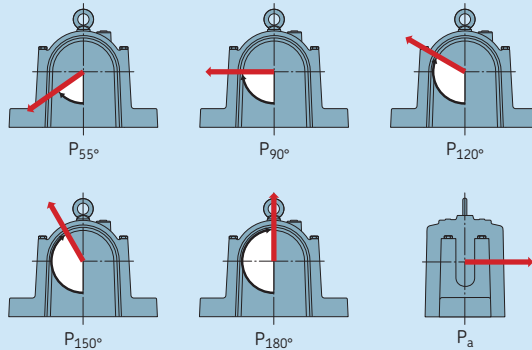
contact the SKF application engineering service.

### Breaking loads and safety factors

Guideline values for the breaking loads  $P$  for housings made of grey cast iron are listed in **table 2**. To obtain the permissible load for a housing, the appropriate breaking load value should be divided by a factor based on the safety requirements. In general engineering, a safety factor of 6 is typical (→ *Load carrying*

Table 2

Breaking loads for SONL plumber block housings made of grey cast iron



Housing Size	Breaking loads					
	$P_{55^\circ}$	$P_{90^\circ}$	$P_{120^\circ}$	$P_{150^\circ}$	$P_{180^\circ}$	$P_a$
–	kN					
217-517	690	260	190	180	230	90
218-518	900	350	250	230	300	120
220-520	1 080	450	300	280	360	140
222-522	1 260	500	350	320	420	170
224-524	2 100	780	580	540	700	280
226-526	2 550	980	700	650	850	340
228-528	2 550	1 020	700	650	850	340
230-530	3 000	1 230	830	770	1 000	400
232-532	3 000	1 230	830	770	1 000	400
234-534	3 360	1 330	940	860	1 120	450
236-536	3 750	1 530	1 040	960	1 250	500
238-538	3 750	1 530	1 040	960	1 250	500
240-540	4 950	2 000	1 380	1 270	1 650	660
244-544	6 350	2 550	1 750	1 600	2 100	840
248-548	6 350	2 550	1 750	1 600	2 100	840

capacity, page 44). The permissible load can only be exploited if the cap bolts are tightened at least to the torque values listed in **table 3**. The load  $P_a$  is the axial breaking load of the housing. If the incorporated bearing is mounted on a sleeve, check the permissible axial load for the sleeve.

For housings made of spheroidal graphite cast iron, the values obtained from **table 2** on **page 361** should be multiplied by a factor of 1,8.

### Additional housing support

When loads act at angles between 55° and 120°, or when the axial loads are greater than 5% of  $P_{180^\circ}$  (→ **table 2** on **page 361**), the housing should be pinned to the support surface or a stop should be provided to counter the load. The dowel pins or stop should be sufficiently strong to accommodate the loads acting parallel to the support surface.

Recommendations for the position and size of the holes to accommodate dowel pins are provided in **table 8** on **page 368**.

### Load carrying capacity of the cap bolts

Approximate values for the yield points for four cap bolts are provided in **table 3**. The values in **table 3** apply to 8.8 class cap bolts, which are supplied with SONL housings.

## Operating temperature

The permissible operating temperature is mainly limited by the seals (→ **table 1**, **page 357**), the oil level gauge and the lubricant. For temperature limits of SKF bearings and lubricants, refer to the product information available online at [skf.com/bearings](http://skf.com/bearings). The permissible operating temperature for the oil level gauge is 110 °C (230 °F).

The housing material does not have any additional temperature limits, except for very low temperature applications where impact strength could be a factor.

The housing paint is heat resistant up to 80 °C (175 °F) material temperature or 100 °C (210 °F) ambient temperature.

When temperatures outside the permissible range are expected, contact the SKF application engineering service.

## Operating speed

The permissible operating speed of the incorporated bearing is not limited by the housing.

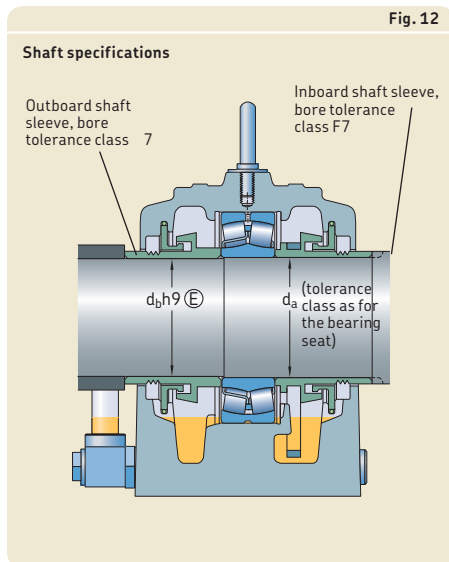
## Shaft specifications

For bearings mounted on an adapter sleeve, the recommended shaft tolerance class is h9(E). A cylindricity tolerance of IT5/2 is satisfactory. The same specifications are applicable for the seats of labyrinth seal shaft sleeves.

For bearings mounted on a cylindrical seat on stepped shafts (→ **fig. 12**), follow the guidelines in the SKF catalogue *Rolling bearings* for the bearing seat. The bore of the shaft sleeve of the inboard labyrinth seal is in accordance with the F7 tolerance class and fits bearing seats machined to typical tolerances. The bore of the shaft sleeve of the outboard labyrinth seal is in accordance with the tolerance class and fits shafts machined to the h9(E) tolerance class.

For bearings mounted on a cylindrical seat on plain shafts, the bore of the shaft sleeves of the labyrinth seals is in accordance with F7 tolerance class and fits bearing seats machined to typical tolerances.

Fig. 12



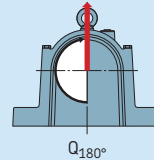
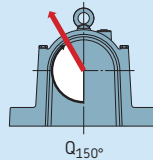
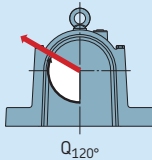
### Attachment bolt recommendations

In typical applications, 8.8 class hexagon head bolts, in accordance with ISO 4014, can be used together with washers. If the load does not act perpendicularly toward the base, it may be necessary to use stronger 10.9 class bolts.

SKF housings can withstand loads resulting from tightening the attachment bolts to the torque values recommended by bolt manufacturers (→ **table 3**). They are valid for oiled, but otherwise untreated thread surfaces. SKF cannot guarantee that tightening to the recommended value provides sufficient anchoring. Make sure that attachment bolts, dowels or stops, and a sufficiently strong support can accommodate all occurring loads.

Table 3

#### Load carrying capacity and torque values for cap bolts and attachment bolts



Housing Size	Cap bolts Yield point for four bolts			Designation to ISO 4014	Tightening torque	Attachment bolts	
	Q <sub>120°</sub>	Q <sub>150°</sub>	Q <sub>180°</sub>			Size	Tightening torque <sup>1)</sup>
–	kN			–	Nm	–	Nm
217-517	300	170	150	M 10×75	50	M 20	385
218-518	440	250	220	M 12×80	80	M 20	385
220-520	440	250	220	M 12×90	80	M 24	665
222-522	440	250	220	M 12×90	80	M 24	665
224-524	800	460	400	M 16×110	150	M 24	665
226-526	800	460	400	M 16×120	150	M 24	665
228-528	1 250	720	620	M 20×130	200	M 30	1 310
230-530	1 250	720	620	M 20×140	200	M 30	1 310
232-532	1 250	720	620	M 20×140	200	M 30	1 310
234-534	1 800	1 040	900	M 24×160	350	M 30	1 310
236-536	1 800	1 040	900	M 24×160	350	M 30	1 310
238-538	1 800	1 040	900	M 24×160	350	M 36	2 280
240-540	1 800	1 040	900	M 24×160	350	M 36	2 280
244-544	1 800	1 040	900	M 24×180	400	M 36	2 280
248-548	2 860	1 650	1 430	M 30×200	400	M 36	2 280

<sup>1)</sup> Recommended by bolt manufacturers.



## Lubrication

SONL plummer (pillow) block housings are designed for two methods of oil lubrication:

- oil bath lubrication with a pick-up ring
- circulating oil

The lubricant should be selected based on the operating conditions of the bearing. For additional information about lubricant selection, refer to the product information available online at [skf.com/bearings](http://skf.com/bearings).

### Oil bath lubrication with a pick-up ring

Oil bath lubrication with a pick-up ring is typically used with SONL housings (→ **fig. 13**). It provides a uniform supply of lubricant to the bearing.

This oil lubrication method uses a ring that hangs loosely from the labyrinth seal shaft sleeve on one side of the bearing. It hangs deep into the oil reservoir in the bottom half of the housing. As the shaft rotates, the ring follows, picking up oil from the sump and bringing it to a collecting trough. The oil then flows through the bearing and back into the oil sump.

In the fifty years that this lubrication method has been used, there has not been any record of wear where the ring contacts its seat on the labyrinth seal shaft sleeve – regardless of the shaft dimensions, or speed of the application.

#### Oil quantities

Housings should be filled with the recommended oil quantities listed in **table 4**. Markings on the inside of the housing base and on the oil level gauge indicate the correct oil level. To avoid leakage, do not exceed the recommended oil level. The oil pick-up ring enables a wide range between maximum and minimum oil levels. This results in a correspondingly long period between refills or oil changes.

The minimum and maximum levels indicated on the oil level gauge apply to standstill. The oil level may drop during operation and may vary even more during start-up. If oil is replenished during operation, keep the level 5 mm below the maximum mark.

Fig. 13

Oil bath lubrication with a pick-up ring

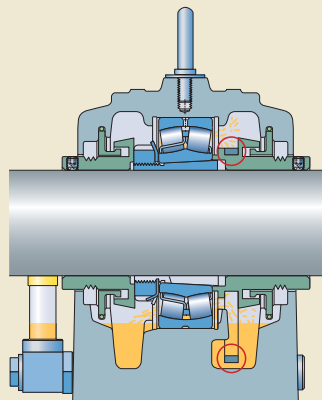


Table 4

#### Oil quantities

Housing Size	Oil fill min	max
–	l	
217-517	0,3	0,4
218-518	0,3	0,5
220-520	0,4	0,6
222-522	0,6	0,9
224-524	0,9	1,3
226-526	0,9	1,4
228-528	1	1,5
230-530	1	1,7
232-532	1,3	2
234-534	2,5	3,5
236-536	2,9	4,2
238-538	3,1	4,5
240-540	3	4,5
244-544	3,8	5,8
248-548	4,8	6,9

Precaution after machine stops

Before start-up, the oil level should be filled to the maximum mark on the oil level gauge. This is even more important after longer machine stops to avoid the possibility of dry-running the bearing until the oil pick-up ring delivers a sufficient amount of lubricant.

After shorter machine stops, a sufficient amount of oil remains in the oil sump and in the bearing to provide lubricant during start-up.

Magnetic plugs

Each seal kit contains a magnetic plug. The plug can be fitted in one of the oil outlet holes in the housing base. The plug attracts metal contaminants in the oil, to extend bearing service life.

Special oil pick-up ring for use on shafts with electromagnetic clutches

If shafts with electromagnetic clutches are to be supported in SONL housings, the standard steel oil pick-up ring must be replaced by a brass ring (GH-TSO ...-.../MB). Appropriate brass rings are listed in **table 5**.

Oil cooling tubes

In high temperature applications, where an oil pick-up ring is used, auxiliary cooling tubes should be installed (→ **fig. 14, page 366**). They use water, which has to be provided via an external system, to cool the oil in the housing. The pressure of the cooling medium should not exceed 4 bar.

Oil cooling tubes are available in different sizes (→ **table 6**). Depending on the need, one or two cooling tubes can be installed via the oil outlet holes in the housing base. Detailed mounting instructions are provided with the products.

Oil cooling tubes are identified by the basic designation AVA-0001 followed by a size identification, e.g. AVA-0001/3.

Oil outlets

Tapped holes in the housing base that are not used for the oil level gauge or cooling tubes can be used as oil outlets.

Table 5

Brass oil pick-up rings	
Housing Size	Pick-up ring Designation
217-517	GH-TSO 217-517/MB
218-518	GH-TSO 218-518/MB
220-520	GH-TSO 220-520/MB
222-522	GH-TSO 222-522/MB
224-524	GH-TSO 224-524/MB
226-526	GH-TSO 226-526/MB
228-528	GH-TSO 228-528/MB
230-530	GH-TSO 230-530/MB
232-532	GH-TSO 232-532/MB
234-534	GH-TSO 234-534/MB
236-536	GH-TSO 236-536/MB
238-538	GH-TSO 238-538/MB
240-540	GH-TSO 240-540/MB
244-544	GH-TSO 244-544/MB
248-548	GH-TSO 248-548/MB

Table 6

Oil cooling tubes	
Housing Size	Oil cooling tube Designation
217-517 and 218-518	AVA-0001/1
220-520 and 222-522	AVA-0001/2
224-524 to 232-532	AVA-0001/3
234-534 to 248-548	AVA-0001/4

Fig. 14

Oil cooling tubes

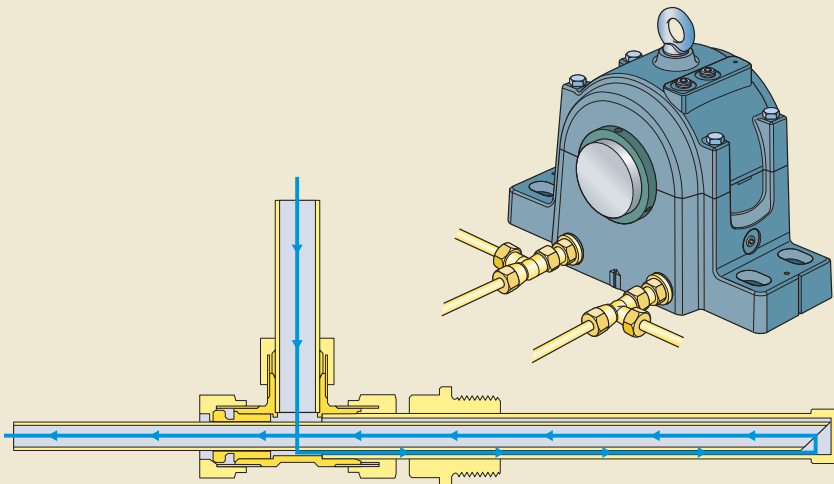
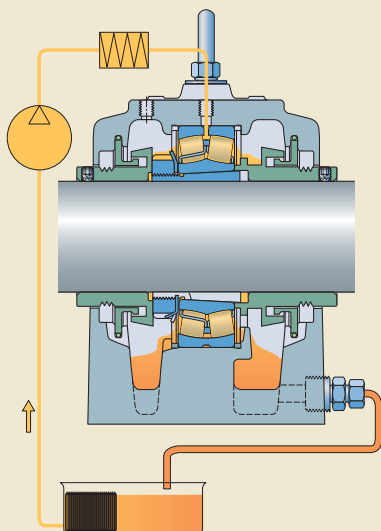


Fig. 15

Circulating oil lubrication system



## Circulating oil lubrication systems

Circulating oil lubrication systems are generally preferred when high speeds generate an excessive amount of heat, or when there are high ambient temperatures. For this lubrication method, the oil pick-up ring should not be used and the oil level gauge is not needed.

A circulating oil lubrication system typically has supply lines attached to the housing cap and drain lines attached to the base (→ **fig. 15**). Circulation is normally produced with the aid of a pump. After the oil has passed through the bearing, it drains from the housing and flows into a tank. It is filtered and, if required, cooled before being returned to the housing. Proper filtering and cooling of the oil are important factors for bearing and oil service life, and can provide improved machinery performance as well as cost savings.

SKF supplies different standard solutions for circulating oil lubrication systems. For smaller systems, e.g. 1–2 fans or pumps, the SM-100 Oil Circulating Unit is available. For larger systems, SKF Flowline is available.

Relevant abutment dimensions for connecting a circulating oil lubrication system to an SONL housing are listed in **table 7**.

### Using a circulating oil lubrication system with spherical roller bearings

SONL housings have two tapped holes in the cap that can be used as oil inlets. The hole in the centre of the cap should be used to lubricate spherical roller bearings with a relubrication feature (a lubrication groove and holes in the outer ring).

The housing base has four tapped holes that can be used as oil outlets.

### Using a circulating oil lubrication system with CARB and self-aligning ball bearings

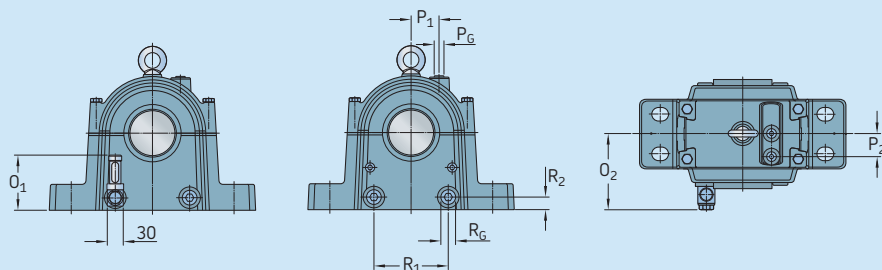
In a circulating oil lubrication system, CARB toroidal roller bearings and self-aligning ball bearings, which are relubricated from the side, require another design compared to spherical

roller bearings, to allow the oil to pass through the bearing. Therefore, SONL housings with the designation suffix RA (→ [page 356](#)) are recommended.

SONL .. RA housings have two tapped holes in the cap that can be used as oil inlets. For CARB toroidal roller and self-aligning ball bearings, always use the offset oil inlet hole in the housing cap, and two oil outlet holes on the opposite side of the housing, to make sure the oil has to pass through the bearing and to get enough outlet capacity.

Table 7

Abutment dimensions for circulating oil lubrication systems and oil bath lubrication with a pick-up ring



Housing Size	Dimensions		P <sub>2</sub>	R <sub>G</sub>	R <sub>1</sub>	R <sub>2</sub>	O <sub>1</sub>	O <sub>2</sub>
	P <sub>G</sub>	P <sub>1</sub>						
–	in.	mm		in.	mm			
217-517	G 3/8	47,5	40	G 3/4	118	22	97	138
218-518	G 3/8	50	41	G 3/4	128	22	97	142
220-520	G 3/8	50	47	G 3/4	144	22	97	150
222-522	G 3/8	55	53	G 3/4	162	23	98	163
224-524	G 3/8	55	65	G 3/4	178	25	100	179
226-526	G 3/8	60	69	G 3/4	192	25	120	184
228-528	G 3/8	65	72	G 3/4	200	26	121	187
230-530	G 3/8	65	73	G 3/4	220	26	121	187
232-532	G 3/8	65	78	G 3/4	252	26	121	196
234-534	G 3/4	85	88	G 1.1/2	268	41	136	215
236-536	G 3/4	85	93	G 1.1/2	278	41	136	220
238-538	G 3/4	85	98	G 1.1/2	298	41	166	225
240-540	G 3/4	85	100	G 1.1/2	320	41	166	229
244-544	G 3/4	105	108	G 1.1/2	360	41	166	239
248-548	G 3/4	110	115	G 1.1/2	400	41	216	244

## Mounting

SONL plummer (pillow) block housings must be mounted properly using the appropriate tools and state of the art mechanical mounting methods. All the associated components must also meet certain basic requirements (→ *Specifications for shafts and housing support surfaces* on **page 45**).

Mounting instructions for each housing are provided with the seal kit. For information about mounting rolling bearings, refer to the *SKF bearing maintenance handbook* or [skf.com/mount](http://skf.com/mount).

### Torque specifications

Cap bolts should be tightened to the torque values listed in **table 3** on **page 363**. For information about attachment bolts, refer to *Attachment bolt recommendations* on **page 363**.

### Pinning or supporting the housing

Some load conditions may require the housing to be pinned to its support surface or a stop to accommodate loads acting parallel to the housing support surface (→ *Additional housing support*, on **page 362**).

Recommendations for the position and size of the holes to accommodate dowel pins are provided in **table 8**. Dimples cast into the housing base mark the recommended positions.

## Condition monitoring

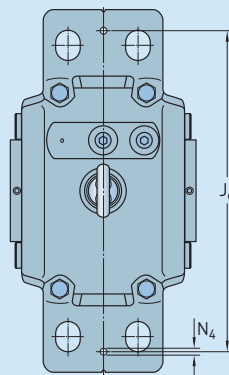
SONL plummer (pillow) block housings have appropriate positions for condition monitoring sensors (→ **fig. 16**).

**Position 1** is a measurement point perpendicular to the shaft and is in accordance with ISO 10816-1.

**Position 2** is a measurement point parallel to the shaft and should be used when loads act toward the support surface.

Table 8

Position and size of dowel pin holes



Housing Size	Dimensions $J_6$	$N_4$ max
—	mm	
217-517	290	6
218-518	320	8
220-520	350	8
222-522	370	8
224-524	370	8
226-526	390	8
228-528	430	8
230-530	460	12
232-532	480	12
234-534	530	20
236-536	570	20
238-538	640	20
240-540	630	20
244-544	690	20
248-548	800	20

## Accessories

Condition monitoring sensors are available for SONL plummer (pillow) block housings.

For additional information, refer to *SKF tools and products* (→ **page 47**).

## Ordering information

For SONL plummer (pillow) block housings, each of the following items must be ordered separately:

- housing
- seal kit (see **page 358** for details)
- locating rings
- bearing
- adapter sleeve

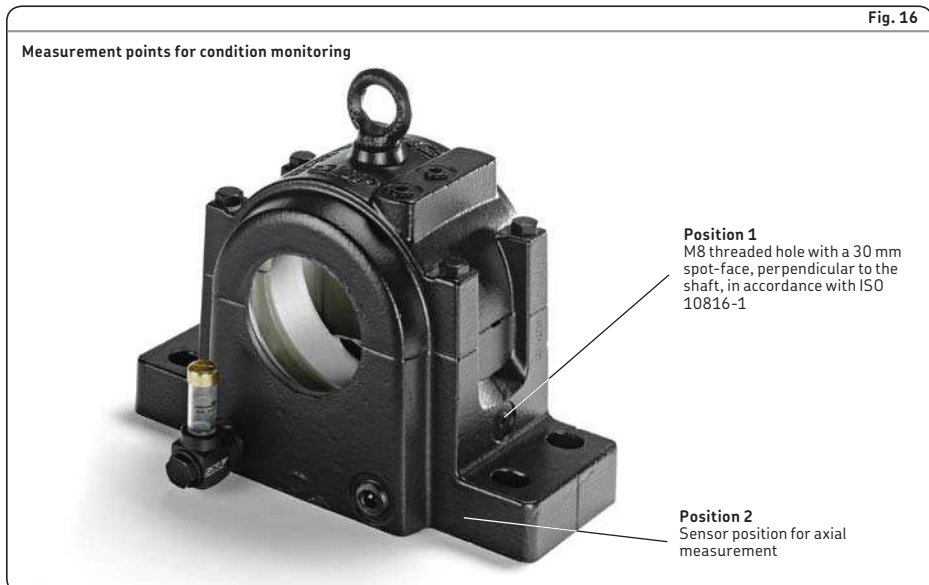
### Order example

Two plummer block housings are required for two 22224 EK spherical roller bearings on H 3124 adapter sleeves. One housing will accommodate the non-locating bearing at the end of the shaft. The other housing will accommodate the locating bearing on a through shaft. The oil needs to be cooled by two oil cooling tubes per housing.

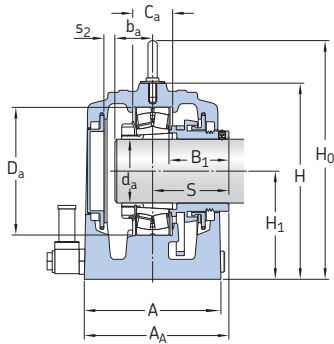
The following items should be ordered:

- 2 housings SONL 224-524
- 1 seal kit TSO 524
- 1 seal kit TSO 524 A
- 2 locating rings FRB 12/215
- 4 oil cooling tubes AVA 0001/3

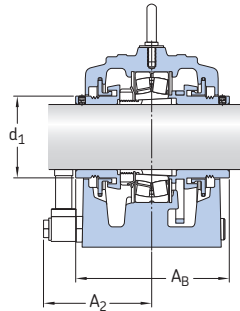
7



## 7.1 SONL plummer block housings for bearings on an adapter sleeve, metric shafts d<sub>a</sub> 75 – 150 mm



Housing for shaft end



Housing for through shaft

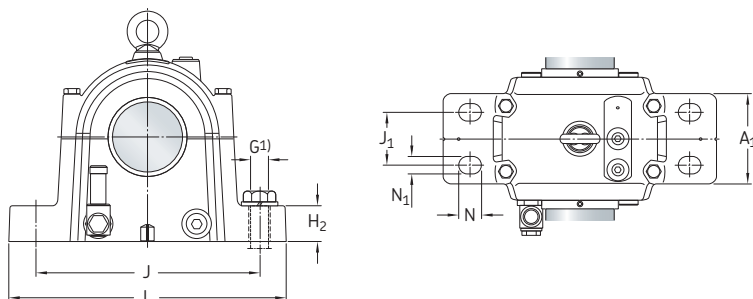
Shaft diameter d <sub>a</sub>	Housing Designation	Appropriate parts Bearing <sup>1)</sup>	Adapter sleeve <sup>2)</sup>	Locating ring <sup>3)</sup>	Seal kit for through shaft <sup>4)</sup>	End cover	Dimensions Housing			
							A	A <sub>1</sub>	A <sub>2</sub>	A <sub>A</sub>
mm	–	–					mm			
75	SONL 217-517	2217 K 22217 EK C 2217 K	H 317 H 317 H 317 E	FRB 5/150 FRB 5/150 FRB 5/150	TSO 517	ECO 217-517	163	110	138	172
80	SONL 218-518	2218 K 22218 EK C 2218 K	H 318 H 318 H 318 E	FRB 5/160 FRB 5/160 FRB 5/160	TSO 518	ECO 218-518	170	120	142	180
90	SONL 220-520	2220 KM 22220 EK C 2220 K	H 320 H 320 H 320 E	FRB 7/180 FRB 7/180 FRB 7/180	TSO 520	ECO 220-520	186	130	150	196
100	SONL 222-522	2222 KM 22222 EK C 2222 K	H 322 H 322 H 322 E	FRB 9/200 FRB 9/200 FRB 9/200	TSO 522	ECO 222-522	213	145	163	221
110	SONL 224-524	22224 EK C 2224 K	H 3124 H 3124 L	FRB 12/215 FRB 12/215	TSO 524	ECO 224-524	245	170	179	261
115	SONL 226-526	22226 EK C 2226 K	H 3126 H 3126 L	FRB 11/230 FRB 11/230	TSO 526	ECO 226-526	255	180	184	263
125	SONL 228-528	22228 CCK/W33 C 2228 K	H 3128 H 3128 L	FRB 11/250 FRB 11/250	TSO 528	ECO 228-528	260	190	187	270
135	SONL 230-530	22230 CCK/W33 C 2230 K	H 3130 H 3130 L	FRB 10/270 FRB 10/270	TSO 530	ECO 230-530	260	190	187	270
140	SONL 232-532	22232 CCK/W33	H 3132	FRB 12/290	TSO 532	ECO 232-532	278	205	196	297
150	SONL 234-534	22234 CCK/W33 C 2234 K	H 3134 H 3134 L	FRB 14/310 FRB 14/310	TSO 534	ECO 234-534	310	230	215	330

<sup>1)</sup> 22(00) – self-aligning ball bearing, 222(00) – spherical roller bearing, C ... – CARB toroidal roller bearing  
Only typical bearings are listed. Other bearing variants can also fit the housing.

<sup>2)</sup> The adapter sleeve fits the bearing in the same line only.

<sup>3)</sup> The locating ring fits the bearing in the same line only. Two locating rings are required for each housing.

<sup>4)</sup> Seal kits for a shaft end have the designation suffix A, i.e. TSO ... A.

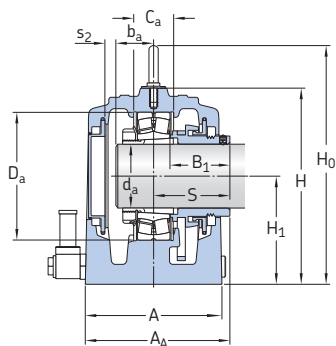


Shaft diam- eter $d_a$	Dimensions Housing																	Eye bolt according to DIN 580	Mass Housing kg
	$A_B$	$d_1$	$B_1$	$C_a$	$D_a$	$b_a$	$s_2$	H	$H_0$	$H_1$	$H_2$	J	$J_1$	L	N	$N_1$	S		
mm	mm																	–	kg
75	180	96	72	46	150	40	19	230	283	125	35	260	60	330	28	22	90	M10	26
80	190	100	75	50	160	42	19	245	298	135	45	290	70	360	28	22	95	M12	33
90	206	112	80	60	180	46	25	270	323	145	50	320	75	400	32	26	103	M12	42
100	229	120	88	71	200	52	32,5	290	343	160	50	347	75	420	32	26	114,5	M12	53
110	276	135	109	82	215	56	47	315	386	170	55	347	90	420	32	26	138	M16	72
115	270	145	103	86	230	60	43	335	406	180	60	377	100	450	35	28	135	M16	87
125	280	160	106	90	250	63	42	355	426	190	65	415	100	500	42	35	140	M20	102
135	280	170	103,5	93	270	67,5	37,5	375	446	200	65	450	115	540	42	35	140	M20	115
140	316	178	118	104	290	73	42	406	477	215	65	470	120	560	42	35	158	M20	141
150	350	195	132	114	310	77	54	440	530	235	70	515	130	610	42	35	175	M24	190

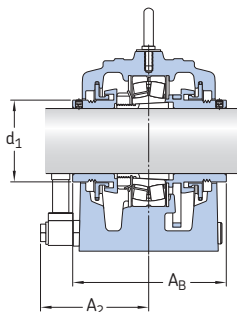
<sup>1)</sup> For sizes and tightening torques of the attachment bolts refer to table 3 on page 363.



## 7.1 SONL plummer block housings for bearings on an adapter sleeve, metric shafts d<sub>a</sub> 160 – 220 mm



Housing for shaft end



Housing for through shaft

Shaft diameter d <sub>a</sub>	Housing Designation	Appropriate parts Bearing <sup>1)</sup>	Adapter sleeve <sup>2)</sup>	Locating ring <sup>3)</sup>	Seal kit for through shaft <sup>4)</sup>	End cover	Dimensions Housing			
							A	A <sub>1</sub>	A <sub>2</sub>	A <sub>A</sub>
mm	–	–					mm			
160	SONL 236-536	22236 CCK/W33	H 3136	FRB 14/320	TS0 536	ECO 236-536	320	240	220	340
170	SONL 238-538	22238 CCK/W33 C 2238 K	H 3138 H 3138	FRB 14/340 FRB 14/340	TS0 538	ECO 238-538	330	250	225	350
180	SONL 240-540	22240 CCK/W33	H 3140	FRB 14/360	TS0 540	ECO 240-540	338	260	229	358
200	SONL 244-544	22244 CCK/W33 C 2244 K	OH 3144 H OH 3144 H	FRB 14/400 FRB 14/400	TS0 544	ECO 244-544	358	280	239	381
220	SONL 248-548	22248 CCK/W33	OH 3148 H	FRB 14/440	TS0 548	ECO 248-548	368	290	244	394

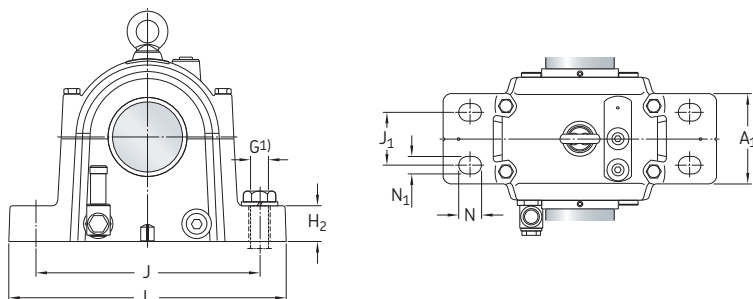
<sup>1)</sup> 222(00) – spherical roller bearing, C... – CARB toroidal roller bearing

Only typical bearings are listed. Other bearing variants can also fit the housing.

<sup>2)</sup> The adapter sleeve fits the bearing in the same line only.

<sup>3)</sup> The locating ring fits the bearing in the same line only. Two locating rings are required for each housing.

<sup>4)</sup> Seal kits for a shaft end have the designation suffix A, i.e. TS0 .. A.



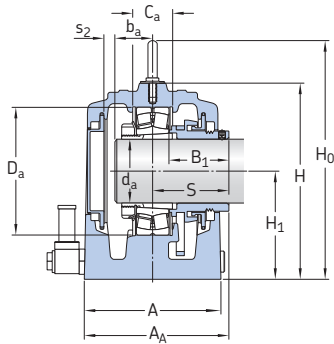
Shaft diam- eter d <sub>a</sub>	Dimensions Housing																		Eye bolt according to DIN 580	Mass Housing
	A <sub>B</sub>	d <sub>1</sub>	B <sub>1</sub>	C <sub>a</sub>	D <sub>a</sub>	b <sub>a</sub>	s <sub>2</sub>	H	H <sub>0</sub>	H <sub>1</sub>	H <sub>2</sub>	J	J <sub>1</sub>	L	N	N <sub>1</sub>	S			
mm	mm																		–	kg
160	360	205	137	114	320	78	53,5	455	545	245	75	545	150	650	42	35	180	M 24	213	
170	370	220	139	120	340	82	52,5	480	570	260	85	590	150	720	50	42	185	M 24	249	
180	378	227	140	126	360	86	51	510	600	275	85	600	160	730	50	42	189	M 24	273	
200	404	255	148	136	400	95	50	565	674	305	95	670	180	820	50	42	202	M 24	361	
220	420	270	150	148	440	105	45,5	625	734	340	100	740	190	900	50	42	210	M 24	456	

<sup>1)</sup> For sizes and tightening torques of the attachment bolts refer to table 3 on page 363.

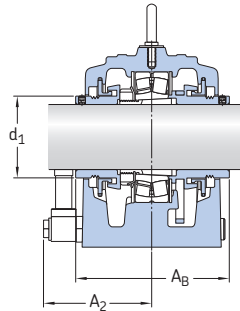
## 7.2 SONL plummer block housings for bearings on an adapter sleeve, inch shafts

$d_a$  2 15/16 – 5 3/16 in.

74,613 – 131,763 mm



Housing for shaft end



Housing for through shaft

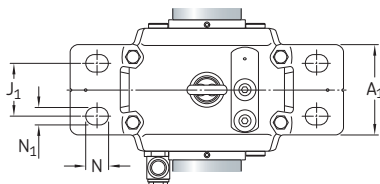
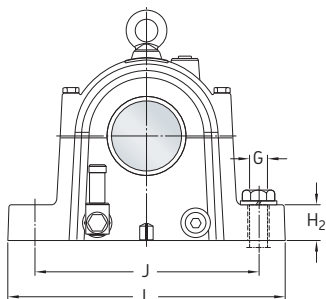
Shaft diameter $d_a$	Housing Designation	Appropriate parts Bearing <sup>1)</sup>	Adapter sleeve <sup>2)</sup>	Locating ring <sup>3)</sup>	Seal kit for through shaft <sup>4)</sup>	End cover	Dimensions Housing			
							A	A <sub>1</sub>	A <sub>2</sub>	A <sub>A</sub>
in./mm	–	–					mm			
2 15/16 74,613	SONL 217-517	2217 K 22217 EK C 2217 K	HA 317 HA 317 HA 317 E	FRB 5/150 FRB 5/150 FRB 5/150	TSO 517/2.15/16	ECO 217-517	163	110	138	172
3 3/16 80,963	SONL 218-518	2218 K 22218 EK C 2218 K	HA 318 HA 318 HA 318 E	FRB 5/160 FRB 5/160 FRB 5/160	TSO 518/3.3/16	ECO 218-518	170	120	142	180
3 7/16 87,313	SONL 220-520	2220 KM 22220 EK C 2220 K	HA 320 HA 320 HA 320 E	FRB 7/180 FRB 7/180 FRB 7/180	TSO 520/3.7/16	ECO 220-520	186	130	150	196
3 15/16 100,013	SONL 222-522	2222 KM 22222 EK C 2222 K	H 22 H 22 H 322 E	FRB 9/200 FRB 9/200 FRB 9/200	TSO 522/3.15/16	ECO 222-522	213	145	163	221
4 3/16 106,363	SONL 224-524	22224 EK C 2224 K	HA 3124 HA 3124 L	FRB 12/215 FRB 12/215	TSO 524/4.3/16	ECO 224-524	245	170	179	261
4 7/16 112,713	SONL 226-526	22226 EK C 2226 K	HA 3126 HA 3126 L	FRB 11/230 FRB 11/230	TSO 526/4.7/16	ECO 226-526	255	180	184	263
4 15/16 125,413	SONL 228-528	22228 CCK/W33 C 2228 K	HA 3128 HA 3128 L	FRB 11/250 FRB 11/250	TSO 528/4.15/16	ECO 228-528	260	190	187	270
5 3/16 131,763	SONL 230-530	22230 CCK/W33 C 2230 K	HA 3130 HA 3130 L	FRB 10/270 FRB 10/270	TSO 530/5.3/16	ECO 230-530	260	190	187	270

1) 22(00) – self-aligning ball bearing, 222(00) – spherical roller bearing, C ... – CARB toroidal roller bearing  
Only typical bearings are listed. Other bearing variants can also fit the housing.

2) The adapter sleeve fits the bearing in the same line only.

3) The locating ring fits the bearing in the same line only. Two locating rings are required for each housing.

4) Seal kits for a shaft end have the designation suffix A, i.e. TSO ... A.

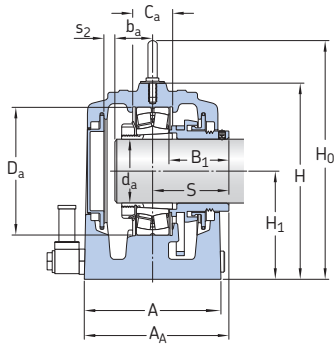


## 7.2

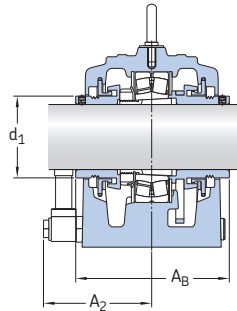
Shaft diameter	Dimensions Housing																			Eye bolt according to DIN 580	Mass Housing	
	d <sub>a</sub>	A <sub>B</sub>	d <sub>1</sub>	B <sub>1</sub>	C <sub>a</sub>	D <sub>a</sub>	b <sub>a</sub>	s <sub>2</sub>	H	H <sub>0</sub>	H <sub>1</sub>	H <sub>2</sub>	J	J <sub>1</sub>	L	N	N <sub>1</sub>	S	G			G
in./mm	mm																			in.	–	kg
2 <sup>15</sup> / <sub>16</sub> 74,613	180	96	72		46	150	40	19	230	283	125	35	260	60	330	28	22	90	20	3/4	M10	26
3 <sup>3</sup> / <sub>16</sub> 80,963	190	100	75		50	160	42	19	245	298	135	45	290	70	360	28	22	95	20	3/4	M12	33
3 <sup>7</sup> / <sub>16</sub> 87,313	206	112	80		60	180	47	25	270	323	145	50	320	75	400	32	26	103	24	7/8	M12	42
3 <sup>15</sup> / <sub>16</sub> 100,013	229	120	88		71	200	52	32,5	290	343	160	50	347	75	420	32	26	114,5	24	7/8	M12	53
4 <sup>3</sup> / <sub>16</sub> 106,363	276	135	109		82	215	56	47	315	386	170	55	347	90	420	32	26	138	24	7/8	M16	72
4 <sup>7</sup> / <sub>16</sub> 112,713	270	145	103		86	230	60	43	335	406	180	60	377	100	450	35	28	135	24	1	M16	87
4 <sup>15</sup> / <sub>16</sub> 125,413	280	160	106		90	250	63	42	355	426	190	65	415	100	500	42	35	140	30	1 1/4	M20	102
5 <sup>3</sup> / <sub>16</sub> 131,763	280	170	103,5	93	270	67,5	37,5	375	446	200	65	450	115	540	42	35	140	30	1 1/4	M20	115	

## 7.2 SONL plummer block housings for bearings on an adapter sleeve, inch shafts

$d_a$  5 <sup>7</sup>/<sub>16</sub> – 8 <sup>15</sup>/<sub>16</sub> in.  
138,113 – 227,013 mm



Housing for shaft end



Housing for through shaft

Shaft diameter $d_a$	Housing Designation	Appropriate parts		Locating ring <sup>3)</sup>	Seal kit for through shaft <sup>4)</sup>	End cover	Dimensions Housing			
		Bearing <sup>1)</sup>	Adapter sleeve <sup>2)</sup>				A	A <sub>1</sub>	A <sub>2</sub>	A <sub>A</sub>
in./mm	–	–					mm			
5 <sup>7</sup> / <sub>16</sub> 138,113	SONL 232-532	22232 CCK/W33	HA 3132	FRB 12/290	TSO 532/5.7/16	ECO 232-532	278	205	196	297
5 <sup>15</sup> / <sub>16</sub> 150,813	SONL 234-534	22234 CCK/W33 C 2234 K	HA 3134 HA 3134 L	FRB 14/310 FRB 14/310	TSO 534/5.15/16	ECO 234-534	310	230	215	330
6 <sup>7</sup> / <sub>16</sub> 163,513	SONL 236-536	22236 CCK/W33	HA 3136	FRB 14/320	TSO 536/6.7/16	ECO 236-536	320	240	220	340
6 <sup>15</sup> / <sub>16</sub> 176,213	SONL 238-538	22238 CCK/W33 C 2238 K	HA 3138 HA 3138	FRB 14/340 FRB 14/340	TSO 538/6.15/16	ECO 238-538	330	250	225	350
7 <sup>3</sup> / <sub>16</sub> 182,563	SONL 240-540	22240 CCK/W33	HA 3140	FRB 14/360	TSO 540/7.3/16	ECO 240-540	338	260	229	358
7 <sup>15</sup> / <sub>16</sub> 201,613	SONL 244-544	22244 CCK/W33 C 2244 K	H 3044/7.15/16 H 3044/7.15/16	FRB 14/400 FRB 14/400	TSO 544/7.15/16	ECO 244-544	358	280	239	381
8 <sup>15</sup> / <sub>16</sub> 227,013	SONL 248-548	22248 CCK/W33	H 3148/8.15/16	FRB 14/440	TSO 548/8.15/16	ECO 248-548	368	290	244	394

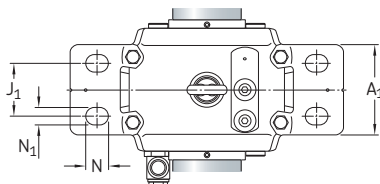
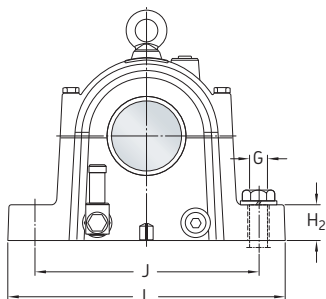
<sup>1)</sup> 222(00) – spherical roller bearing, C... – CARB toroidal roller bearing

Only typical bearings are listed. Other bearing variants can also fit the housing.

<sup>2)</sup> The adapter sleeve fits the bearing in the same line only.

<sup>3)</sup> The locating ring fits the bearing in the same line only. Two locating rings are required for each housing.

<sup>4)</sup> Seal kits for a shaft end have the designation suffix A, i.e. TSO .. A.

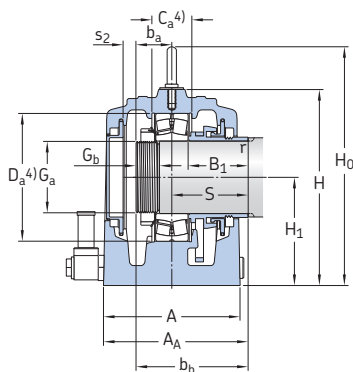


## 7.2

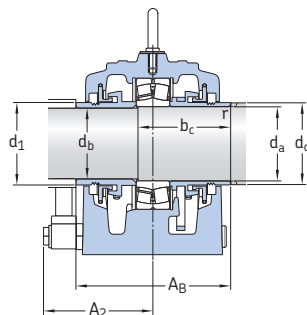
Shaft diameter	Dimensions Housing																			Eye bolt according to DIN 580	Mass Housing	
	d <sub>a</sub>	A <sub>B</sub>	d <sub>1</sub>	B <sub>1</sub>	C <sub>a</sub>	D <sub>a</sub>	b <sub>a</sub>	s <sub>2</sub>	H	H <sub>0</sub>	H <sub>1</sub>	H <sub>2</sub>	J	J <sub>1</sub>	L	N	N <sub>1</sub>	S	G			G
in./mm	mm																			in.	–	kg
<b>5 7/16</b> 138,113	316	178	118	104	290	73	42	406	477	215	65	470	120	560	42	35	158	30	1 1/4	M 20	141	
<b>5 15/16</b> 150,813	350	195	132	114	310	77	54	440	530	235	70	515	130	610	42	35	175	30	1 1/4	M 24	190	
<b>6 7/16</b> 163,513	360	205	137	114	320	78	53,5	455	545	245	75	545	150	650	42	35	180	30	1 1/4	M 24	213	
<b>6 15/16</b> 176,213	370	220	139	120	340	82	52,5	480	570	260	85	590	150	720	50	42	185	36	1 1/2	M 24	249	
<b>7 3/16</b> 182,563	378	227	140	126	360	86	51	510	600	275	85	600	160	730	50	42	189	36	1 1/2	M 24	273	
<b>7 15/16</b> 201,613	404	255	148	136	400	95	50	565	674	305	95	670	180	820	50	42	202	36	1 1/2	M 24	361	
<b>8 15/16</b> 227,013	420	270	150	148	440	105	45,5	625	734	340	100	740	190	900	50	42	210	36	1 1/2	M 24	456	

## 7.3 SONL plummer block housings for bearings on a cylindrical seat and a stepped shaft

$d_a$  85 – 160 mm



Housing for shaft end



Housing for through shaft

Shaft diameter $d_a$	Housing Designation	Appropriate parts		Lock nut	Locking washer	Seal kit for through shaft <sup>3)</sup>	End cover	Dimensions Housing						
		Bearing <sup>1)</sup>	Locating ring <sup>2)</sup>					A	A <sub>1</sub>	A <sub>2</sub>	A <sub>A</sub>	A <sub>B</sub>	d <sub>1</sub>	
mm	–	–	–	–	–	–	–	mm						
85	SONL 217-517	2217 22217 E C 2217	FRB 5/150 FRB 5/150 FRB 5/150	KM 17 KM 17 KMFE 17	MB 17 MB 17 –	TSO 217	ECO 217-517	163	110	138	172	180	96	
90	SONL 218-518	2218 22218 E C 2218	FRB 5/160 FRB 5/160 FRB 5/160	KM 18 KM 18 KMFE 18	MB 18 MB 18 –	TSO 218	ECO 218-518	170	120	142	180	190	100	
100	SONL 220-520	2220 M 22220 E C 2220	FRB 7/180 FRB 7/180 FRB 7/180	KM 20 KM 20 KMFE 20	MB 20 MB 20 –	TSO 220	ECO 220-520	186	130	150	196	206	112	
110	SONL 222-522	2222 M 22222 E C 2222	FRB 9/200 FRB 9/200 FRB 9/200	KM 22 KM 22 KMFE 22	MB 22 MB 22 –	TSO 222	ECO 222-522	213	145	163	221	229	120	
120	SONL 224-524	22224 E C 2224	FRB 12/215 FRB 12/215	KM 24 KML 24	MB 24 MBL 24	TSO 224	ECO 224-524	245	170	179	261	276	135	
130	SONL 226-526	22226 E C 2226	FRB 11/230 FRB 11/230	KM 26 KML 26	MB 26 MBL 26	TSO 226	ECO 226-526	255	180	184	263	270	145	
140	SONL 228-528	22228 CC C 2228	FRB 11/250 FRB 11/250	KM 28 KML 28	MB 28 MBL 28	TSO 228	ECO 228-528	260	190	187	270	280	160	
150	SONL 230-530	22230 CC C 2230	FRB 10/270 FRB 10/270	KM 30 KML 30	MB 30 MBL 30	TSO 230	ECO 230-530	260	190	187	270	280	170	
160	SONL 232-532	22232 CC	FRB 12/290	KM 32	MB 32	TSO 232	ECO 232-532	278	205	196	297	316	178	

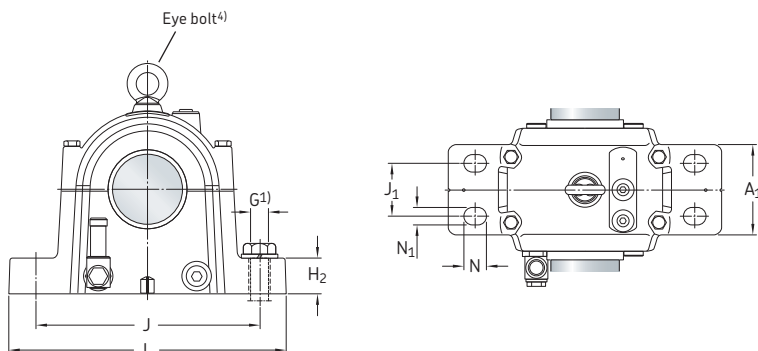
<sup>1)</sup> 22(00) – self-aligning ball bearing, 222(00) – spherical roller bearing, C... – CARB toroidal roller bearing

<sup>2)</sup> Only typical bearings are listed. Other bearing variants can also fit the housing.

<sup>3)</sup> The locating ring fits the bearing in the same line only. Two locating rings are required for each housing.

<sup>4)</sup> TSO .. is the seal kit for through shaft. For shaft ends, order TSO .. A. ECO .. is the end cover.

<sup>5)</sup> For C<sub>a</sub>, D<sub>a</sub> and eye bolt sizes, refer to **product tables 7.1 and 7.2**.



**Shaft Dimensions**  
diam-  
eter

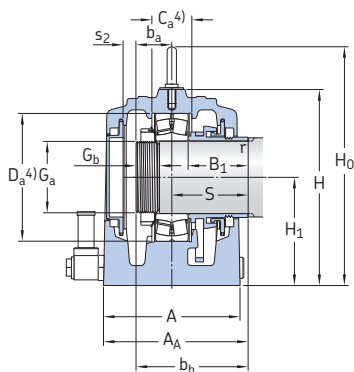
d <sub>a</sub>	B <sub>1</sub>	s <sub>2</sub>	H	H <sub>0</sub>	H <sub>1</sub>	H <sub>2</sub>	J	J <sub>1</sub>	L	N	N <sub>1</sub>	S	Shaft				d <sub>c</sub> min	G <sub>a</sub>	G <sub>b</sub>	r	Mass Housing
mm	mm												b <sub>a</sub>	b <sub>b</sub>	b <sub>c</sub>	d <sub>b</sub>					kg
<b>85</b>	72	19	230	283	125	35	260	60	330	28	22	90	40	130	105	83	91	M 85×2	24	1,6	26
<b>90</b>	75	19	245	298	135	45	290	70	360	28	22	95	42	137	112	88	96	M 90×2	24	1,6	33
<b>100</b>	80	25	270	323	145	50	320	75	400	32	26	103	46	150	123	98	106	M 100×2	26	1,6	42
<b>110</b>	88	32,5	290	343	160	50	347	75	420	32	26	114,5	52	167	138	108	116	M 110×2	28	1,6	52
<b>120</b>	109	47	315	386	170	55	347	90	420	32	26	138	56	194	164	118	126	M 120×2	29	1,6	70
<b>130</b>	103	43	335	406	180	60	377	100	450	35	28	135	60	195	164	128	138	M 130×2	31	1,6	84
<b>140</b>	106	42	355	426	190	65	415	100	500	42	35	140	63	203	170	138	148	M 140×2	32	1,6	100
<b>150</b>	103,5	37,5	375	446	200	65	450	115	540	42	35	140	68	207,5	173	148	158	M 150×2	34	1,6	113
<b>160</b>	118	42	406	477	215	65	470	120	560	42	35	158	73	231	195	158	168	M 160×3	36	1,6	136

<sup>1)</sup> For sizes and tightening torques of the attachment bolts refer to **table 3** on **page 363**.

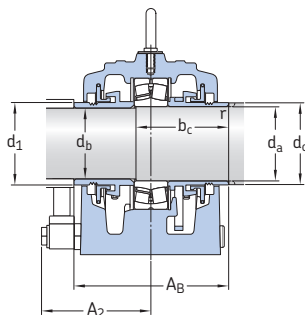


## 7.3 SONL plummer block housings for bearings on a cylindrical seat and a stepped shaft

$d_a$  170 – 240 mm



Housing for shaft end



Housing for through shaft

Shaft diameter $d_a$	Housing Designation	Appropriate parts				Seal kit for through shaft <sup>3)</sup>	End cover	Dimensions Housing					
		Bearing <sup>1)</sup>	Locating ring <sup>2)</sup>	Lock nut	Locking washer			A	A <sub>1</sub>	A <sub>2</sub>	A <sub>A</sub>	A <sub>B</sub>	
mm	–	–						mm					
170	SONL 234-534	22234 CC/W33 C 2234	FRB 14/310 FRB 14/310	KM 34 KML 34	MB 34 MBL 34	TSO 234	ECO 234-534	310	230	215	330	350	
180	SONL 236-536	22236 CC/W33	FRB 14/320	KM 36	MB 36	TSO 236	ECO 236-536	320	240	220	340	360	
190	SONL 238-538	22238 CC/W33 C 2238	FRB 14/340 FRB 14/340	KM 38 KML 38	MB 38 MBL 38	TSO 238	ECO 238-538	330	250	225	350	370	
200	SONL 240-540	22240 CC/W33	FRB 14/360	KM 40	MB 40	TSO 240	ECO 240-540	338	260	229	358	378	
220	SONL 244-544	22244 CC/W33 C 2244	FRB 14/400 FRB 14/400	HM 44 T HM 44 T	MB 44 MB 44	TSO 244	ECO 244-544	358	280	239	381	404	
240	SONL 248-548	22248 CC/W33	FRB 14/440	HM 48 T	MB 48	TSO 248	ECO 248-548	368	290	244	394	420	

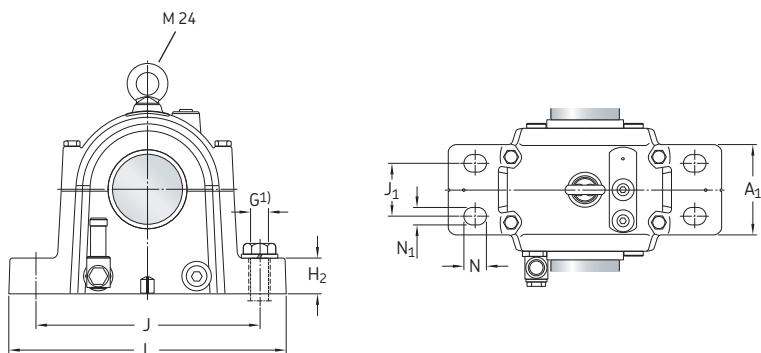
<sup>1)</sup> 222(00) – spherical roller bearing, C... – CARB toroidal roller bearing

Only typical bearings are listed. Other bearing variants can also fit the housing.

<sup>2)</sup> The locating ring fits the bearing in the same line only. Two locating rings are required for each housing.

<sup>3)</sup> Seal kits for a shaft end have the designation suffix A, i.e. TSO ... A.

<sup>4)</sup> The values for  $C_a$  and  $D_a$  can be found, for each housing size, in **product tables 7.1 and 7.2**.



Shaft diameter $d_a$	Dimensions Housing														Shaft					Mass Housing		
	$d_1$	$B_1$	$s_2$	H	$H_0$	$H_1$	$H_2$	J	$J_1$	L	N	$N_1$	S	$b_a$	$b_b$	$b_c$	$d_b$	$d_c$ min	$G_a$	$G_b$	r	
mm	mm																					kg
170	195	132	54	440	530	235	70	515	130	610	42	35	175	77	252	213	168	180	M170×3	38	3	185
180	205	137	53,5	455	545	245	75	545	150	650	42	35	180	78	258	223	177	196	M180×3	39	4	208
190	220	139	52,5	480	570	260	85	590	150	720	50	42	185	82	267	231	188	208	M190×3	40	4	244
200	227	140	51	510	600	275	85	600	160	730	50	42	189	86	275	233	198	218	M200×3	41	4	267
220	255	148	50	565	674	305	95	670	180	820	50	42	202	95	297	256	218	238	Tr220×4	45	4	355
240	270	150	45,5	625	734	340	100	740	190	900	50	42	210	105	315	270	238	258	Tr240×4	49	4	450

<sup>1)</sup> For sizes and tightening torques of the attachment bolts refer to **table 3** on **page 363**.