SCHAEFFLER

High Precision Bearings for Combined Loads

Fitting and maintenance manual

High precision bearings for combined loads

About the mounting manual

This manual describes the fitting and maintenance of:

- axial/radial bearings YRTC and YRTS
- axial angular contact ball bearings ZKLDF
- axial/radial bearings with integrated measurement ring YRTCM, YRTSM, YRTCMA, YRTSMA and YRTCMI

Symbols

The warning and hazard symbols are defined in accordance with ANSI Z535.6-2011.

WARNING In case of non-compliance, death or serious injury may occur. ◁

NOTICE In case of non-compliance, damage or malfunctions in the product or the adjacent construction may occur. ◁

General safety guidelines

Schaeffler accepts no liability for loss or damage arising from:

- incorrect fitting
- incorrect or inadequate maintenance
- incorrect communication of the content to third parties or a failure to do so

The content of this fitting and maintenance manual must be communicated to the end user.

Usage for the intended purpose

Axial/radial bearings YRT, YRTC and YRTS and axial angular contact ball bearings ZKLDF are envisaged for use in chip-forming machine tools and in particular for the bearing arrangements of high precision rotary axes in milling and turning machines.

The bearings are intended for applications which require clearance-free, precise and rigid axial/radial bearings or axial angular contact ball bearings.

Axial/radial bearings YRTCM, YRTSM, YRTCMA, YRTSMA and YRTCMI, which have an integrated measurement ring, are intended for use in electrically driven, position-controlled machine tool axes.

Any usage outside the specified area or for purposes other than that intended is at the personal responsibility of the user.

Qualified personnel

The rotary table bearing may only be handled and mounted by appropriately qualified personnel.

Safety guidelines

Ensure correct handling during the individual phases:

- opening the packaging
- transporting the bearing
- mounting the bearing
- screw mounting the bearing rings

Transport and storage

Protect bearings from exposure to load resulting from incorrect transport or storage. Large bearings should only be stored lying flat and should be transported lying flat if possible.

Unpacking, transport, packing and storage may only be performed by appropriately qualified personnel.

Mounting

Before and during fitting, the bearings and measuring system must be handled with care and in accordance with this fitting and maintenance manual.

Bearings should only be fitted using the tools and fitting aids specified. If unsuitable or contaminated tools and fitting aids are used, this will seriously impair the function of the bearings and significantly reduce their operating life.

Mounting, regreasing, the grease distribution cycle and commissioning may only be performed by appropriately qualified personnel.

Adjacent construction

The sequence of operations depends on the design of the adjacent construction. It is therefore not possible to provide a single description that includes all the fitting variants.

Since, in the majority of applications, the bearing inner ring is fitted on the shaft first and the bearing outer ring is then fixed in place, the fitting of the bearings is described on the basis of this fitting process.

If the adjacent construction is different, fit the bearing appropriately or contact us for advice.

Measurement ring

Protect the measurement rings against shock loads.

During unpackaging and restorage, ensure that the measurement ring does not come into contact with tools, wrapping loops or eye bolts.

Similarly, ensure that the cylinder head screws, tools and screw assembly tools do not come into contact with the measurement ring during mounting and screw mounting.

Measurement rings can be scratched, deformed or destroyed in contact with tools, objects, eye bolts or wrapping loops and under exposure to high forces. In particular, damage to or deformation of the measurement ring and its structure will impair or destroy the angular measurement accuracy.

Measurement ring and protective strip (YRTCM, YRTSM)

Shock loads can lead to flaking of the composite material of the measurement ring.

The protective strip is a piece of adhesive tape and is used to provide protection during transportation. It must be removed prior to initial operation.

Measurement ring and cover ring (YRTCMA, YRTSMA and YRTCMI)

Shock loads can damage the lattice structure of the measurement ring and lead to measurement errors.

The cover ring is manufactured from stainless steel and must not be removed, but must remain on the inner ring.

Preparations for fitting

Axial/radial bearings and axial angular contact ball bearings are precision machine elements. These high precision rolling bearings will only achieve their maximum operating life and functional capability if they are fitted correctly.

Bearings with magneto-resistive angular measuring system

Axial/radial bearings YRTCM and YRTSM correspond in mechanical terms to series YRTC and YRTS, but are additionally fitted with a magnetically coded measurement ring and a protective strip.

Measurement rings are manufactured from a composite material that has a magnetic multipolar arrangement. This is scanned by magneto-resistive means.

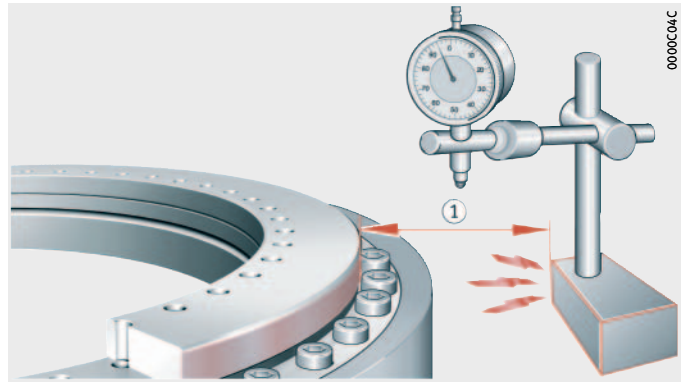
The protective strip is a piece of adhesive tape and is used to provide protection during transportation. It must be removed prior to initial operation.

The measurement ring, which is protected by a protective strip during transportation and mounting, is located on the cylindrical outside surface of axial/radial bearings YRTCM and YRTSM.
The measurement ring must be protected against shock loads. During unpackaging and restorage, ensure that the measurement ring does not come into contact with tools, wrapping loops or eye bolts. Similarly, ensure that the cylinder head screws, screw assembly tools and other tools used do not come into contact with the measurement ring during mounting and screw mounting of the outer ring.

NOTICE

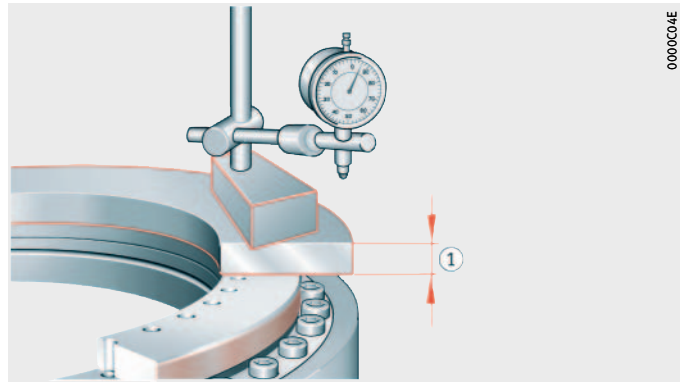
External magnetic fields damage the magnetic measurement ring. Keep the measurement ring away from magnetic sources, to avoid partial mismeasurements by the system. A field strength of approximately 70 mT or higher immediately on the coding carries the risk of damage to the magnetic poles of the measurement ring.

Magnetic dial gauge stands must not be placed directly on the coded washer (guide value: at least 100 mm distance in air or 10 mm unalloyed steel). ◁



① Minimum distance > 100 mm

Figure 1
Minimum distance between magnetic measurement stand and magnetic measurement ring



① Shielding > 10 mm

Figure 2
Shielding by unalloyed steel

Bearings with inductive angular measuring system

Axial/radial bearings YRTCMA, YRTSMA and YRTCMI correspond in mechanical terms to series YRTC and YRTS, but are additionally fitted with a measurement ring, which can be scanned by inductive means, and a cover ring.

The measurement ring and the cover ring, which are components of the angular measuring system, are located on the cylindrical outside surface of axial/radial bearings YRTCMA, YRTSMA and YRTSMI. Measurement rings are manufactured from stainless steel and have a high-precision lattice structure, which is scanned by inductive means. The cover ring is manufactured from stainless steel and must not be removed, but must remain on the inner ring.

Damage to the measurement ring and cover ring, which can be caused by contact with tools, objects, eye bolts or wrapping loops and exposure to high forces, will impair measuring accuracy and result in the functional failure of the measuring system.

When fitting and screw mounting the outer ring, ensure that the cover ring does not come into contact with cylinder head screws, screw assembly tools and other tools.

Guide the axial/radial bearing with angular measuring system centrally into the axle housing, to ensure that the axial/radial bearing and, in particular, the measurement ring, do not come into contact with sharp edges or metal burr.

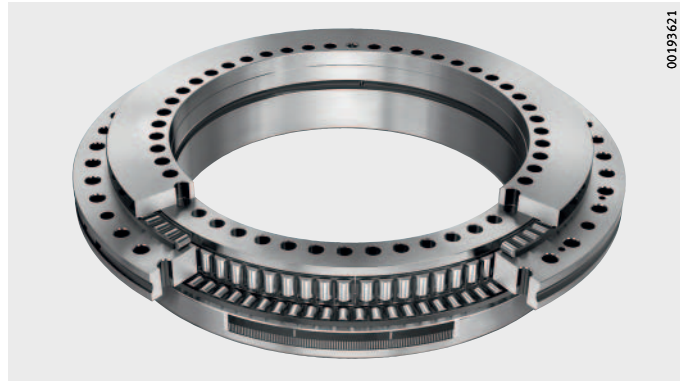


Figure 3
Axial/radial bearing with inductive angular measuring system

Delivered condition of the bearings

The bearings are wrapped in anti-corrosion paper and individually packed in film. Smaller sizes are also supplied in multiple packs.

Initial greasing

The bearings are greased:

- YRTS, YRTSM and YRTSMA with a lubricating grease according to Arcanol LOAD150
- YRTC, YRTCM, YRTCMA, YRTCMI and ZKLDF with a lubricating grease according to Arcanol MULTITOP

The rotational resistance is heavily dependent on the greasing of the bearing. The frictional torque values given in the dimension tables (Catalogue HR 1, Rolling Bearings, and TPI 120, High Precision Bearings for Combined Loads) are only valid for bearings with the original greasing.

Miscibility of greases

Greases may be mixed if the following preconditions are fulfilled:

- same base oil
- compatible thickener type
- similar base oil viscosities (differing by no more than one ISO viscosity grade VG)
- matching consistency (NLGI consistency class)

If there is any doubt, please consult the lubricant manufacturer.

Bearing storage and storage life

The shelf life of the bearings is limited by the storage life of the grease.

Experience shows that the greases used, with a mineral oil base, can be stored for up to 3 years under the following conditions:

- closed room
- dry, clean rooms with temperatures between 0 °C and +40 °C
- relative humidity up to a maximum of 65%
- no influence of chemical agents (vapours, gases, fluids)

After long storage periods, the frictional torque may temporarily be higher than that of freshly greased bearings. The lubricity of the grease may also have deteriorated.

Compatibility and miscibility with anti-corrosion agents

The anti-corrosion agents in bearings with an oil-based preservative are compatible and miscible with lubricating oils having a mineral oil base. Compatibility must be checked if, for example, synthetic lubricants are to be used.

If there is an incompatibility, wash out the anti-corrosion oil before greasing. This is necessary in the following cases:

- products based on alkoxyfluoroether
- products based on polyglycol oil
- use of silicone oils
- change of lubricant
- contamination of the bearings

If in doubt, please contact the relevant lubricant manufacturer.

Cleaning of bearings

In general, it is not necessary to remove the anti-corrosion agents from bearings coated with an oil-based preservative.

NOTICE

Risk of damage due to the introduction of contaminants.
Contaminants can impair the function and operating life of bearings.
Use a lint-free cloth to clean the external surfaces of the bearing only.
Check the contaminant content of the cleaning baths. A contaminant content of 0,1% must not be exceeded. ◁

Cleaning can be carried out using:

- organic cleaning agents
  - paraffin oil free from water and acid, petroleum ether (not petrol), freon 12 substitutes
- thin, clean oil for hot cleaning
  - oil with a flash point of at least +250 °C should be used and heated to approx. +120 °C
  - in addition to effective cleaning, this method also protects the bearings temporarily against corrosion

Legal regulations on environmental protection and on health and safety at work in the respective country of use must be observed, in addition to application information provided by the manufacturer of the product used.

Removing bearings from packaging

The original packaging protects the bearing from minor transport damage and contamination.

NOTICE

To prevent corrosion, ensure your hands are clean and dry.
Wear safety gloves. ◁

- ▶ Bearings should only be removed from their original packaging immediately before assembly.
- ▶ If the original packaging is damaged, the bearings must be checked.
- ▶ Clean any contaminated bearings.

Multi-item packaging

For multi-item packaging with dry preservation, the protective vapour phase is only effective in closed packaging.

- ▶ The packaging should be closed again immediately.
- ▶ Ungreased bearings should be oiled or greased immediately.

Transport of bearings

The bearing must be transported correctly.

⚠WARNING

In order to prevent the occurrence of personal injury or damage, the transport specifications must be observed.

Use suitable technical accessories to lift heavy components.
The mounting personnel must be familiar with correct usage of the accessories and must observe all safety specifications relating to the handling of suspended loads.

Only use lifting gear, tackle and cranes that are designed, tested and approved for the specific intended purpose.

The presence or movement of persons, or body parts, under suspended loads is not permitted. ◁

NOTICE

To prevent damage in transit, ensure correct transport. Do not position the bearings vertically. Bearings must not be wrapped in a chain. Bearings should never be supported at one point only for lifting. ◁

- ▶ Large bearings should only be stored lying flat and should be transported lying flat if possible.
- ▶ Heavy bearings must only be transported using a hoist attached to the eye bolts or by means of textile slings.

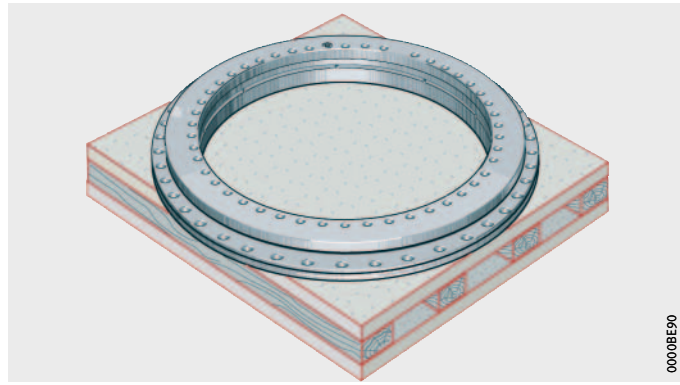


Figure 4
Storage lying flat

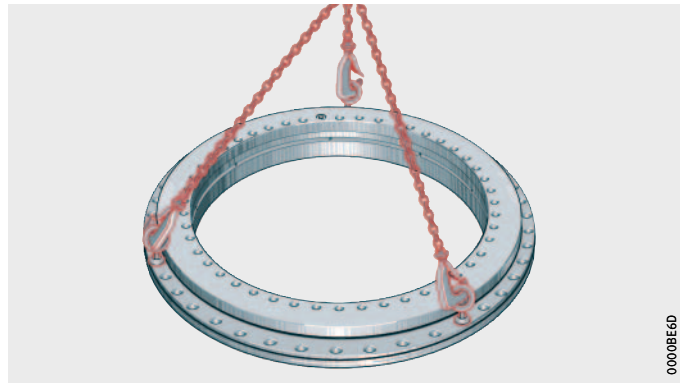


Figure 5
Transport using hoist and eye bolts

Design of fitting area

- Ensure that work surfaces are bright, clean and free from fibres and that lighting conditions are good.
- Rolling bearings should be fitted in the workshop if possible.

If this is not possible:

- Cover the machine.
- Protect the bearings against contamination from the surrounding area.
- Bearings should only be unpacked immediately before fitting and must be protected against contamination.

NOTICE

The fitting area must be kept clean and free from dust. Contamination will impair the function and operating life of the bearings.

To prevent corrosion, ensure your hands are clean and dry. Wear safety gloves. The bearings must be protected against moisture and aggressive media. ◁

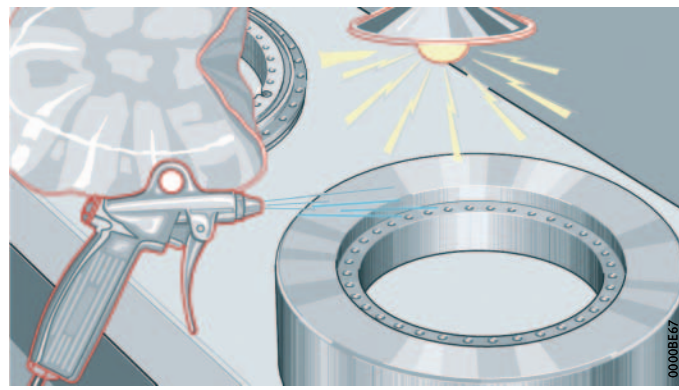


Figure 6
Design of fitting area

Protection measures during fitting

If fitting the bearings in complex fitting processes is very time-consuming or fitting is interrupted, take appropriate measures to protect bearings against contamination and damage.

The machine area can be completely covered using VCI paper or plastic sheeting.

If this is not possible, cover the exposed bearing and shaft with a clean, lint-free cloth.

Preparation of the adjacent construction

The locating surfaces for the bearing rings must be clean and free from burrs for fitting.

Cleaning the adjacent construction

Suitable cleaning agents include petroleum, diesel oil and commercially available grease solvents such as acetone or isopropanol.

Legal regulations on environmental protection and on health and safety at work in the respective country of use must be observed, in addition to application information provided by the manufacturer of the product used.

- ▶ Smooth the locating surfaces and burrs using an oil stone.
- ▶ Apply cleaning agents to the locating and bearing seating surfaces using a brush or suitable cloth.
- ▶ Clean and dry the surfaces.

NOTICE

Ensure that all adjacent components and lubrication holes are free from cleaning agents, solvents, washing emulsions and detaching particles. If the adjacent construction and lubrication holes are not completely clean, the raceway system may become contaminated or the fit surfaces may rust. ◁

Selection of fasteners

Bearings must only be fixed using the screw types specified.

It is essential that the information in the following sources is followed:

- technical proposal
- Catalogue HR 1, Rolling Bearings, dimension tables
- TPI 120, High Precision Bearings for Combined Loads

NOTICE

The specifications relating to the fasteners must be observed. Any deviations will influence the effectiveness of the screw connection and the function, such as frictional torque and rigidity, as well as the life of the bearings.

As fixing screws, use cylinder head screws of grade 10.9 to DIN EN ISO 4762 only. For other grades, please contact Schaeffler.

The user should ensure a screw connection with the adjacent construction and strength thereof to guideline VDI 2230.◁

Checking the tolerances of the screw mounting surfaces

The dimensional, form and positional tolerances for the screw mounting surfaces on the adjacent construction must be within the stated values in accordance with TPI 120, High Precision Bearings for Combined Loads, and Catalogue HR 1, Rolling Bearings.

The measurement method depends on the following factors:

- the measuring equipment used
- the geometry of the adjacent components
- the requirements for running accuracy

In order to achieve the high measurement accuracy required, a measuring machine should be used for the check if necessary.

The adjacent construction should be measured under the usual technical conditions (temperature in the region of the reference temperature +20 °C, no wide component temperature variations). The components should be allowed sufficient time to reach these temperatures where required, for example, in the event of transport from a cold environment to the hall.

NOTICE

The screw mounting surfaces of the adjacent construction must not exceed the permissible geometrical tolerances according to the diagram, see TPI 120, High Precision Bearings for Combined Loads, and Catalogue HR 1, Rolling Bearings.◁

Fitting

Checking the dimensional and running accuracy of the bearings

▶ To check the dimensional tolerances D and d, loosen the retaining screws used to secure the bearing during transport.

The data supplied for the bearing diameter in TPI 120, High Precision Bearings for Combined Loads, and in Catalogue HR 1, Rolling Bearings, are mean values.

The running accuracy of the bearings can only be measured on a bearing that is already fitted, screw mounted and fully supported.

The full bearing running accuracy can only be transmitted to the complete assembly if there is a clearance-free fit on the rotating bearing ring.

Locating the bearing rings

In order to facilitate fitting, the bearings can be heated. Heating by between 10 K and 20 K is generally sufficient.

▶ Allow the bearings to cool before tightening the screws.

NOTICE

Mounting forces must only be applied to the bearing ring to be fitted and never through the rolling elements. Avoid direct blows on the bearing rings in all cases. Bearing rings must be fitted without the use of external loads.

When fitting the inner ring, direct forces only through the inner ring. When fitting the outer ring, direct forces only through the outer ring.

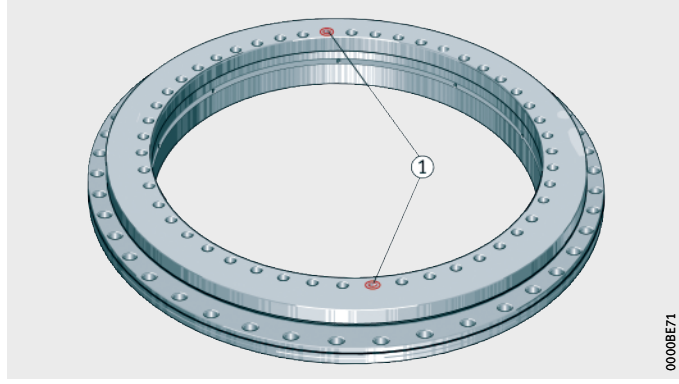
Bearing components must not be separated or interchanged during fitting and dismantling. ◁

Locating the bearing inner ring

▶ The seating surfaces for the bearing inner rings on the adjacent construction should be lightly oiled or rubbed with solid lubricant.

▶ Loosen the retaining screws (2 or 3, depending on the bearing) by between half a revolution and one full revolution. For ZKLDF bearings, loosen the retaining screws so that the two inner rings can centre themselves in relation to each other.

▷ Once the retaining screws have been removed, the bearing arrangement is no longer self-retaining.



① Retaining screws

Figure 7
Loosening the retaining screws

- ▶ Before the bearing is pushed into place, align the hole pattern in the bearing to the hole pattern in the adjacent construction. For example, threaded rods can be used.
- ▶ Push the bearing onto the shaft, taking care not to tilt the bearing.
- ▶ Insert the fixing screws in the holes and tighten finger tight. In the case of axial angular contact ball bearings ZKLDF, rotate the unlocated bearing ring. This will centre the inner rings.

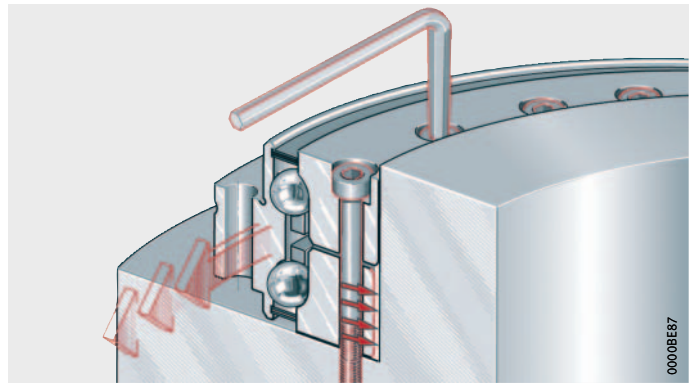


Figure 8
Rotating the unlocated bearing ring

- ▶ Tighten the fixing screws in a crosswise sequence using a torque wrench in three stages to the specified tightening torque M_A. In the case of axial angular contact ball bearings ZKLDF, rotate the bearing ring.

Tighten the fixing screws in three stages using different tightening torques, see page 18:

- stage 1: 40% of M_A
- stage 2: 70% of M_A
- stage 3: 100% of M_A

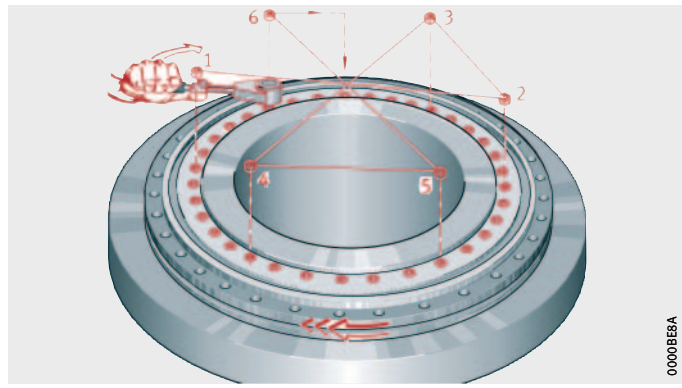


Figure 9
Locating the inner ring

- ▶ After fitting of the bearings, retighten or remove the retaining screws.

Locating the bearing outer ring

- ▶ The seating surface for the bearing outer ring in the housing should be lightly oiled or rubbed with solid lubricant.
- ▶ Fit the outer ring of the bearing and shaft assembly in the housing bore.

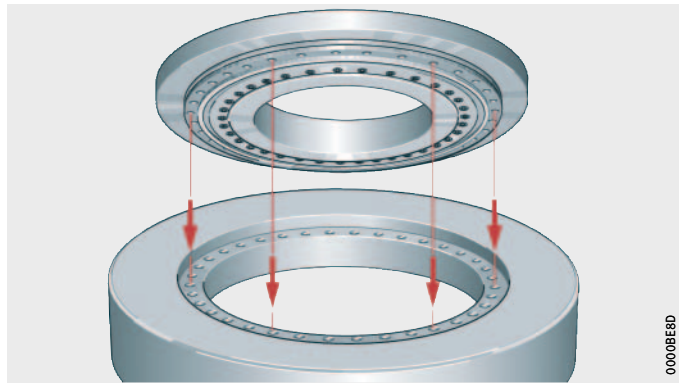


Figure 10
Insert the outer ring into the housing bore

- ▶ Insert the fixing screws in the holes and tighten in a crosswise sequence using a torque wrench in three stages to the specified tightening torque M_A.

Tighten the fixing screws in three stages using different tightening torques, see page 18:

- stage 1: 40% of M_A
- stage 2: 70% of M_A
- stage 3: 100% of M_A

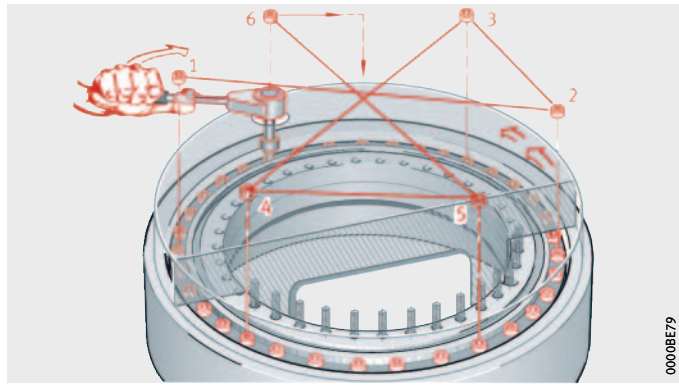


Figure 11
Locating the outer ring

NOTICE

All the fixing screw holes must be used. If a smaller number of fixing screws is used, this will reduce the load carrying capacity of the screw connections as well as the running accuracy and rigidity of the bearing. ◁

The rigidity values in the dimension tables of TPI 120, High Precision Bearings for Combined Loads, and in Catalogue HR 1, Rolling Bearings, are only valid if all the fixing holes are used.

In order to prevent unacceptable variations between the screw tensioning forces, adhere exactly to the fixing sequence (tighten the screws in a crosswise sequence).

Tightening torques M_A for axial/radial bearings

Bore diameter mm	Fixing screw	Tightening torque [1] M_A Nm Stage 1 40% of M_A	2 70% of M_A	3 100% of M_A
50	M5	3	6	8,5
80	M4	3	3	4,5
80	M5	3	6	8,5
100	M5	3	6	8,5
120	M6	6	10	14
150	M6	6	10	14
180	M6	6	10	14
200	M6	6	10	14
260	M8	14	24	34
325	M8	14	24	34
395	M8	14	24	34
460	M8	14	24	34
580	M10	27	48	68
650	M12	46	81	116
850	M16	114	199	284
950	M16	114	199	284
1 030	M16	114	199	284

[1] Tightening torque M_A for fixing screws to DIN EN ISO 4762, grade 10.9.

Function and safety checks

Checking the bearing frictional torque

The bearing frictional torque (rotational resistance) can only be measured on a bearing that is already fitted, screw mounted and fully supported.

When the fixing screws are tightened as specified, the bearing must rotate evenly.

For bearing frictional torques, see TPI 120, High Precision Bearings for Combined Loads, or Catalogue HR 1, Rolling Bearings.

The rotational resistance is also influenced by:

- operating loads
- screw tightening torque
- geometrical accuracy of the fit and screw mounting surfaces
- fit
- temperature difference between the inner ring and outer ring
- operating temperature
- lubricant used
- grease quantity

If the bearing is unusually difficult to move, loosen all of the fixing screws and tighten them again in steps in a crosswise sequence. This will relieve any distortion.

Functional inspection of the measuring system, see mounting instruction MON 18, Axial/radial bearings YRTM with integral angular measuring system.

Checking running accuracy

The running accuracy can only be checked once the bearing is fitted and with a dial gauge.

Incorrect running accuracy may be due to:

- inaccuracies in the adjacent construction that are then transmitted to the raceway system
- eccentric mounting of the bearing with a fit clearance
- fixing screws that are not tightened as specified
- retaining screws that were not loosened before the rings were mounted

Checking the fixing screws

The fixing screws must be checked regularly, especially in the following circumstances:

- high tilting moment load
- continuous and alternating axial load

▶ In order to compensate for settling effects, check the tightening torque M_A of the fixing screws after initial operation of the bearing and, if there is any deviation, tighten to the specified value.

⚠WARNING

Check the tightening torques M_A of the fixing screws within the framework of the machine service intervals and, if necessary, correct to the specified value. If the bearing is replaced, new fixing screws must always be used. Failure to follow these instructions can lead to personal injury or damage to property. ◁

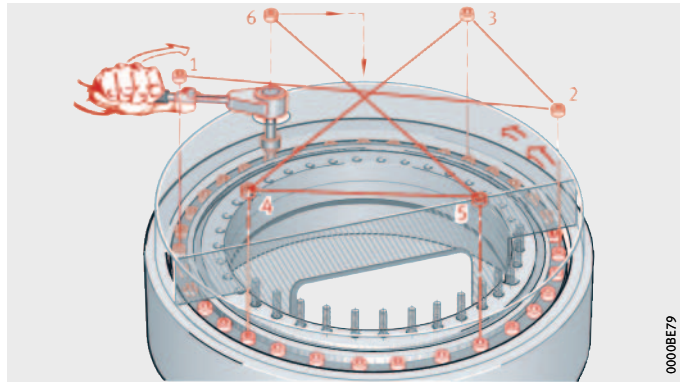


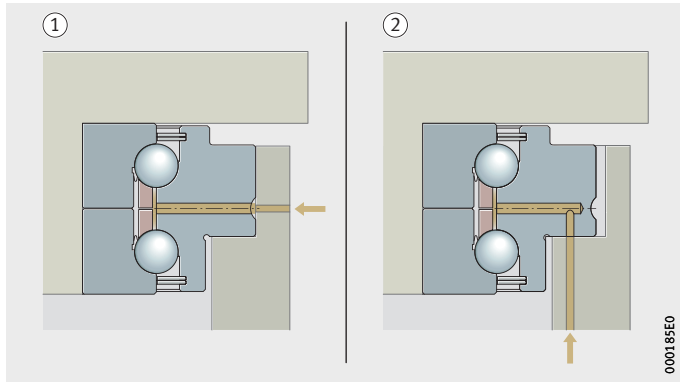
Figure 12
Checking the tightening torques of the fixing screws

Lubrication

The speed capability, friction, rating life, functional capability and periods between relubrication intervals are essentially influenced by the grease used.

The bearings YRTC and YRTS can be lubricated via the outer ring and inner ring, bearings ZKLDF via the outer ring only.

Bearing series YRTC from bore diameter 580 mm as well as bearing series YRTS and ZKLDF have an additional lubrication connector in the screw mounting face of the outer ring. This allows reliable feed of lubricant even where there is a large fit clearance in the bearing seat or the outer ring is free.



① Relubrication via the lubrication groove in the outer ring
② Relubrication via the outer ring screw mounting surface

Figure 13
Options for relubrication

For calculation of the relubrication quantities and intervals based on a stated load collective (speed, load, operating duration) and the environmental conditions, please contact us.

Greases for relubrication

Series	Relubrication using grease
YRT, YRTC, YRTCM, YRTCMA, YRTCMI, ZKLDF	Arcanol MULTITOP
YRTS, YRTSM, YRTSMA	Arcanol LOAD150

Bearings should always be relubricated before and after extended breaks in operation, under high moisture levels and within the specified lubrication intervals. Observe the data in the assembly drawing.

For the following applications, please contact us:

- stationary bearings
- vibrations
- very small oscillating movements

Further information

For further information on lubrication, see:

- Catalogue HR 1, Rolling Bearings
- TPI 120, High Precision Bearings for Combined Loads

Relubrication of bearings

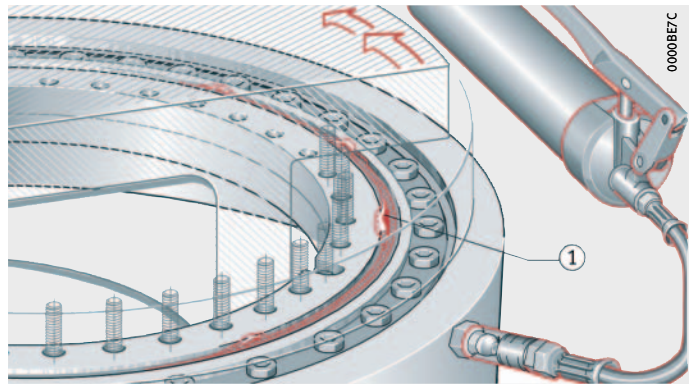
If possible, the grease used should be the same as the grease with which the bearing was supplied.

NOTICE

Relubrication should be carried out with the bearing warm from operation and rotating slowly.

Before relubrication is carried out, it must be ensured that the lubricant ducts in the adjacent construction do not contain any cleaning agents, solvents, washing emulsions or other contaminants. ◁

- ▶ Clean the lubrication nipples, clean or replace the lubricant filters.
- ▶ Inject grease into all the lubrication nipples until the relubrication quantity is reached. Rotate one bearing ring during this process and ensure that old grease can exit the bearing without hindrance.



① Old grease

Figure 14
Rotating the bearing ring during relubrication

- ▶ Before initial operation, it must be ensured that all the lubricant ducts to the bearing are filled with lubricant.

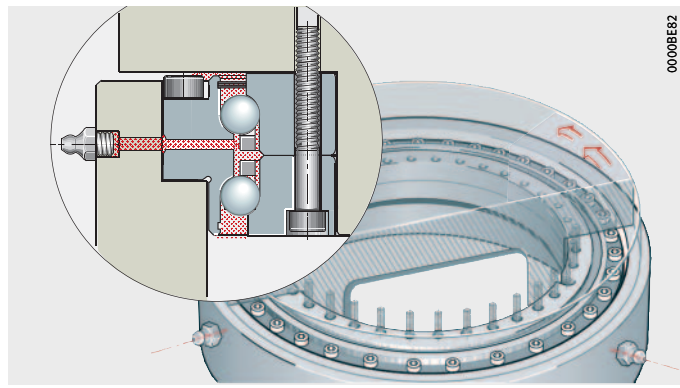
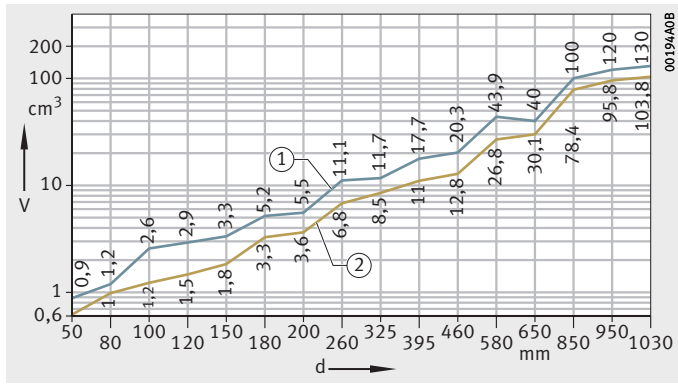


Figure 15
Filled lubricant ducts



① Outer ring
② Inner ring

Figure 16
Grease quantities for initial filling of the lubrication groove

Relubrication quantity
YRT, YRTC, YRTCM, YRTCMA, YRTCMI

Axial/radial bearing	Relubrication quantity	
	min. g	max. g
YRT50	4	5
YRT80-TV	3	4
YRTC100-XL	6	7
YRTC120-XL	7	8
YRTC150-XL	8	10
YRTC180-XL	12	14
YRTC200-XL	12	14
YRTC260-XL	17	19
YRTC325-XL	24	26
YRTC395-XL	28	30
YRTC460-XL	37	40
YRTC580-XL	64	66
YRTC650-XL	102	118
YRTC850-XL	132	149
YRTC950-XL	176	193
YRTC1030-XL	176	193

Relubrication quantity YRTS, YRTSM, YRTSMA

Axial/radial bearing	Relubrication quantity	
	min. g	max. g
YRTS200	7	8
YRTS260	12	13
YRTS325	20	23
YRTS395	21	23
YRTS460	42	47

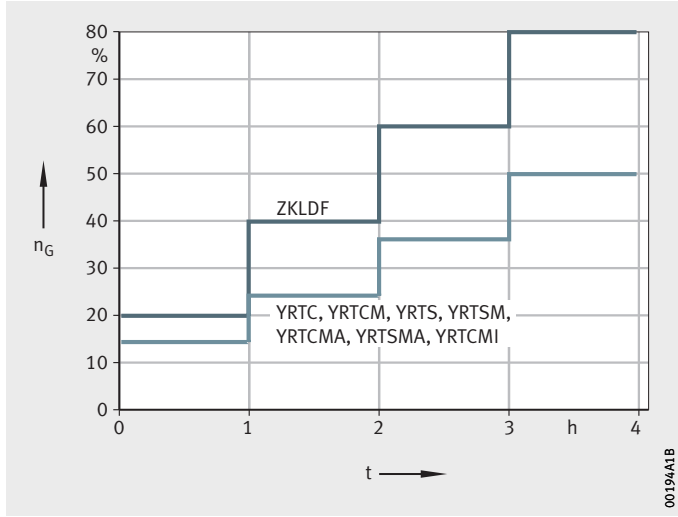
Relubrication quantity ZKLDF

Axial/radial bearing	Relubrication quantity	
	min. g	max. g
ZKLDF100	7	8
ZKLDF120	9	10
ZKLDF150	11	14
ZKLDF180	15	17
ZKLDF200	19	22
ZKLDF260	28	33
ZKLDF325	39	44
ZKLDF395	55	66
ZKLDF460	72	88

Overlubrication

The bearings may be damaged by overheating as a result of increased frictional torque when operating at high speeds if they have been accidentally overlubricated.

In order to achieve the original frictional torque again, the running-in cycle must be carried out.



n_G = limiting speed, see dimension tables
t = time

Figure 17
Running-in cycle for initial operation and after overlubrication

Initial operation

Rolling bearings may exhibit increased frictional torque during initial operation, which can lead to overheating where there is immediate operation at high speeds.

NOTICE

In order to prevent overheating of the bearing, the running-in cycle must always be carried out. The running-in cycle may be shortened if there is appropriate monitoring of the bearing temperature.

The bearing ring temperature must not exceed +70 °C.◁

In the case of swivel type axes (low speed or small operating duration), the running-in cycle is not required.

Further information

Catalogue HR 1, Rolling Bearings, and TPI 120, High Precision Bearings for Combined Loads, give comprehensive information on high precision bearings for combined loads.

Significant questions on the calculation and design of bearing arrangements with these bearings are covered in the principles of rolling bearings. All the available bearings are described in the dimension tables.

For questions on fitting and maintenance as well as advice on the selection and application of high precision bearings, our external sales force and application engineers are available to assist you.

Publication requests

Technical product information is available upon request:

- TPI 120, High Precision Bearings for Combined Loads
- Catalogue HR 1, Rolling Bearings
- MON 100, High Precision Bearings for Combined Loads
- MON 18, Axial/radial bearings YRTM with integrated angular measuring system
- http://medias.schaeffler.de

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