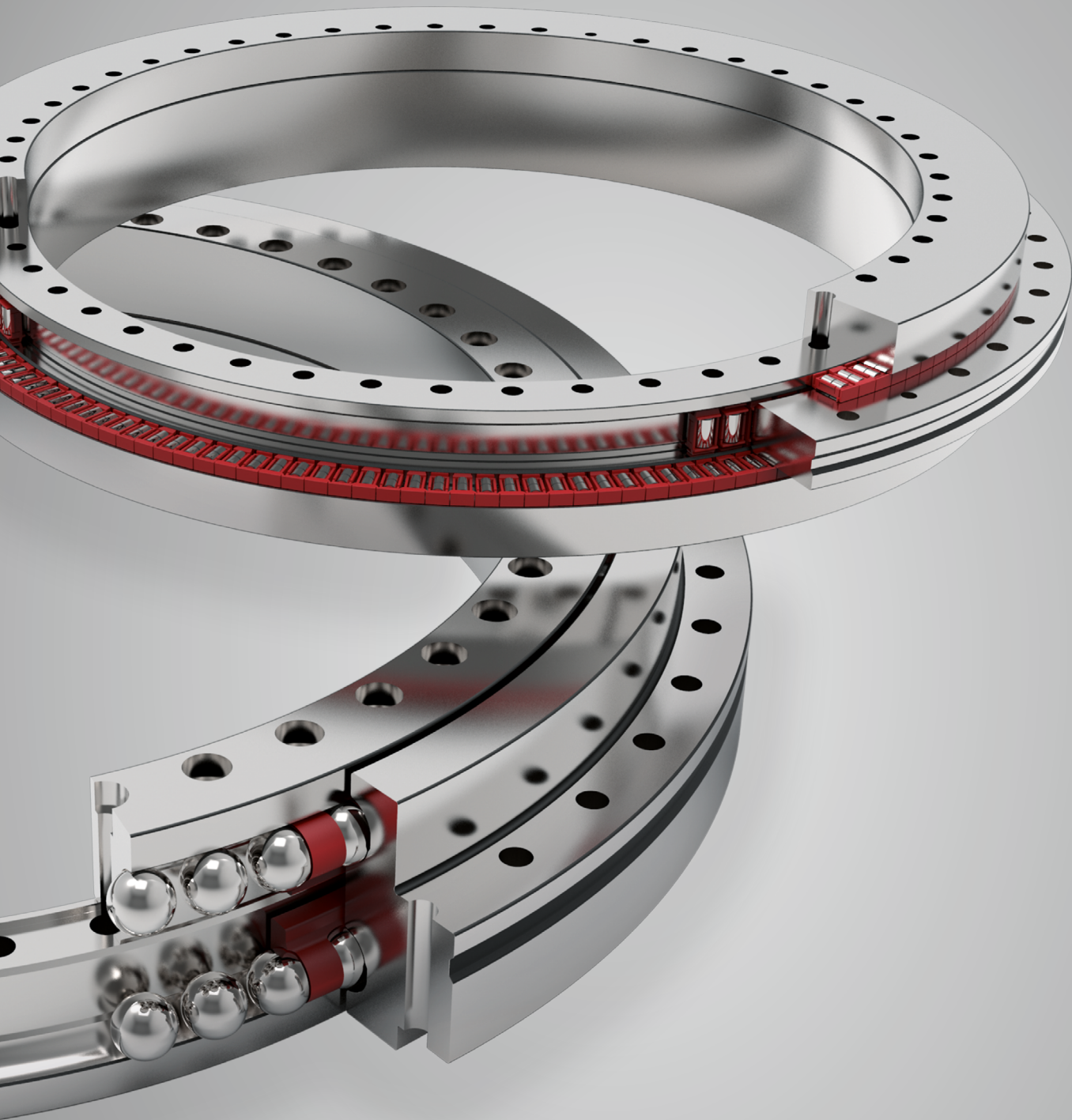
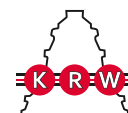


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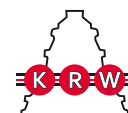
ROTAB[®]

Installation manual
for rotary table bearings



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1 General information

This manual gives an overview of the correct installation of KRW rotary table bearings. The instructions on the KRW drawings and/or bearing-specific KRW instructions also apply. The contents of this installation manual must be provided to the end user. KRW is not liable for damage caused by faulty installation, lack of or incorrect maintenance or missing or incomplete transfer of the contents to third parties.

The general industrial safety guidelines must also be observed.

2 Storage and shelf life of bearings

The storage time of the bearings is strongly influenced by the environmental conditions, such as temperature or humidity. Therefore, we recommend to keep the storage time for bearings as short as possible. The condition of the bearings must be checked for corrosion and/or damage, if the storage time is exceeded, if there is visible damage to the packaging or if the preservation is inadequate. Bearings without preservation are generally susceptible to corrosion.

For the removal of the bearing from the original packaging, as well as its handling and installation, suitable protective gloves have to be used. If direct contact cannot be avoided, the bearings must then be cleaned and preserved with a suitable anti-corrosion agent.

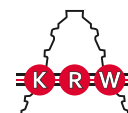
If, in spite of all appropriate precautions, the bearing is contaminated during the installation process, these liquid or solid contaminants must be thoroughly rinsed out with a suitable agent before installation. For greased bearings, the contaminated grease must be completely replaced using suitable aids. After re-greasing, perform a grease distribution run as described in Chapter 5 „Lubrication and commissioning“. In case of insufficient experience or uncertainty, the bearing must be re-greased by KRW. Solid mineral particles in particular may lead to premature failure of the bearing during operation.

For information on the storage and shelf life of bearings, please see:

www.krw.de

2.1 Preservation

In most cases, KRW bearings are greased at the factory. In addition to packaging, the bearings are treated with an anti-corrosion agent to increase their durability. If the bearing is not contaminated, washing before use is strongly discouraged. The preservative can be removed from the fitting surfaces with a clean rag before installation.



2.2 Storage time

Experience has shown that KRW bearings can be stored for up to two years. If the packaged bearing is placed in sturdy wooden box, the storage time increases to up to three years. This storage period starts on the date of factory packing of the bearings and is based on the following storage and transport conditions.

2.3 Storage conditions

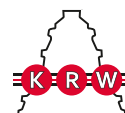
The following storage conditions ensure the minimum storage period for bearings. They also provide important information on the proper storage of the bearings.

- Bearings must be stored in a horizontal position and supported around the entire circumference of the ring surface.
- Storage on wooden shelves is not permitted.
- The storage location must have a minimum distance of 30 cm from walls, floors, heating and air-conditioning systems and their supply and drain pipes.
- Bearings must not be stored in stacks or subjected to constraining forces during storage.
- The storage room may not be subject to severe temperature fluctuations.
- The maximum relative air humidity is 65%.
- Bearings must be stored in their original unopened packaging and removed only immediately before installation.
- No labels or other tags may be removed from the original packaging.
- If the bearing is to be stored after the original packaging has been opened, suitable preservation measures must be taken.
- When stored, the bearing may not be exposed to aggressive or corrosive media such as gases, mists or aerosols.
- Bearings may not be stored for extended periods in direct sunlight.
- The place of storage must not be exposed to permanent vibrations or shocks in order to prevent premature damage to the bearing (stagnation marks or false brinelling).

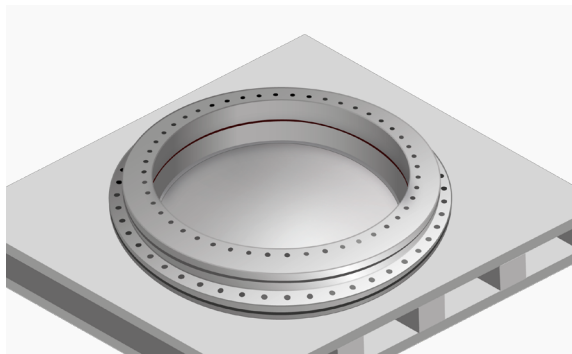
2.4 Transport conditions

The general rules apply to the transport of bearings:

- The original KRW packaging must be used to transport the bearings.
- Bearings must be transported in a horizontal position only and must be supported around the entire circumference of the ring surface.
- It is generally not permitted to stack bearings, even in their original packaging. The instructions on the original packaging must be observed.
- Bearings must be protected against environmental influences and transported without exposure to large temperature fluctuations.
- To avoid stagnation marks, transport must be carried out with little vibration or at least with vibration dampening.

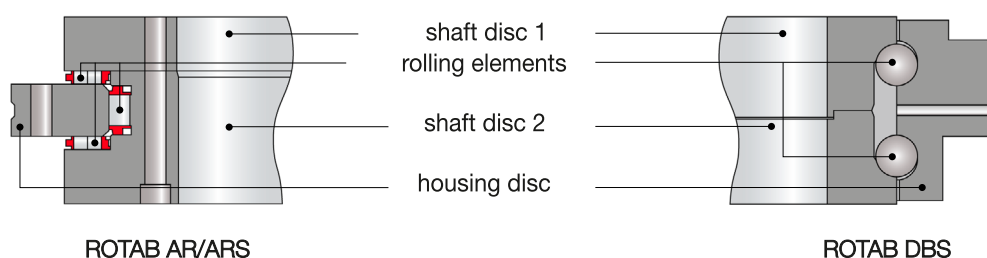


These specifications always apply. Damage to the bearings during transport can be reliably prevented if you take these measures.



3 Illustration of the ROTAB® bearing series and its components

ROTAB® bearings consist of the following components, depending on the bearing type:



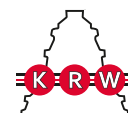
The dimensions of the bearing determine the size and number of screws to be used.

4 Installation

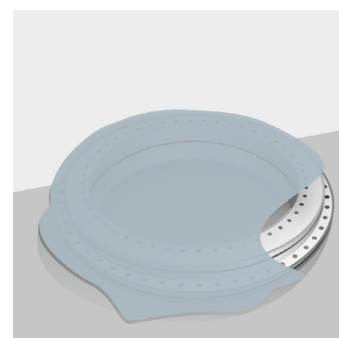
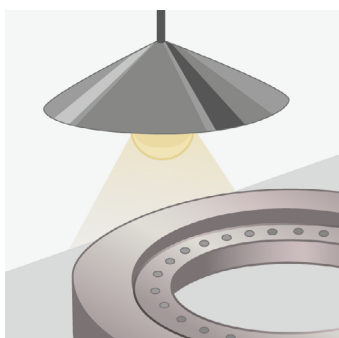
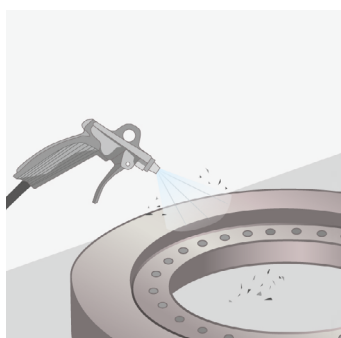
4.1 General information

The following instructions must be observed and adhered to before and during installation:

- The place of installation must be clean, dry, dust-free and have adequate lighting.
- Ensure that the surface is well-lit, clean and as free of fibers as possible.
- We recommend a room temperature of 15°C to 25°C.
- All contact and screw-on surfaces must be wiped with an oil stone and cleaned with a lint-free cloth to ensure that they are free of chips and other residues.
- It must be ensured that the surrounding components have the same temperatures as the bearing to be installed.
- Impact points on contact and functional surfaces must be avoided.
- The lubricating ducts of the connecting structure must be free of chips and other residues.
- The bores must be cleaned and deburred using compressed air. You must wear safety goggles and ear protection when you do this.
- The bearings may only be installed using clean tools and suitable aids.



- The bearings should only be removed from their packaging immediately before installation in order to avoid contamination. If the bearings are removed prematurely from their original packaging, they must be stored with a suitable cover.
- If the bearings are provided with magnetic angle coding, they must be kept away from magnetic sources, e.g. magnetic bases.



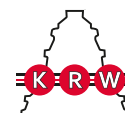
4.2 Tools and aids

- Suitable cleaning agent
- Suitable lubricant (e.g. oil stone) for contact surfaces (e.g. shaft - shaft disc)
- Two threaded rods (thread corresponding to the fastening screws)
- Adjustable and calibrated torque wrench
- Fixing screws with a min. strength class of 10.9 in accordance with DIN EN ISO 4762
- Three eyebolts with suitable lifting gear
- Locating pins for positioning face-side lubrication holes
- Spirit level

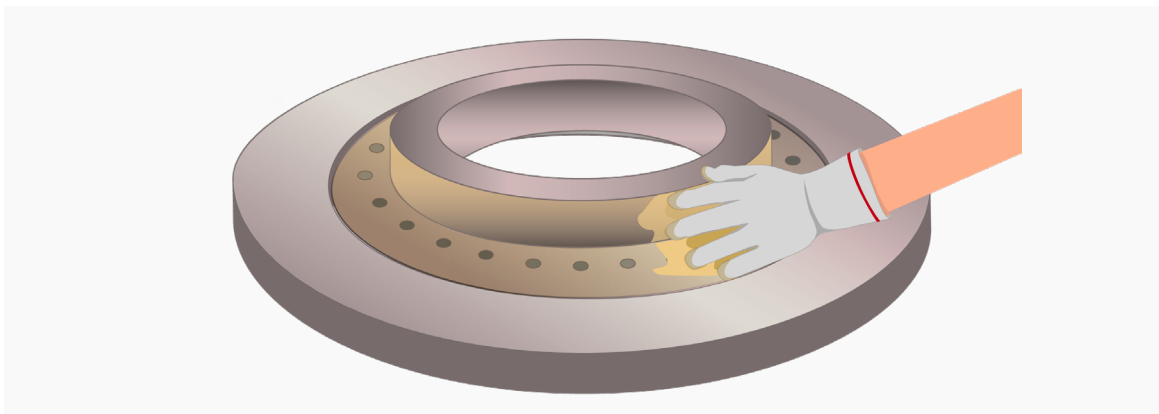
4.3 Installation

In most rotary tables, the shaft discs are fitted first and the housing discs are fastened afterwards. This is the basis of the following installation steps. If the mating structures deviate, install the bearing accordingly or contact the KRW Application Engineering department.

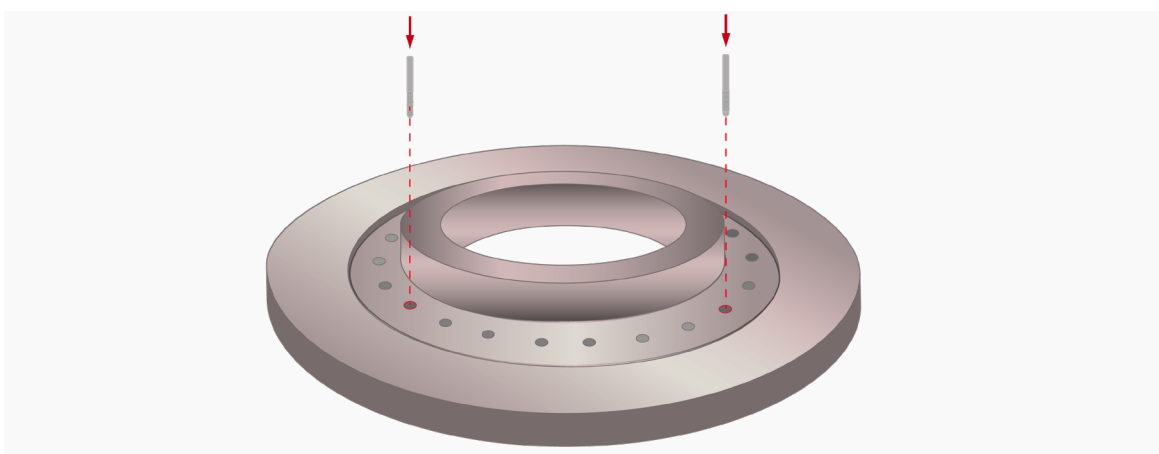
Note: Each KRW rotary table bearing is supplied with a size record of the actual values measured at the factory for all important abutment dimensions and the relevant radial and axial runouts. A re-measurement of these values during installation is only representative on bearings which have been fully and correctly bolted.



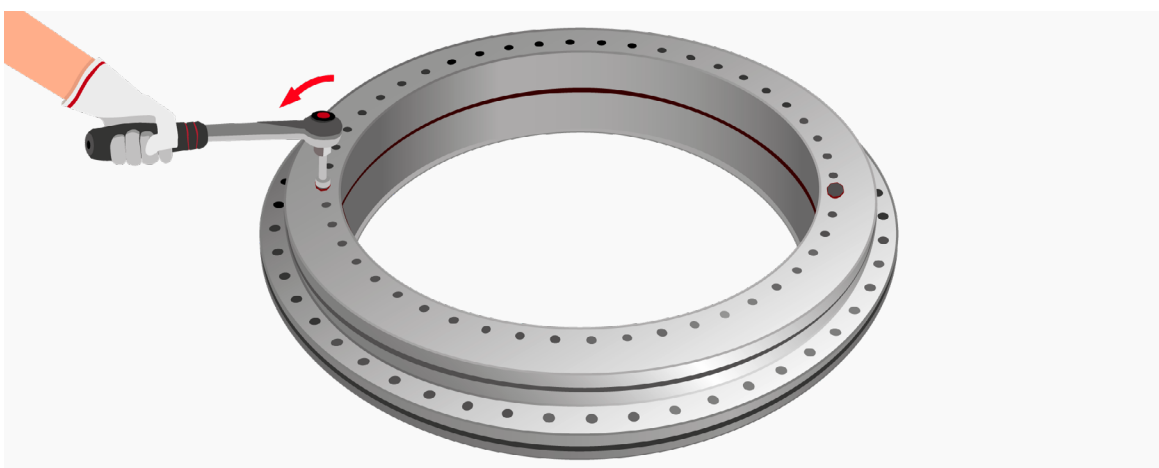
Step 1: Remove any burrs from the seating surfaces of the mating structures with an oil stone and clean thoroughly with an oil-based, lint-free cloth to prevent corrosion.

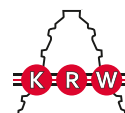


Step 2: In order to correctly align the bores of the bearing with the bores on the shaft, two threaded rods must be screwed into the bores on the shaft. The threaded rods have the same thread as the fastening screws.

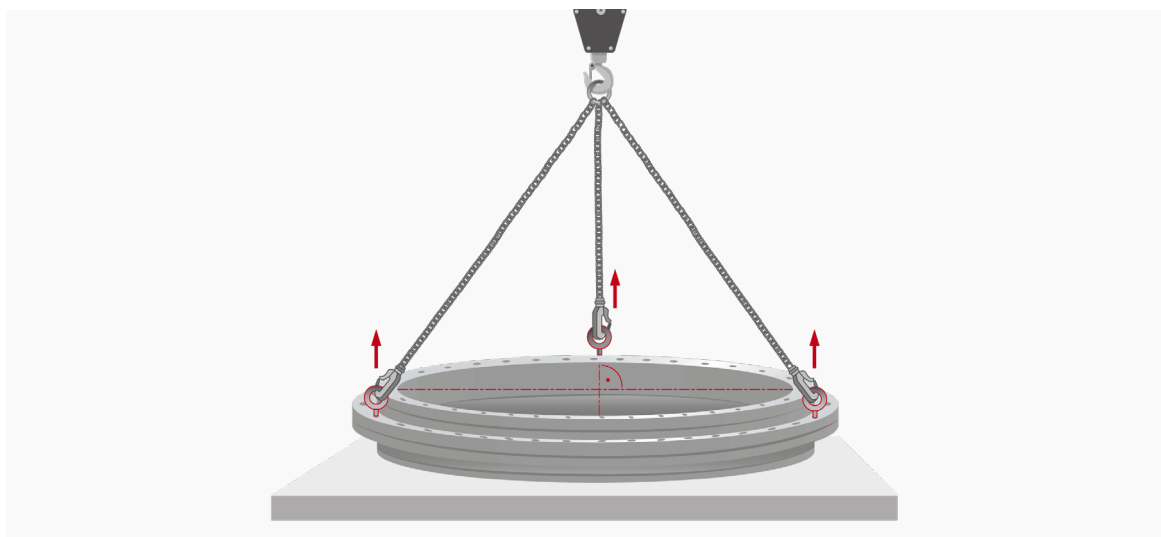


Step 3: The fixing screws (usually 2 per bearing) must be loosened slightly by a half or full turn before to installation so that the two shaft discs can align with each other. The fixing screws are also used as transport safety.

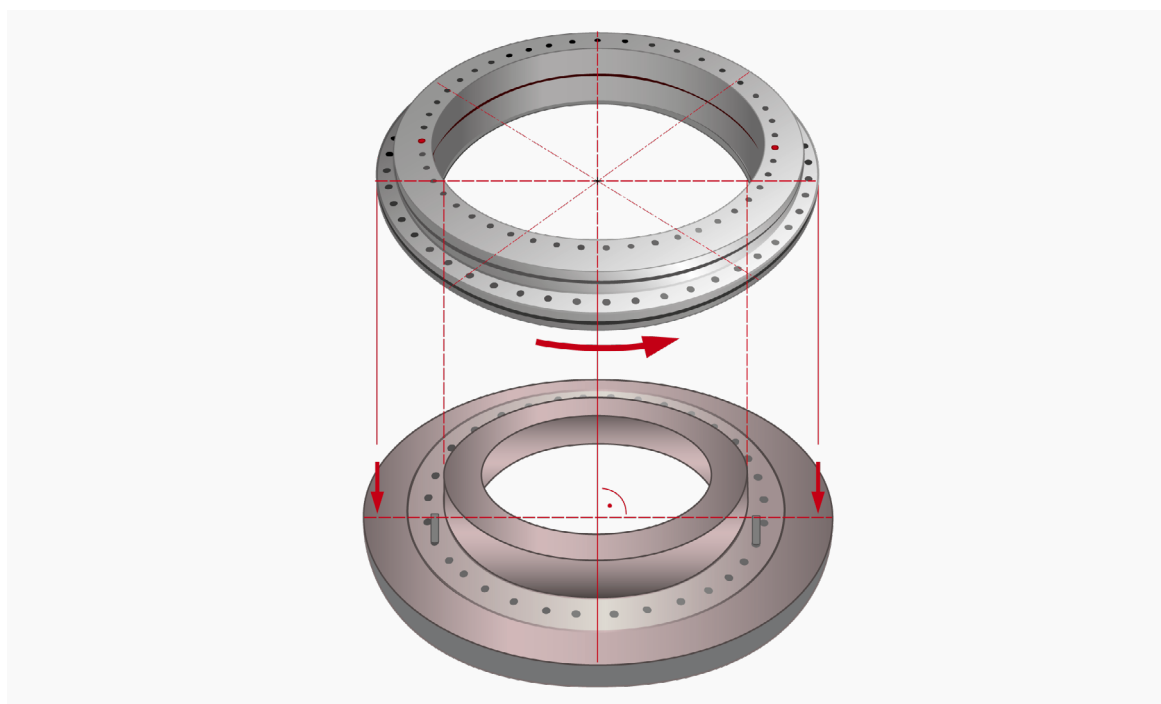


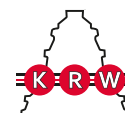


Step 4: Assemblies or individual parts which, under the current Occupational Health and Safety Act, violate the load handling regulations for movement by human hand, are to be moved with an industrial truck. Suitable slinging equipment must be used for transport. The bearings may not be lifted or lowered askew. We recommend using three slings to lift the load.

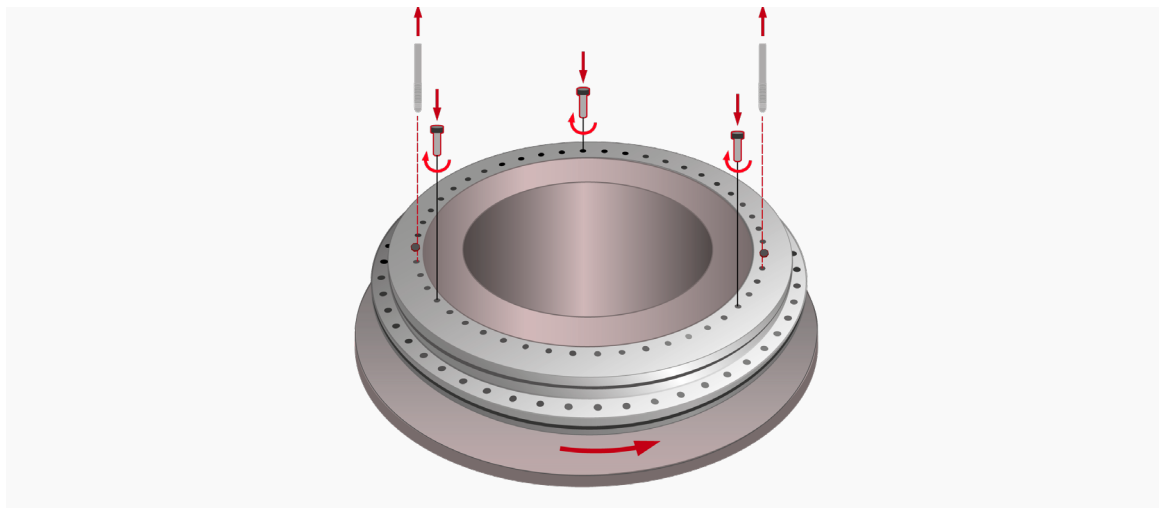


Step 5: Align the bearing with a spirit level and pull it onto the shaft without tilting it. During installation, no forces may be transmitted via the rolling elements. Position the fastening holes in relation to each other with the help of the previously screwed-in threaded rods. If the bearing is to be relubricated through lubrication holes in the shaft discs, use locating pins to position the lubrication holes.

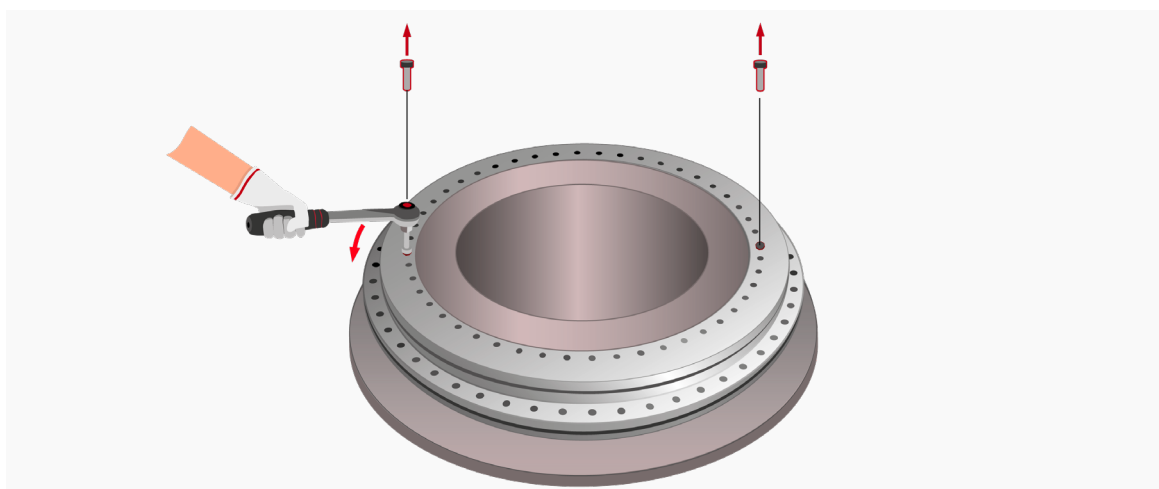




Step 6: Insert eight fastening screws, evenly distributed around the circumference, into the holes and tighten them lightly by hand. Remove the threaded rods. When inserting and lightly hand-tightening the remaining fastening screws, rotate the housing disc continuously so that the shaft discs can align with each other.

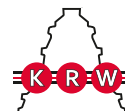


Step 7: Loosen and remove the fixing screws.



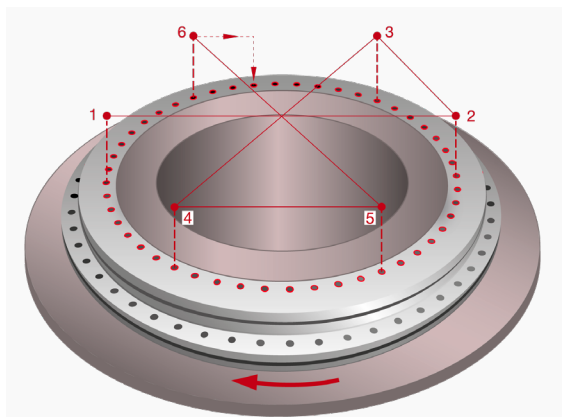
Step 8: Tighten the fastening screws according to KRW specific instructions while rotating the unattached housing disc. Ensure both the correct tightening sequence and the correct three-stage tightening torque. The required information can be found on the current technical drawing or in the table below. If the values in the table differ from those in the KRW drawing, the drawing specifications must be used. If in doubt, contact the KRW Application Engineering department.

Step 9: If the tightening sequence is not marked on the bearing, it must be applied manually with a permanent marker. It is recommended to mark each tightened bolt in each load step with a colored marker. Each load step should have a different color to avoid confusion or double tightening. In case of interruption you are able to continue at the same point. After each torque step, a second operator should check the torque of each bolt. This check does not have to follow the tightening



pattern. If several screws are not properly tightened, all screws must be loosened and the tightening starts over according to the marked sequence.

Step 10: A record of the correct tightening of the bolts should be made, documented and kept in a quality report. This should include the tool number with calibration date of the torque wrench, the name of the employee executing the work and the inspecting employee.

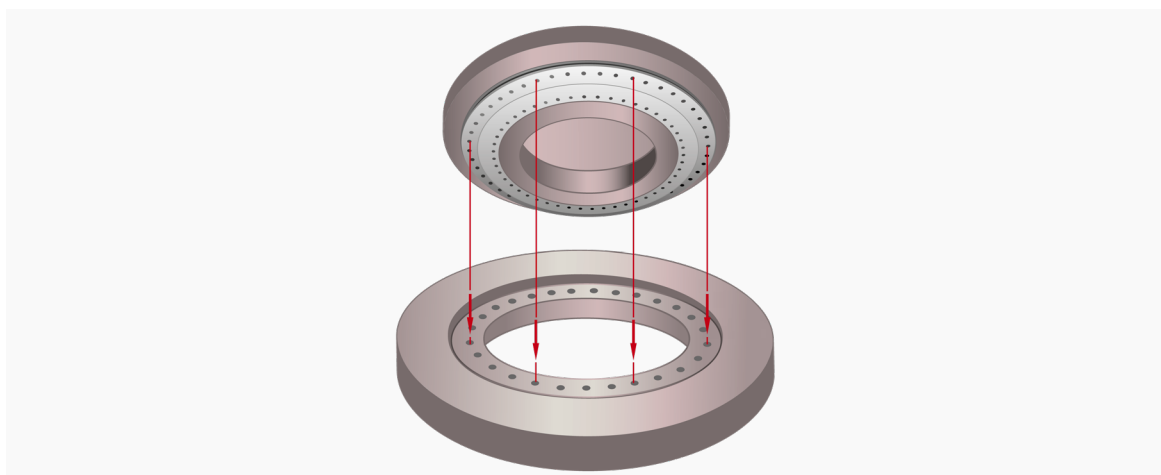


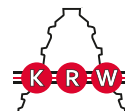
Overview tightening torques

Bearing bore	Screw size	1st Step	2nd Step	3rd Step
[mm]	[-]	[Nm]	[Nm]	[Nm]
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
725	M12	46	81	116
850	M16	114	199	284
950	M16	114	199	284
1030	M16	114	199	284

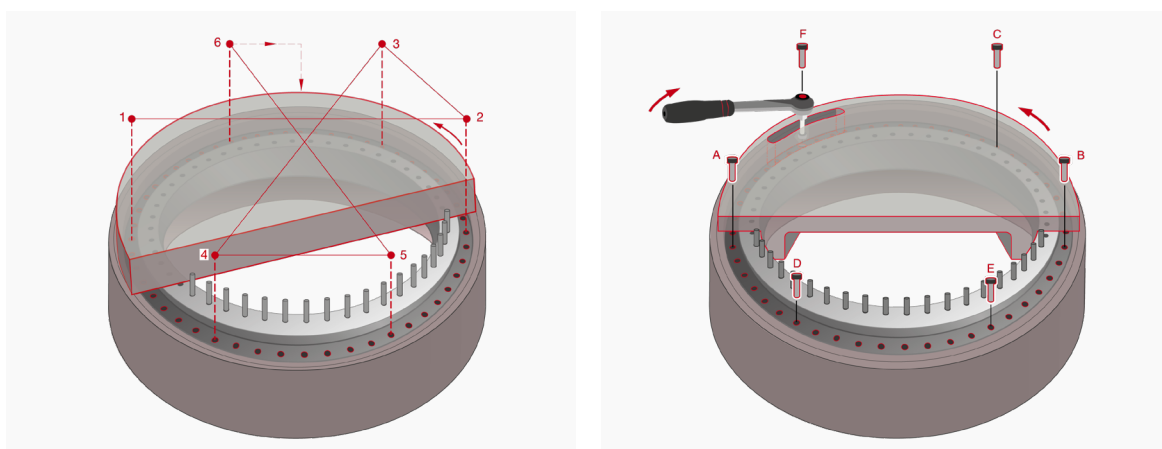
Step 11: If the bearing is difficult to rotate manually, this could be caused by possible tensions. You can fix this by loosening and retightening the fastening screws according to the instructions. If the tensions are not eliminated after retightening according to the above-mentioned procedure, contact the KRW Application Engineering department.

Step 12: As with the shaft disc, two threaded rods are screwed into the housing disc to position the fastening holes.





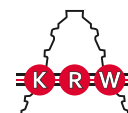
If the bearing is to be relubricated via lubrication holes in the housing disc, use the locating pins to position the lubrication holes. Align the bearing with a spirit level so that it can be installed in the housing without tilting. Insert eight fastening screws, evenly spaced around the circumference, into the holes and tighten them lightly by hand. Remove the threaded rods. Tighten the remaining fastening screws lightly by hand. Tighten the fastening screws according to the KRW-specific instructions while rotating the table spigot. Ensure both the correct tightening sequence and the correct, three-stage tightening torque. The required information can be found on the current technical drawing or in the table above. For a detailed description, refer to steps 8 through 11.



Accuracy measurement (optional):

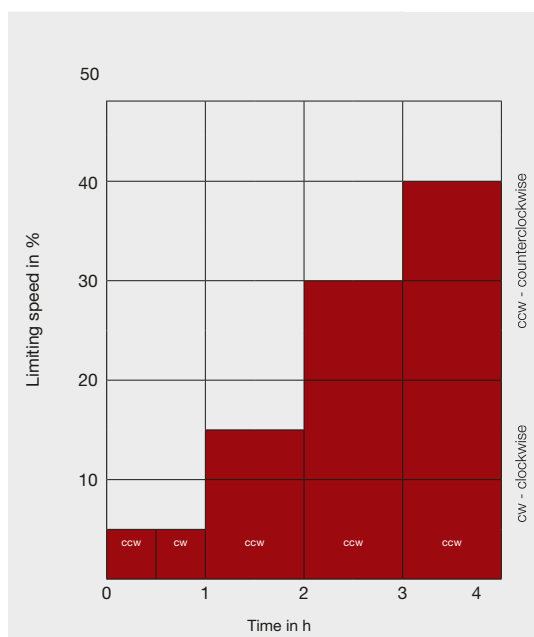
Running accuracy can only be measured on the installed bearing. If there are inaccuracies, check the following causes:

- Eccentric mounting of the bearing due to fit clearance
- Inaccuracy or contamination of the contact surfaces
- Incorrect tightening sequence or tightening torques of the fastening screws
- The fixing screws were not loosened



5 Lubrication and commissioning

KRW rotary table bearings are supplied either filled with a suitable rolling bearing grease or ungreased - but always preserved - depending on customer requirements. As a general rule, bearings must never be allowed to run without grease. In the case of grease lubrication, the grease distribution run at initial start-up or re-greasing must be done as shown in the figure below.



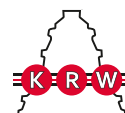
Grease distribution run before commissioning and after relubrication

5.1 Relubrication intervals

Relubrication is required for all grease-filled ROTAB® bearings, depending on the speed and operating time. Please note that the frictional torque is increased by the quantity of grease added. For this reason, a grease distribution run is also required after each relubrication. The length of the relubrication period can vary greatly depending on the application.

In the case of very slowly rotating milling tables or swivel axes, a grease distribution run may not be necessary. This decision is based on the user's experience. For high-speed applications, it can be useful to implement an automatic relubrication unit for regreasing. With an appropriate interface to the machine control system, this can supply the optimum lubrication quantity without overlubricating the bearings and interrupting operation.

You can request the relubrication intervals and quantities from the KRW Application Engineering department. Make sure to state the loads and speeds as well as the ambient conditions (e.g. temperatures) in your request.



5.2 Commissioning

In general, rotary table bearings are provided with a defined preload to ensure the highest precision and sufficient rigidity of the rotary table. As a result, all rotary table bearings are sensitive to temperature fluctuations between the shaft and housing. Especially for new developments, we strongly recommend that you slowly increase the rotational speed and monitor the temperatures of the shaft and housing discs at the same time. A stable steady-state temperature should be reached during operation before a new higher speed stage is started.

If you have any questions during installation or commissioning, we will be pleased to help you.

 Phone: (+49) 0341 45320-0

 E-Mail: application.engineering@krw.de

Quality report: Installation of ROTAB[®] bearing on the shaft



Machine designation		Date	
Bearing designation		Bearing No.	
Signature of the executing employee			
Name of the inspecting employee			

	1st Step	2nd Step	3rd Step
Number of the torque wrench			
Calibration date of the torque wrench			
Tightening torque [Nm]			
Tightening sequence observed	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Comment			

Confirmation of the correctness of the quality report and compliance with all instructions given in the installation manual:

Signature of executing employee: _____

Signature of inspecting employee: _____

Quality report: Installation ROTAB® bearing in housing



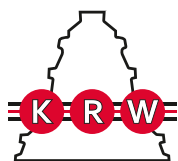
Machine designation		Date	
Bearing designation		Bearing No.	
Signature of the executing employee			
Name of the inspecting employee			

	1st Step	2nd Step	3rd Step
Number of the torque wrench			
Calibration date of the torque wrench			
Tightening torque [Nm]			
Tightening sequence observed	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Comment			

Confirmation of the correctness of the quality report and compliance with all instructions given in the installation manual:

Signature of executing employee: _____

Signature of inspecting employee: _____



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