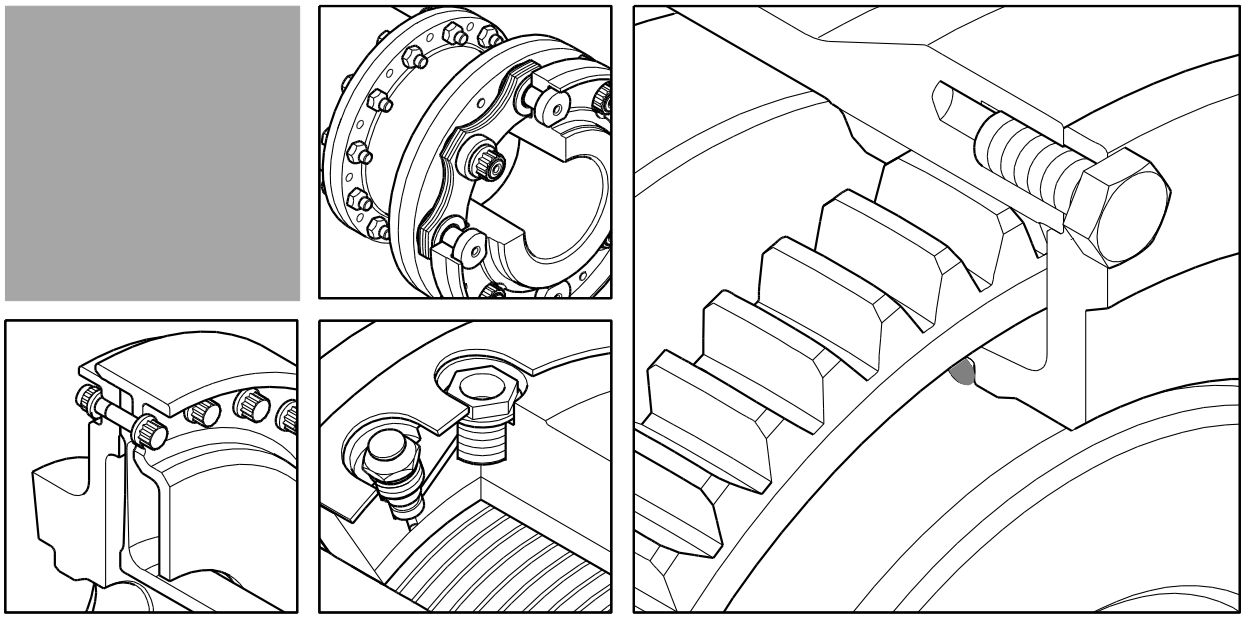
Operation Manual



Curved Tooth Couplings

Basic Series

SB - SBR - SBL - SBZ - SRL - SBG - SRG - SBD - SBT - VSB
TS - TUR - TSL - TSZ - TURL - TSG - TURG

Original Operation Manual
B590350/12.2015

Contents

Contents

1 Notes on this manual

1.1 Subject matter and validity

This operation manual from RENK AG (Rheine plant) describes the transportation, assembly, operation, servicing, disassembly and disposal of the Curved Tooth Couplings series listed in the following table.

The couplings described in this operation manual are also called the "product" in the following.

If special versions of the coupling are used, this operation manual can be supplemented with additional instructions.

If the coupling has been specified for use in potentially explosive atmospheres, instructions on ATEX are supplied in addition to the operation manual. It is vital that you observe all the information and regulations contained in the additional instructions on ATEX.

Design configurations used in the coupling	Slow	Insulated	Medium speed	Insulated
Basic version	SB	SBi	TS	TSi
Retaining ring	SBR	SBRi	TUR	TURi
Spacer	SBL SBZ	SBLi SBZi	TSL TSZ	TSLi TSZi
Spacer and retaining ring	SRL	SRLi	TURL	TURLi
Intermediate shaft	SBG	SBGi	TSG	TSGi
Intermediate shaft and retaining ring	SRG	SRGi	TURG	TURGi
Brake disc for shoe brake	SBD	SBDi		
Brake disc for disc brake	SBT	SBTi		
Vertical	VSB	VSBi		

Tab. 1: Design configurations used in the coupling

Only use this operation manual for the specified products.

The operation manual is an important aid for the successful and safe operation of the product. The operation manual contains important notes on how to operate the product safely, properly and efficiently. You can prevent risks, repair costs and downtimes by paying attention to the operation manual. Complying with the operation manual increases the reliability and service life of product and machine

The operation manual must always be available for working on the product.

In addition to this operation manual, the applicable national and international regulations on accident prevention, on environmental protection as well as the recognised rules concerning working safety and workmanlike conduct all need to be observed at the operating site.

The safety regulations used by the European Union and Germany are incorporated in this operation manual.

1.2 Copyright and property rights

The documentation as a whole and this document are protected by copyright. All rights reserved.

The reproduction of these documents, in part or as a whole, as well as making use of them or making them available to others, i.e. for the purpose of competition or disclosure to third parties, shall require the previous consent of RENK AG.

1.3 Target group

This operation manual is aimed at qualified specialist personnel who plan, execute, manage or monitor the work described in this document.

Specialist personnel are persons who owing to their technical training, know-how and experience, as well as their knowledge of the relevant standards and regulations, are capable of assessing the work assigned to them and identifying possible hazards.

The operating company must instruct the specialist personnel regarding the safe and proper use of the product.

All persons working with the product need to have read and understood this operation manual, and make use of it.

1.4 Warnings for risks posed to people

The following warnings indicate hazards and risks that could lead to personal injury. The warnings contain information about the type and severity of the hazards.

Always observe the warnings and follow the relevant measures put in place to prevent hazards.

⚠ DANGER

Type and source of danger to life (consequence: extremely serious injuries or death)!

Imminent danger if not observed.

- Measure put in place to prevent hazard.

⚠ WARNING

Type and source of risk of injury (consequence: extremely serious injuries with irreversible damage)!

Possible danger if not observed.

- Measure put in place to prevent hazard.

⚠ CAUTION

Type and source of risk of injury (consequence: minor injuries)!

Possible danger if not observed.

- Measure put in place to prevent hazard.

1.5 Warnings for possible damage to property

The following warnings indicate hazards and risks to property, which could lead to material damage as a result of the way the product is handled.

Always observe the warnings and follow the relevant measures put in place to prevent hazards.

NOTICE

Type and source of the risk of damage!

Possible damage to property if not observed.

- Measure put in place to prevent hazard.

1.6 Labelling in the text

The following symbol points to specific information.

indicates information which facilitates the working task, ensures an efficient workflow and provides other useful information.

Individual points in a list are distinguished by a dash:

– Item in the list.

Individual steps in a sequence of tasks are highlighted with a bullet point. The steps of action must be executed in the correct sequence (from top to bottom):

- Step of action.

Figures include item numbers which indicate components. These numbers are printed in bold type in the associated text, for example (**1**). They always relate to the preceding figure.
Numbers relating to a different figure than the preceding one also include the number of the figure, for example (**4** in Fig. 3).

1.7 Figures

The figures in this manual are used for understanding and visualising the work described.

Always observe for all work the corresponding drawings in the applicable documents. The figures used in this manual are not a replacement for dimension sheets, for example.

1.8 Applicable documents

Other documents contained in the complete set of documentation from RENK AG (Rheine plant) also apply in conjunction with this operation manual:

– Table of lubricants for Curved Tooth Couplings with lubricant filling.
– Dimension sheet (if supplied).
– Additional instructions (only for special versions).

This operation manual and all applicable documents are part of the product.

– Always keep the complete set of documentation ready and available for all work carried out.
– Pass the complete set of documentation on to the successor should the operating company be changed.
– In the event of contradictory figures and data, please always observe the figures and data in the dimension sheet.
– Before commencing work, please contact RENK AG (Rheine plant) in the event of missing or unclear information in the complete set of documentation.

2 Product description

2.1 Subject Matter and function

The coupling consists of the coupling halves A and B and, depending on the design, the spacer or the intermediate shaft (see chapter 12).

The coupling halves consist of the housing with internal teeth and hub with curved teeth.

The coupling allows displacements of the shafts. Axial, angular and radial displacements are all possible.

The couplings in these series are designed optionally for oil lubrication and grease lubrication.

The components used in the coupling are either finished machined upon request and balanced in accordance with customer specifications, or just delivered pre-drilled. Special versions, e.g. with clamping flange or with a greater ability to adjust shaft misalignments are available upon request.

2.2 Intended use

The coupling is used for transmitting the torque between connected machine parts and for compensating for displacements caused by misalignment.

Also constituting intended use is:

– Complying with the operation manual and the applicable documents.
– Always using the product within the guidelines from the technical data (see chapter 12).
– Carrying out all retrofitting work or additions with accessories only after this has been approved in writing by RENK AG (Rheine plant).

2.3 Improper use

Improper use can result in a risk of personal injury as well as damage to property and the risk of product failure, all of which the manufacturer shall not be liable for.

The following constitutes improper use and is prohibited:

- Using the product outside the specifications given in the technical data.
- Using the product without or with not enough lubricant.
- Welding on product components.
- Unauthorised rebuilds or modifications on the product.
- If welding work is carried out in the vicinity of the product, the product must not be located between the welded joint and the earthing for the welding equipment; i.e. the product must not be within the electric circuit.

2.4 Product components

Product components and items included in the scope of delivery:

- Coupling, fully or partially assembled.
- Operation manual.
- Applicable documents.

2.5 Requirements to be met by the area of use

Include adequate space all around the product and its guard in your plans for assembly, servicing and disassembly at the location of installation.

The temperature in the area of use has to comply with the technical data.

The subsurface must be suitable for accommodating the weight loads during transport and assembly.

2.6 To be provided by the customer

To be provided by the customer for assembly are:

- Suitable means of transportation and lifting tackle.
- Usual set of tools (workshop trolleys).
- Rubber mallet.
- Torque wrench.
- Device for heating up the hub (e.g. oven or ring burner).
- Measuring instruments for measuring the alignment.
- Measuring instruments for measuring the temperature of the components.
- Device for pulling off the hub or flange.
- Pressurised oil device, including lubricant.
- Lubricant for lubricating the toothing.
- Guard.

3 Basic safety instructions

Basic safety instructions apply generally to several activities. For all types of work, always observe the basic safety instructions, observe the safety instructions at the beginning of the chapters and the safety instructions prior to certain potentially hazardous activities.

Safety conscious behaviour and observance of the safety instructions can help to prevent hazards arising that could have fatal consequences for the operator or third parties, and also helps to avoid risks of damaging the product or other material assets, and will also help in avoiding downtimes.

3.1 Using the operation manual

The operation manual is an essential part of the product and provides information on its correct, safe and efficient use.

The operation manual needs to be available for all types of work using the product. If the operation manual gets lost or becomes unusable, then you can order a new one at RENK AG (Rheine plant).

The manufacturer shall not be liable for any damages occurring due to the disregard of this operation manual.

3.2 Required provisions to be met by the operating company

The operating company may only employ instructed and qualified specialist personnel, who have read and understood the operation manual, to work with the product.

The operating company is responsible for proper transportation, assembly, operation, maintenance and repair, and disposal.

The operating company may not make any changes to, nor perform any extension or retrofitting work on, the product without the approval of RENK AG (Rheine plant). This also applies to assembly procedures, safety device settings and to welding work performed on parts of the product.

3.3 Requirements to be met by personnel

Only instructed and qualified specialist personnel are permitted to work with the product and need to have read and understood this operation manual, and make use of it.

The specialist personnel need to have been instructed by the operating company in the following themes:

- Safe handling of the product whilst being conscious of the hazards involved.
- Regulations in regard of accident prevention and environmental protection.
- Required personal protective equipment (protective gloves, protective goggles, helmet, safety footwear and standard protective clothing).
- Responsibility and workplace communication.
- Safe transportation of the product.
- Product storage.
- Operating and servicing the product.
- Response in the event of problems.
- Disassembling the product.

3.4 Safety instructions with regard to specific operating phases

3.4.1 Operating phase: Transportation

- Never stand underneath a suspended load.
- Prior to transportation, familiarise yourself with the weight, centre of gravity, construction and attachment points for the packing and product using the technical data as a guide.
- If available, always use for transportation the attachment points or lifting threads marked on the packing or stipulated in the technical data.
- Only use lifting tackle and load carrying attachments with an adequate lifting capacity.
- Always secure the product against rolling away or turning over, e.g. if you need to move the product or components of the product into a different position by tilting it.
- Use anti-slip mats as an underlay during lifting or turning operations applied to components, to prevent damage from occurring due to the unit slipping.
- Immediately remove any lubricants from the wetted surfaces that may have escaped out of the product during transportation.
- Check the product for damage after transportation.

3.4.2 Operating phase: Assembly

- Switch the machinery train off and secure the control devices against unwanted activation.
- Observe the assembly procedures described.
- Do not make any changes to the product, nor perform any extension or retrofitting work on it.
- Do not change the factory settings of safety devices.
- Always secure the product against rolling away or turning over, e.g. if you need to move the product or components of the product into a different position by tilting it.
- Use a guard to safeguard persons against being caught in the product, wound in or against the product from being touched inadvertently.

3.4.3 Operating phase: Operation

- Only operate the product when it is completely assembled and fully lubricated, and when the guards are completely assembled and working correctly.
- Any malfunctions on the product have to be eliminated immediately.
- If any changes emerge in the operational behaviour (e.g. noises or vibrations) or if the product is faulty, then shut down the product immediately and eliminate the causes of the problem.

3.4.4 Operating phase: Servicing

- Switch the machinery train off and secure the control devices against unwanted activation.
- Before removing the guard, wait for the product and adjacent machine parts to come to a standstill as these may still be running for some time afterwards.
- Before starting work, allow the product and adjacent machine parts enough time to cool down in order to avoid burns.
- Adhere to the deadlines stipulated for the system and those specified in the operation manual for recurring maintenance work.
- Retighten all screwed connections undone for maintenance work and observe the details given in regard to the tightening torques.
- Install the guards removed for the servicing work and check that they are working correctly before the product is started up.

3.4.5 Operating phase: Disassembly

- Switch the machinery train off and secure the control devices against unwanted activation.
- Before removing the guard, wait for the product and adjacent machine parts to come to a standstill as these may still be running for some time afterwards.
- Before starting work, allow the product and adjacent machine parts enough time to cool down in order to avoid burns.
- Always secure the product and components used in the product against rolling away or turning over.

3.5 Safety instructions with regard to specific types of hazards

3.5.1 Hazards caused by lubricants and other substances

- Observe and comply with the applicable regulations and data sheets from the manufacturer when working with lubricants, cleaning agents and other chemical substances.
- Prevent slipping risks by immediately and completely removing any leaked lubricants from all wetted surfaces and, if necessary, use suitable binding agents.
- Lubricants could contaminate the soil and groundwater. Make sure that no lubricants get into the ground, soil, sewage system or the groundwater.
- Dispose of lubricants and any waste containing lubricants properly and observe the environment protection conditions.

3.5.2 Risks caused by heat

– The product and machine parts can become very hot during operation. Before starting work, allow the product and adjacent machine parts enough time to cool down in order to avoid burns.
– Wear suitable protective clothing for work on hot components.

3.5.3 Risks due to electrical energy

– Install optional electrical accessories in a technically correct manner.

3.5.4 Risks caused by noise

The continuous sound pressure level (A-weighted) of the product is below 83 dB(A). This is why the wearing of ear protectors is not mandatory due to the noise coming from the product.

We recommend permanently wearing ear protectors in the vicinity of loud machines.

3.5.5 Hazards caused by moving parts

– Rotating and moving parts need to be protected against access by people using guards in accordance with the legal requirements.

3.6 Safety devices and guards

– Prior to starting up the product after maintenance or servicing work, make sure that all removed guards have been reattached.
– All safety devices and guards need to be in place when the system is running.
– Only remove the guards if the product is at standstill and is secured against being inadvertently started up.
– Guards may only be removable using tools.

4 Transportation and storage

4.1 Transportation

In addition to the basic safety instructions given in Chapter 3, always observe the following so that damage can be prevented during transportation:

– If possible, keep the product in its original packing until shortly before assembly, thus helping to prevent damage in transit and to avoid contamination.
– Use suitable attachment points or lifting threads in order to avoid damage in transit due to components becoming loose.
– In order to prevent damage to the surface of the product, always use round slings, lifting straps or similar, and include edge protection. Never use wire cables or chains.
– Do not use levers, e.g. made of metal, that could damage the components. For example, use wooden products or plastic rods as levers.
– Avoid impacts and knocks that could deform and damage the product.
– Check the product for damage after transportation.
– Avoid having any contamination on sealing elements or joining surfaces.

4.2 Checking the delivery

We can deliver the product in accordance with your order, fully or partially assembled.

- Check the complete scope of delivery using the delivery note and packing list as a guide, and notify RENK AG (Rheine plant) in writing (e.g. per e-mail) of any deviations from the scope of delivery within 2 weeks upon receipt of delivery.
- Check the delivery for any damage (visual inspection) and note any damages on the delivery note from the freight forwarder. Also, immediately report any damages to last freight forwarder and to RENK AG (Rheine plant). Keep the packing in case the freight forwarder needs to check it or should it be needed for return shipment.

If parts are damaged to such an extent that a return shipment is needed, please contact RENK AG (Rheine plant) beforehand.

- Where applicable, pack the delivery for return shipment such that no further damage can occur during properly conducted transportation.

4.3 Storage

NOTICE

The coupling can be damaged by corrosion if the storage period is exceeded!

Corrosion can render the coupling unserviceable.

- Check the coupling for signs of corrosion every four weeks after the storage period has been exceeded.
- If there are signs of corrosion, use a long term preservative in accordance with the manufacturer's instructions to protect all coupling elements – after having consulted RENK AG (Rheine plant).

The default preservation used for the coupling is designed for indoor, dry transportation and storage lasting six months.

If the coupling is stored for longer than six months after delivery ex works, then the preservation will have to be renewed.

Preservation used in moist, salty or acidic conditions for transport and storage or long-term storage is possible upon request.

- All parts of the coupling:
  - should be stored indoors and in dry conditions.
  - should not be exposed to humid, salty or acidic atmospheres, nor atmospheres containing chemicals.
  - should be protected against mechanical damage.
- Observe the period of storage.
- Do not remove the preservation until shortly before assembly.

4.4 Disposing of the packing

The packing is adapted to the size, scope and transport route of the delivery.

- Dispose of the packing in accordance with the applicable national regulations.

5 Assembly

In addition to the basic safety instructions given in Chapter 3, always observe the following so that damage can be prevented during assembly:

- Always lift the coupling and parts of the coupling using suitable lifting tackle and also use edge protection, anti-slip mats or similar.
- Only use suitable tools (e.g. rubber mallet as a striking tool) and the appropriate devices and installation methods in order to prevent burr formation, deformation and coupling failure. Never use hard striking tools or pointed or sharp tools.
- Observe the instructions provided by the manufacturer of the machines to be coupled and by the manufacturer of the devices used for the installation.
- Only use solvent-free cleaning agents, e.g. wax solvents, benzine or alkaline industrial detergents so that surfaces and gaskets used in the coupling do not get damaged. Never use cleaning agents containing solvents or petrol for cleaning the coupling.
- Remove any stickers that may still be found on the parts.
- Coat the screws using a thin film of lubricating oil. In doing so, never use grease, paste or similar that reduces friction, as this will change the required friction coefficient (μ = 0.14), and the screws could tear off.
- Observe the tightening torques for the screws.
- If a dimension sheet has been supplied, it is vital that you observe the data given in that dimension sheet.

5.1 Markings on the coupling

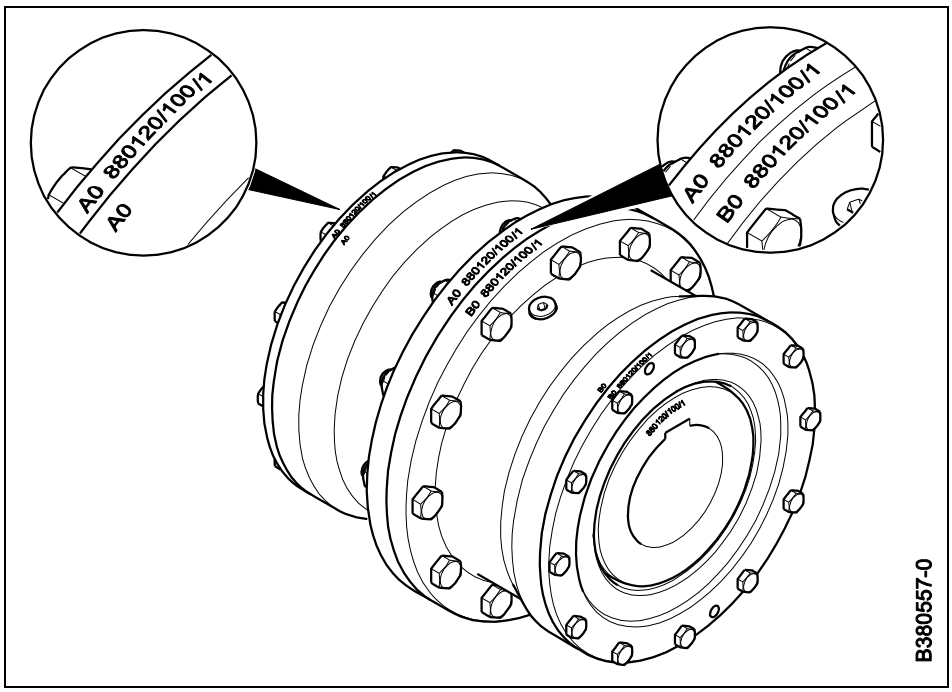


Fig. 1: Markings on the coupling

Side	Zero setting	Order number	Item in the order	Seq. no. of the order item
A	0	880120	100	1
B	0	880120	100	1

Tab. 2: Example of marking using the order number 880120/100/1

Fig. 1 includes examples of the markings on the coupling.

The marking consists of the side designation ("A" or "B"), the zero setting ("0") and the order number.

The marking can be found on the largest outer diameter on the main parts of the coupling or both on the front surface (hub) and on the packing for the small parts supplied.

– Check whether all parts and data required for assembly are available.
– Take care to ensure that you only use the coupling specific to the application and the parts belonging to that coupling.
– Assemble the coupling in accordance with the factory markings and at the correct sides in accordance with system planning.

5.2 Preparing the coupling for assembly

The coupling must first be partially disassembled and cleaned.
According to the order, the hubs or flanges used in the coupling are either delivered ready drilled and, where applicable, balanced, or just pre-drilled. Pre-drilled components will have to be drilled out and balanced, if necessary.
Then you can fit the hubs, or, in couplings with an intermediate shaft, the flanges onto the shaft journals and install the coupling halves.

5.2.1 Partially disassembling and cleaning the coupling

If, in the event of a coupling with intermediate shaft being used, the flanges are going to be fitted onto the shaft journals and the final installation of the coupling is going to take place at a lengthy interval, then only remove and clean the two flanges first.

The assembly state of the coupling when delivered can vary depending on the order or size. Adapt the assembly procedure accordingly.

- Remove the housing covers.
- Remove the screwed joints on the housings.
- Screw the screws into the threaded extraction holes in the flanges for the adjacent components and thus separate the components from one another.
- Keep the screws in a safe place.
- Clean all parts of the coupling prior to assembly using solvent-free cleaning agents and completely remove the preservative.

5.2.2 Drilling out the pre-drilled coupling

DANGER

Risk of fatal injury due to the coupling bursting!

If the bore hole is too large or the shrinkage strain in the coupling elements is too high, this can result in the coupling bursting and causing life threatening injuries.

- Drilling the hole should be done carefully and in accordance with the specifications.

The operator is responsible for the design and implementation of the shaft-hub connection.

If the coupling is delivered just pre-drilled upon request, then the two hubs or flanges will still need to be drilled out to the required actual dimension.

Check the following prior to drilling out:

– The maximum permissible bore for d1 and d2, or d3 and d4 stated in the technical data must not be exceeded and applies only to fitting key grooves in accordance with DIN 6885/1.

– If interference fits are used, then the resultant stress will have to be checked by way of calculation.

– Unless otherwise stated, the minimum yield strength for a standard hub or flange is 430 N/mm^2. The stresses in the interference fit and the stresses (expansion pressure) during installation or removal must not exceed this value.

– If an interference fit is used, then you will need to both calculate the required oversize and select the tolerances yourself.
Excessive oversize leads to widening of the hub's toothed tip or to centring of the flange. The tooth tip or the centring must then be rectified after previous consultation with RENK AG (Rheine plant).

– If fitting key connections are used, please observe the tolerances in the following table as reference values.

Bore	F7	H7	J7	K7	M7	P7
Shaft	s6	p6	n6	m6	k6	h6

Tab. 3: Recommended tolerances for fitting key connections

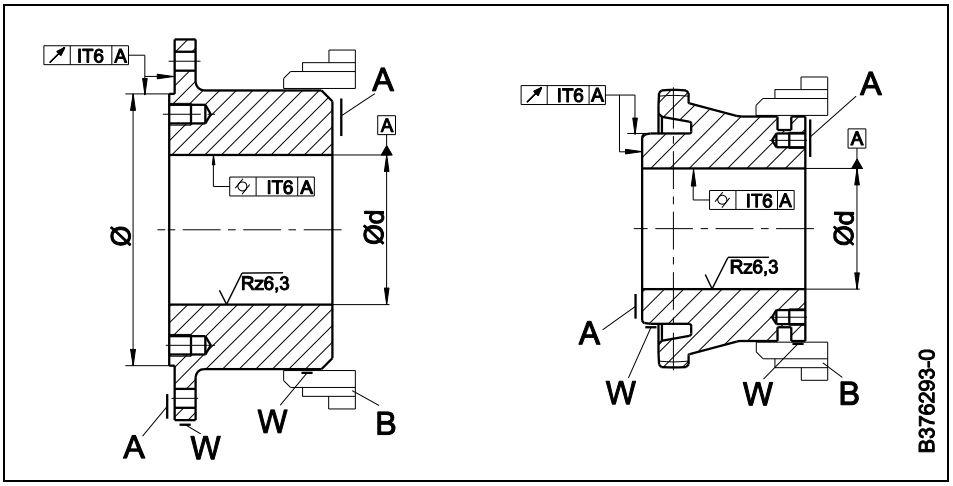


Fig. 2: Drilling out the pre-drilled coupling

Key

A Material removal	d Diameter of shaft
B Component mount	W Surface for balancing run

- Clamp the hubs or flanges into the processing machine at the surfaces (**B**) marked in Fig. 2 and carefully align them.
- When drilling out, adhere to the permissible concentricity and axial run-out tolerances specified in Fig. 2.

5.2.3 Balancing the drilled out coupling

If needed, you will have to balance the drilled-out hubs or flanges . The unbalance produced by reworking will have to be eliminated by means of material removal at the marked surfaces (**A**).

Please observe the following when balancing:

– Select the balancing quality in accordance with your requirements.
– Always balance the parts at two levels in a technically correct manner (e.g. in accordance with ISO 1940).
– The operations involving material removal must be on an outer radius as far as possible from the axis of the coupling, so that you have to remove the least possible amount of material.
– If the shafts with fitted hubs or flanges are dynamically balanced, then the material should not be removed from the hubs or flanges.

5.3 Connecting the hubs or flanges to the shafts

The hubs or flanges can be connected to the shafts in different ways:

– Fitting key connection or splines in accordance with DIN 5480.
– Thermally joining the interference fit.
– Hydraulically joining the interference fit.

Other connections are possible upon request.

- Check the dimensions of the bore hole and the shaft dimensions before commencing with work.
- Check whether the bore holes and shafts are well chamfered and burr-free. Remove any burrs or damage.

Install the coupling halves one after the other as described below:

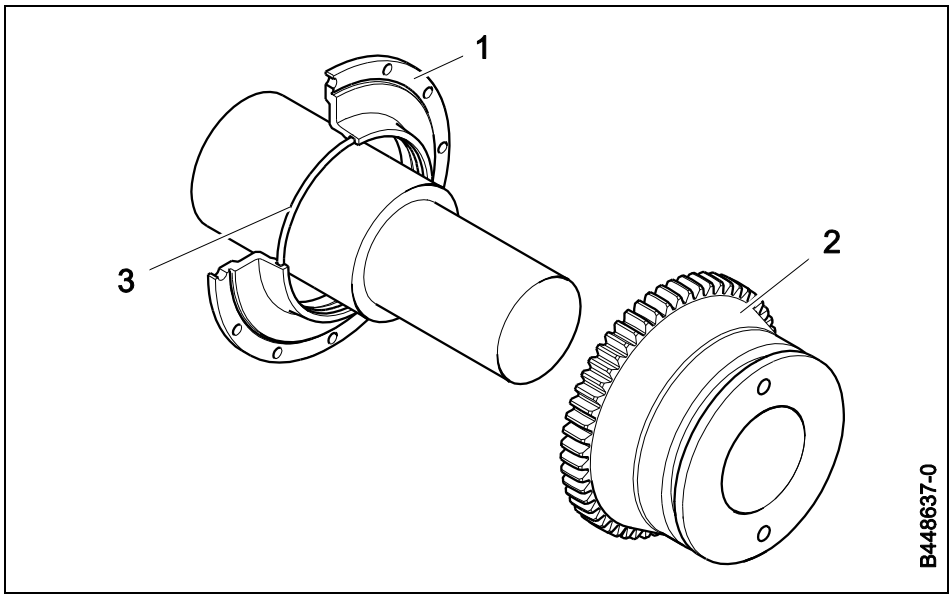


Fig. 3: Pushing on the housing cover and O-rings

Key

1 Housing cover
2 Hub
3 O-ring

*It is vital that the housing covers (**1**) and the O-rings (**3**) are pushed over the two shafts prior to fitting the hubs (**2**).*

Only for VSB couplings:

- Install the wider of the two housing covers at the top.
- Align the housing cover with the outer sides to the machines being coupled.
- Push the housing cover and O-rings over the two shafts.

NOTICE

Risk of damaging the O-rings by heat!

- When the hub is heating up, protect the O-rings against the heat for as long as it takes until the hub and shaft have cooled down again.

NOTICE

Risk of damage due to loss of adhesive force if unsuitable lubricants (grease, paste or similar) are used!

The coupling could slip, not transmit the torque and get damaged.

- Coat the joining surfaces on the flange or hub only using a thin film of mineral oil without additives.

5.3.1 Key connection or splines in accordance with DIN 5480

Required tools:

– Suitable ring burner, oven or induction heater.
– Temperature gauge.
– Lifting tackle for holding the hub.

- Insert the key into the fitting key groove for the shaft.

⚠ CAUTION

Risk of burns due to heated device or components!

Burns on parts of the body are possible.

- Wear suitable protective clothing.

- Evenly heat the hub or flange all around using a suitable device (e.g. ring burner, oven or inductively) up to a temperature of 80 °C. Observe the instructions from the device manufacturer in doing so.
- Fit the hub or flange onto the shaft. Observe the direction of installation.
- Secure the hub against axial shift, e.g. using a support plate or locking screws.

Only for couplings using oil lubrication:

- After the hub has cooled down, seal the grooves by using, for example, plastic that does not harden, or foils, in order to prevent oil from leaking.

5.3.2 Thermally joining the interference fit

Required tools:

– Suitable ring burner, oven or induction heater.
– Temperature gauge.
– Lifting tackle for holding the hub.

Required data:

– Jointing temperature
– Pull up dimension (for tapered bore hole).

Please refer to the dimension sheet for the required data or contact the system planner or RENK AG (Rheine plant).

If tapered connections are used:

- If it is not hot, push the hub or flange so far onto the shaft that the fitting surfaces adjoin each other without pressure.
- Measure and note down the resulting position (zero position) in relation to a reference edge. Select the reference edge such that the pull up dimension can also be measured after fitting.

If tapered or cylindrical connections are used:

- Evenly heat up the hubs or flanges all around but not higher than necessary for the joint clearance.

⚠ CAUTION

Risk of burns due to heated device or components!

Burns on parts of the body are possible.

- Wear suitable protective clothing.

The oven should be as close as possible to the installation point so that the expansion of the component, which cools down during transportation, is not reduced too much. Do the joining in a room free of draught if possible and join the components quickly after they have been warmed up.

- Evenly heat the hub or flange all around using a suitable device (e.g. ring burner, oven or inductively) up to the required joining temperature. Observe the instructions from the device manufacturer in doing so.
- When heating up, continually check the temperatures at various positions of the bore hole.
- Check the expansion of the bore hole prior to fitting.

DANGER

Risk of fatal injury due to the coupling elements bursting!

Tapered hubs or flanges that have been fitted on too far can burst immediately or during later operation, and ejected coupling elements can lead to life threatening injuries.

- Comply with the stipulated pull up dimension if tapered connections are used. Do not fit the hub or flange on too far.

- Fit the hub or flange onto the shaft in the required position.
- Secure the hub or flange axially against slipping, e.g. using a support plate.
- Allow the hub, or flange and shaft to cool down as much as possible to the ambient temperature.
- Remove axial securing means. Suitable axial securing means, e.g. using a support plate, are constantly required in the event of a steep angle being used in the tapered connection (taper ratio less than 1:30). In this case, do not remove the axial securing means, or replace it at a later time with a suitable axial securing means.
- Check the position of the hub or flange and correct if necessary.

5.3.3 Hydraulically joining the interference fit

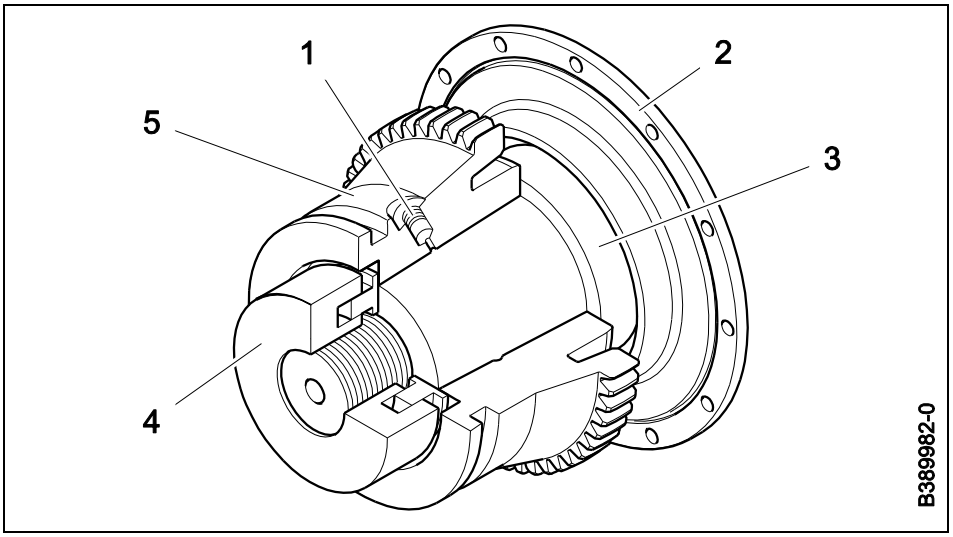


Fig. 4: Tapered interference fit

Key

1 Oil connection for radial pressure
2 Housing cover
3 Machine shaft
4 Hydraulic nut
5 Hub

The interference fit is joined hydraulically in tapered connections only. Cylindrical interference fits and stepped cylindrical interference fits are joined thermally.

Unless otherwise stipulated on the dimension sheet, use mineral oil for hydraulic joining.

Required tools:

– Suitable pneumatic pump or motor pump (pressurised oil device) for generating the radial pressure. If mating parts with more than one oil connection are used, then you will need a pump for every single connection.
– Suitable (hand operated) pump for generating the axial pressure.
– Hydraulic nut (**4**), if possible with sufficient stroke.
– Lifting tackle for holding the hub.
– Oil for generating pressure.

Required data:

– Required and maximum expansion pressure.
– Axial installation force.
– Pull up dimension (for tapered bore hole).

Please refer to the dimension sheet for the required data or contact the system planner or RENK AG (Rheine plant).

- Coat all joining surfaces with a thin film of oil.
- If it is not hot, push the hub or flange so far onto the shaft that the fitting surfaces adjoin each other without pressure.

- Measure and note down the resulting position (zero position) in relation to a reference edge. Select the reference edge such that the pull up dimension can also be measured after fitting.

DANGER

Risk of fatal injury due to the coupling elements bursting!

Hubs or flanges that have been expanded too far or fitted on too far can burst immediately or during later operation, and ejected coupling elements can lead to life threatening injuries.

- Do not exceed the maximum expansion pressure.
- Comply with the stipulated pull up dimension if tapered connections are used. Do not fit the hub or flange on too far.

- Install the hub or flange using a hydraulic fitting tool in accordance with the instructions of the tool manufacturer. The fitting tool must secure the hub or flange axially against slipping.

Recommendations for hydraulic installation using a hydraulic nut:

Proceed in a similar manner if you use a different fitting tool.

– Installation work should be carried out at room temperature if possible.
– The parts being joined together are to have the same temperature.
– Use a pump for every single oil connection if mating parts with more than one oil connection are used.

- Retract the hydraulic nut completely.
- Screw on the hydraulic nut and connect up the pump. Do not submit any pressure just yet.
- Unscrew the screw plugs out of the oil connections and connect up the pump or pumps.
- Apply about 50% of the required pressure to the hydraulic nut.
- Apply the radial expansion pressure stipulated in the dimension sheet to the pump or pumps in several steps. Where applicable, please contact RENK AG (Rheine plant) in the event of any missing data.
  1st step: Apply 50 % of the required pressure. Allow the pressure 10 minutes to take effect.
  2nd step: Increase the pressure by 200 bar. Allow the pressure 2 minutes to take effect.
  Repeat the second step for as long as it takes until the required expansion pressure is reached.
- If pressurised oil assemblies are used without a sealing ring, only inject the pressurised oil until it escapes to the full extent on both sides of the hub or flange and the hub or flange "floats".
- If pressurised oil assemblies are used with a sealing ring, only inject the pressurised oil until it escapes to the full extent at the end of the shaft and the hub or flange "floats".

The oil outlet can be covered at the shaft end by the structural shape of the fitting tool used.

- Raise the axial pressure and use the hydraulic nut to fit the hub or the flange onto the shaft in the stipulated position. Continue to press the pressurised oil into the fitted joint.
- Continually check the maximum expansion pressure during the entire joining process and do not exceed that pressure.
- When the hub or the flange is in position, open the return valve on the pump in order to reduce the oil pressure in the fitted joint.
- Hold the oil pressure in the hydraulic nut for at least four hours.

- Remove the fitting tool when the oil pressure in the fitted joint is completely discharged.

- Measure the axial position for the hub or the flange and compare it with the specifications. If required, correct the axial position by pressing once more.
- Close the oil connections again.
- Install axial securing means. Suitable axial securing means, e.g. using a support plate, are constantly required in the event of a steep angle being used in the tapered connection (taper ratio less than 1:30).

NOTICE

Risk of damaging the coupling due to it being started up too early after the interference fit has been hydraulically joined!

Damage to and failure of the coupling is possible.

- Do not apply torque to the hydraulically joined interference fits until the pressurised oil film has been completely removed (after approx. eight hours).

5.4 Aligning the shafts

5.4.1 Shaft displacements

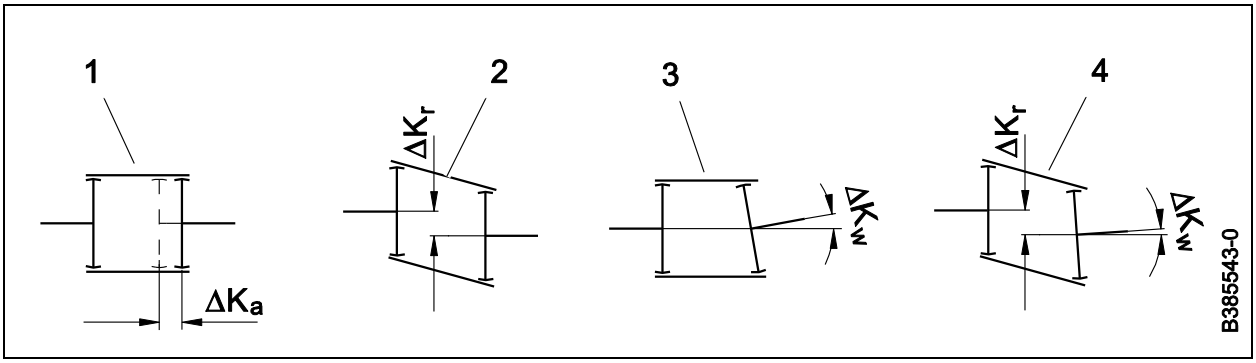


Fig. 5: Shaft displacements

Key

1 Axial offset
2 Radial offset
3 Angular offset
4 Radial and angular offset

Shaft displacements mostly generate a combination of axial, angular and radial offset, whereby the angular and the radial offset form the actual displacement in the coupling.

Shaft displacements are produced through errors in the alignment and by additional displacements arising during operation. These include thermal expansion, shaft deflection or shifting in the foundations.

The coupling is designed for displacements specified in the technical data (see chapter 12.1). The alignment values were substantially cut back in order to ensure reliable operation in the coupling. One third of the possible displacement in the coupling is achieved when the recommended alignment values are utilised. This means there are still enough reserves for additional displacements produced.

If the manufacturers of the machines being coupled stipulate different alignment values, it is essential that these are then taken into account.

If displacements are known during operation, then take these into account during alignment such that the maximum permissible displacement taken from the technical data is not exceeded in any operating state.

Observe the following for aligning the shafts:

- Do not align the shafts until the hubs or flanges have been fitted and a suitable point in time is available for your coupling series (see chapter 5.6).
- If possible, also take into account the thermal expansions in the machines being coupled.
- Please refer to the technical data or the dimension drawing for the required data.
- Use suitable resources when performing alignment work, e.g. measuring gauges or optical equipment (lasers) for bridging large distances.
  We recommend alignment using laser technology.
- Observe possible alignment values specified in the dimension sheet. These have priority.

5.4.2 Minimum displacement

A slight displacement improves the lubrication of the toothing and increases the service life of the coupling. Movement in the toothing promotes the distribution of the lubricant. Precise shaft alignment to zero displacement prevents this movement from occurring.

Always align the shaft such that a minimum displacement is not fallen short of. This is assured if you do not fall below 50% of the recommended alignment.

It is practical to set up the minimum displacement such that it is not compensated by possible thermal expansion. Through a lateral offset in the shafts, for example.

5.4.3 Coupling with retaining ring

Couplings with a retaining ring have a limited axial clearance and are restricted in their ability to adjust shaft misalignments. You have to align these couplings precisely in order to ensure the reliability and performance.

The ability to adjust shaft misalignments is determined by the axial clearance a and b. The following values apply to the standard axial clearance a and b in accordance with the tables in Chapter 12.2. The alignment values are specified in the dimension sheet if reduced axial clearances are used.

5.4.4 Axial offset

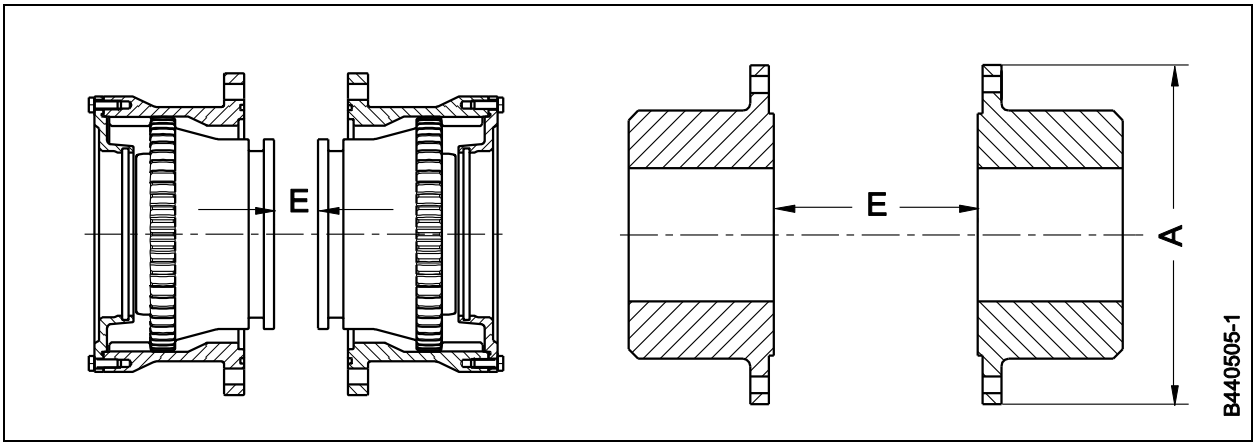


Fig. 6: Axial offset

Key

A Flange diameter
E Shaft distance

The required shaft clearance can be found in the order confirmation, in the technical data or in the dimension sheet, if available.

- Align the shafts of the machines being connected to shaft distance **E**, using a tolerance as set out in Chapter 5.4.7.

5.4.5 Radial offset

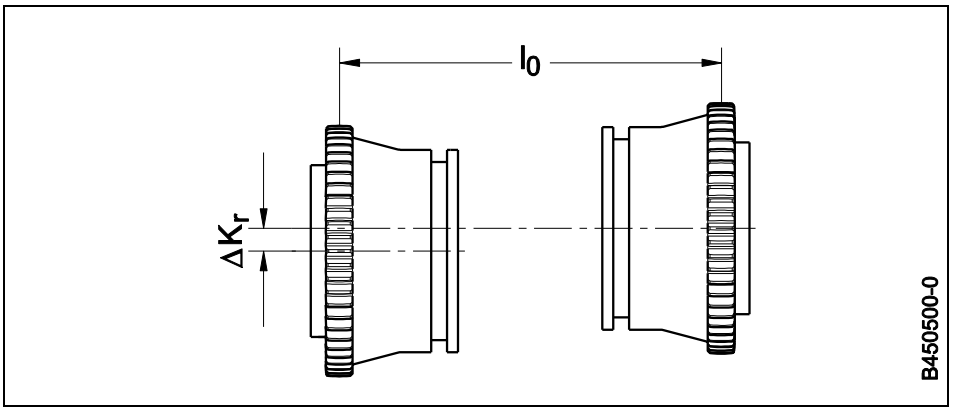


Fig. 7: Radial offset

Key

l_0 Distance between tooth centres
ΔK_r Radial offset

The permissible radial offset ΔK_r depends on the length and thus on the distance between tooth centres of the coupling.

5.4.6 Angular offset

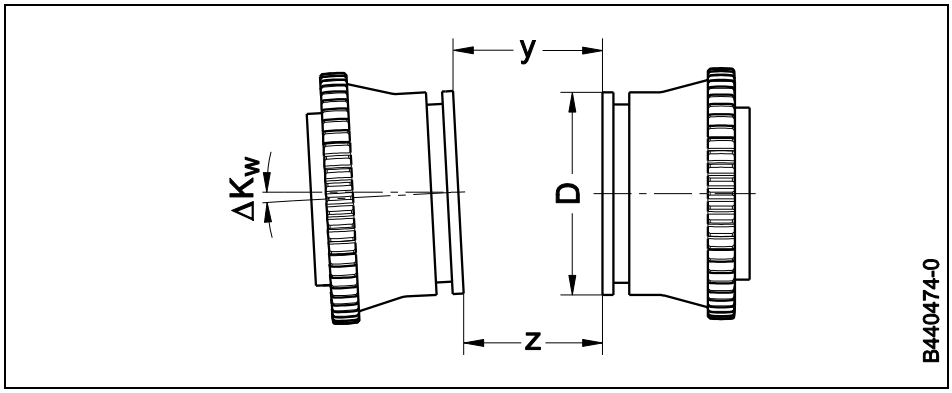


Fig. 8: Gap using the hub as an example

Key

y Maximum gap	D Hub diameter
z Minimum gap	ΔK_w Angular offset

The angular offset ΔK_w is derived from the gap y-z for the shafts and depends on the measured diameter D.

- Measure the gap for the hubs or flanges for at least four positions distributed evenly on the circumference.

The difference between the largest and smallest value produces the value y-z.

For couplings using flanges, replace the hub diameter D with flange diameter A (see Fig. 6).

5.4.7 Determining the recommended alignment values

Size	Hub diameter D (mm)	Flange diameter A (mm)
30	56	118
40	70	145
50	85	165
60	100	200
70	120	220
80	135	240
90	150	270
100	165	280
110	180	310
125	205	340
140	235	390
160	270	435
180	300	480
200	340	545
220	370	580
240	400	645
260	430	680
280	480	745
300	500	775
320	540	825
340	585	915

Tab. 4: Data for determining the alignment values

Axial offset

– Coupling without retaining ring: Tolerance for dimension E = ± 1 mm
– Coupling with retaining ring: Tolerance for dimension E = ± 0.1 mm

Axial clearance factor

– Couplings without retaining ring: $f_H = 1.0$
– Couplings with retaining ring: $f_H = 0.4$

Radial offset

– $\Delta K_r = l_0 \cdot 0.0044 \cdot f_H$ [mm]

Distance between tooth centres l_0 (see chapter 12.2)

Angular offset (gap)

– y-z = D • 0.0044 • f_H [mm]
– Couplings with flange: y-z = A • 0.0044 • f_H [mm]

5.4.8 Example of aligning the shaft

SRL 100 coupling with a shaft clearance of E= 450 mm

Coupling with retaining ring	$f_H = 0.4$
Distance between tooth centres	$l_0 = E + 210 = 660$ mm
Hub diameter	D = 165 mm
Axial offset	E = 450 ± 0.1 mm
Radial offset $\Delta K_r = l_0 \cdot 0.0044 \cdot f_H$	$\Delta K_r = 1.16$ mm
Gap $y\text{-}z = D \cdot 0.0044 \cdot f_H$	y-z = 0.29 mm
Minimum displacement $\Delta K_{r\,min} = 0.5 \cdot \Delta K_r$	$\Delta K_{r\,min} = 0.58$ mm

5.5 Installing the coupling halves (all couplings)

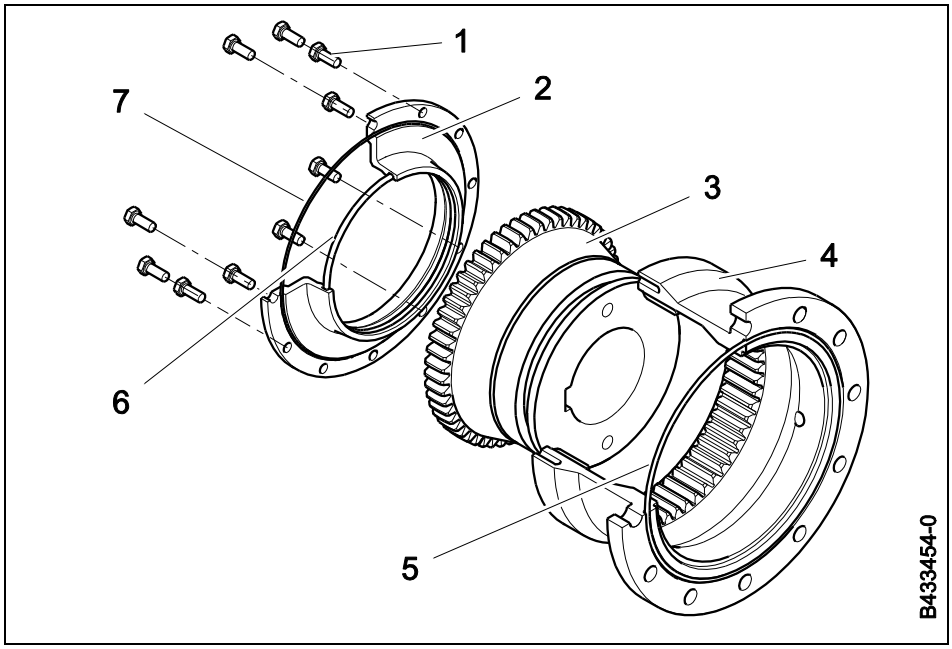


Fig. 9: Installing the coupling halves

Key

1 Hexagon head bolt	5 O-ring
2 Housing cover	6 O-ring
3 Hub	7 O-ring
4 Housing	

O-rings easily fall out of the grooves. Use a little lubricating grease at three or four places in the groove so that the O-ring remains stuck in.

Perform the following steps one after the other for the two coupling halves:

- Insert the O-ring (**6**) providing a seal between the housing cover (**2**) and hub (**3**) into the groove in the housing cover.
- Put on the O-ring (**7**) providing a seal between the housing cover and housing (**4**) over the teeth for the splined hub and insert it into the groove in the housing cover.

NOTICE

Risk of damaging the coupling due to insufficient lubrication!

The housing and hub toothing could wear out prematurely if the toothing is not adequately lubricated during assembly.

- Lubricate the coupling using a suitable lubricant and the stipulated quantity of lubricant prior to assembling the coupling halves.

Observe the stipulated amounts of lubricant and the recommended lubricants (see chapter 12.4).

Coupling with grease lubrication:

- Divide the stipulated quantity of grease: two times 1/6 and one time 4/6.
- Coat the toothings for the housing and the hub for each coupling half using approx. 1/6 of the prescribed quantity of grease.
- Keep the remaining divided up quantity of grease (4/6) in a safe place.

Coupling with grease lubrication, operating speed < (0.05 • n_{max}):
(For n_{max}, see Chapter 12.2)

- Spread the entire quantity of grease evenly into the toothings of the housings and hubs.

Coupling with oil lubrication:

- Use lubrication oil to coat the toothings of the housings and hubs immediately prior to assembly.

All couplings:

- Engage the housing (**4**) in the toothing of the hub (**3**) and join it to the housing cover (**2**). Take care not to squash the O-ring (**7**) in doing so.
- Before screwing down the housing cover, check whether the housing can be freely moved in an axial direction.
- Screw the housing cover to the housing using hexagon head bolts (1) and tighten the hexagon head bolts in a crosswise sequence using the tightening torque given in Chapter 12.3.

NOTICE

Risk of damaging the coupling due to screws being torn off!

The required friction coefficient (μ = 0.14) of the screws is changed owing to coating with grease, paste or similar.

- Only coat the screws with a thin film of lubricating oil. In doing so, never use grease, paste or similar that reduces friction. Observe the tightening torques for the screws.

5.6 Assembling the coupling (depending on series)

5.6.1 Basic version (SB, TS)

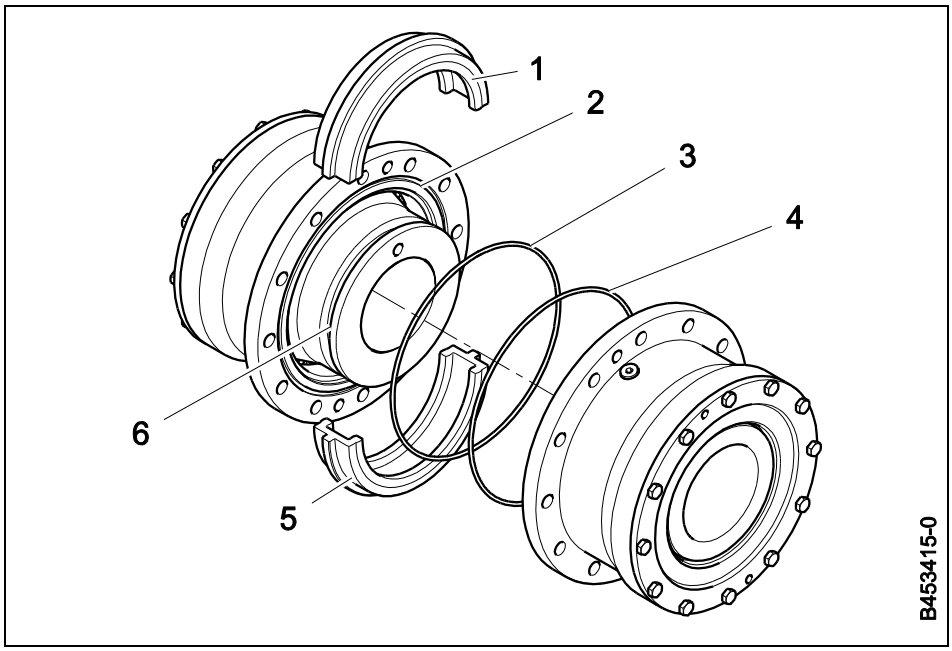


Fig. 10: SB, TS, SBR and TUR couplings

Key

1 Retaining ring, upper half *
2 Groove for O-ring
3 O-ring
4 O-ring *
5 Retaining ring, lower half *
6 Groove for the retaining ring

* only SBR and TUR

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the shafts being coupled.
- Insert one O-ring (**3**) into the groove (**2**) for the O-ring in the housing.
- Carefully push the two housings together. Take care not to squash the O-ring in doing so.

After that, continue with Chapter 5.7.

5.6.2 Coupling with retaining ring (SBR, TUR)

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the shafts being coupled.
- Push the housing toward the machine so that the groove (**6**) is uncovered for the retaining ring.
- Coat the groove for the retaining ring in the hub using the lubricant.
- Insert two O-rings (**3** and **4**) into the grooves on the two housings.
- Insert the halves (**1** and **5**) of the retaining ring into the groove and push the housing over the retaining ring in order to fix the halves of the retaining ring in place.

- Carefully push the two housings together. Take care not to squash the O-rings in doing so.

After that, continue with Chapter 5.7.

5.6.3 Coupling with spacer (SBL, SBZ, TSL, TSZ)

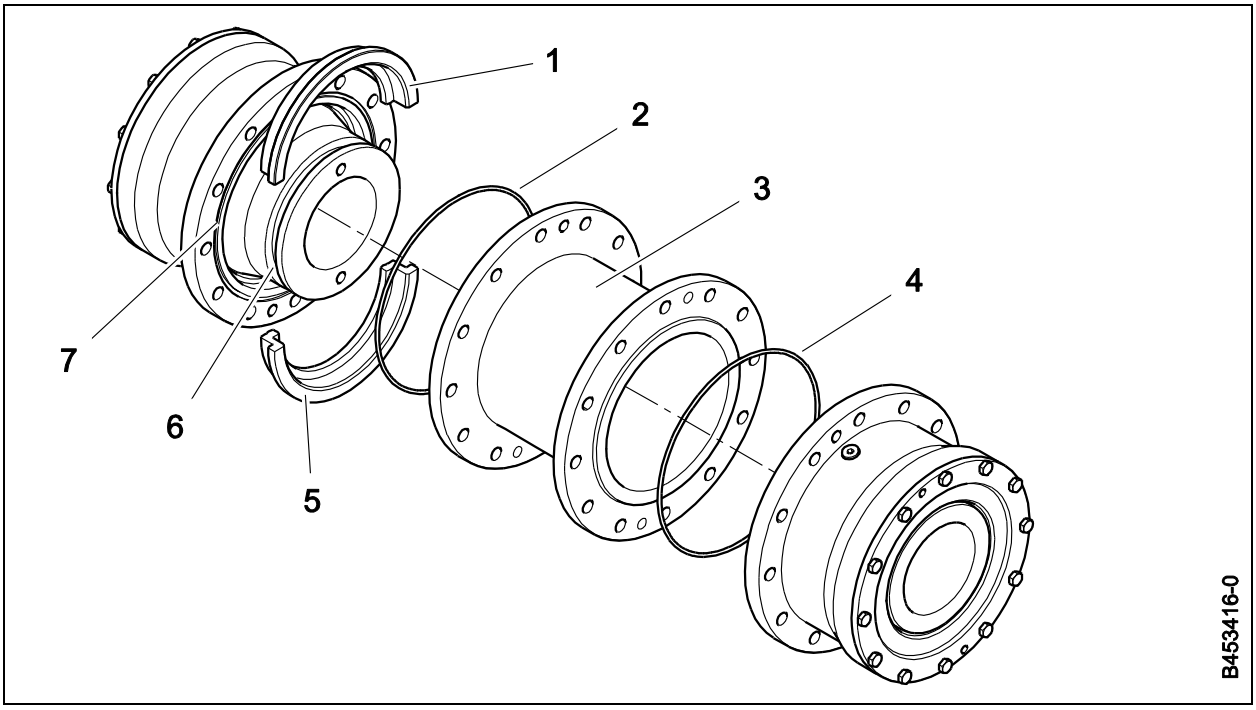


Fig. 11: SBL, SBZ, TSL, TSZ, SRL and TURL couplings

Key

1 Retaining ring, upper half *
2 O-ring
3 Spacer
4 O-ring
5 Retaining ring, lower half *
6 Groove for the retaining ring
7 Groove for O-ring

* only SRL and TURL

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the shafts being coupled.
- Insert two O-rings (**2** and **4**) into the grooves on the two housings (SBL, TSL) or on the housing and the spacer (SBZ, TSZ).
- Use suitable lifting tackle to position the spacer (**3**) between the two coupling halves. Observe the side designation of the components in doing so.
- Carefully push the two housings inwards onto the spacer. Take care not to squash the O-rings in doing so.

After that, continue with Chapter 5.7.

5.6.4 Coupling with spacer and retaining ring (SRL, TURL)

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the shafts being coupled.
- Push the two housings toward the machine so that the grooves for the retaining rings are uncovered.
- Coat the grooves for the retaining rings in the hubs using the lubricant.

- Insert two O-rings (**2** and **4**) into the grooves on the two housings.
- Insert the two retaining ring halves into their respective groove and push the housing over the retaining ring in order to fix the halves of the retaining rings in place.
- Use suitable lifting tackle to position the spacer (**3**) between the two coupling halves. Observe the side designation of the components in doing so.
- Carefully push the two housings inwards onto the spacer. Take care not to squash the O-rings in doing so.

After that, continue with Chapter 5.7.

5.6.5 Coupling with intermediate shaft (SBG, TSG)

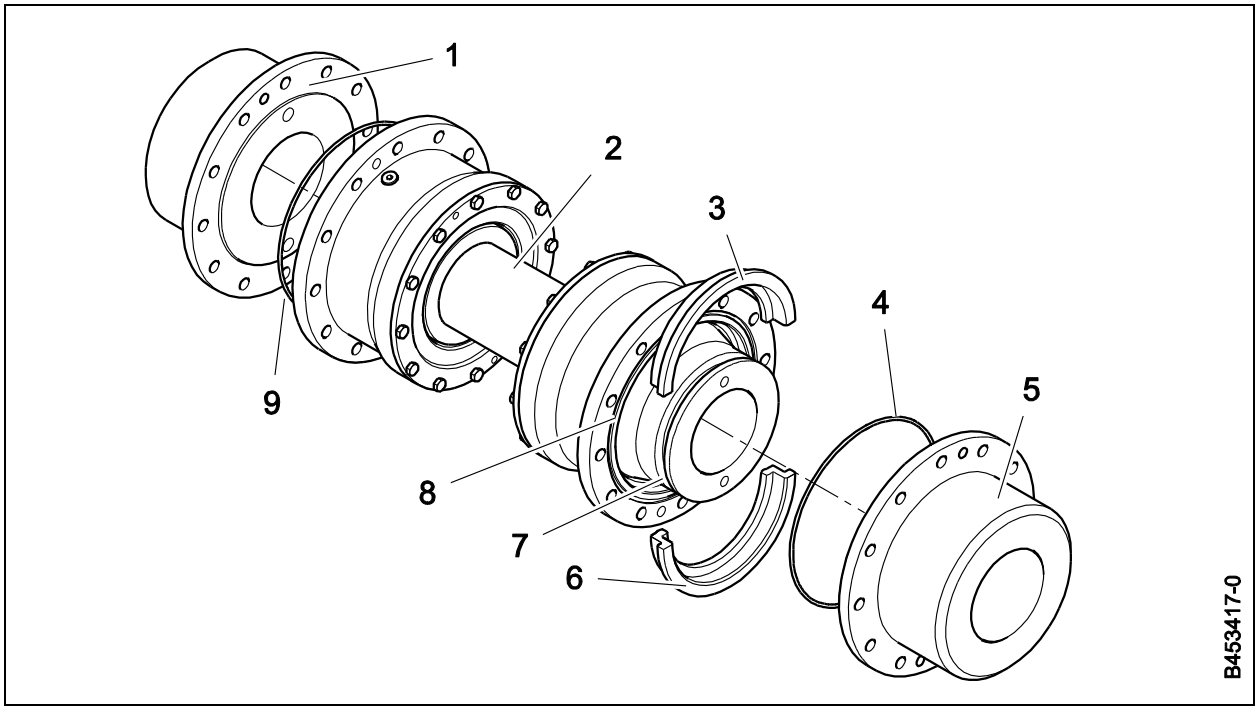


Fig. 12: SBG, TSG, SRG and TURG couplings

Key

1 Flange	4 O-ring	7 Groove for the retaining ring
2 Intermediate shaft, installed	5 Flange	8 Groove for O-ring
3 Retaining ring, upper half *	6 Retaining ring, lower half *	9 O-ring

* only SRG and TURG

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the shafts being coupled.
- Insert two O-rings (**4** and **9**) into the grooves on the two housings.
- Use suitable lifting tackle to position the completely installed intermediate shaft (**2**) between the two flanges (**1** and **5**). Observe the side designation of the components in doing so.
- Carefully push the two housings outwards onto the flanges. Take care not to squash the O-rings in doing so.

After that, continue with Chapter 5.7.

5.6.6 Coupling with intermediate shaft and retaining ring (SRG, TURG)

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the shafts being coupled.
- Use suitable lifting tackle to position the completely installed intermediate shaft (**2**) between the two flanges (**1** and **5**). Observe the side designation of the components in doing so.
- Push the two housings further onto the intermediate shaft so that the groove (**7**) is uncovered for the retaining ring.
- Coat the grooves for the retaining rings in the hubs using the lubricant.
- Insert two O-rings (**4** and **9**) into the grooves on the two housings.
- Insert the two retaining ring halves into their respective groove and push the housing over the retaining ring in order to fix the halves of the retaining rings in place.
- Carefully push the two housings outwards onto the flanges. Take care not to squash the O-rings in doing so.

After that, continue with Chapter 5.7.

5.6.7 Couplings with brake disc (SBD, SBT)

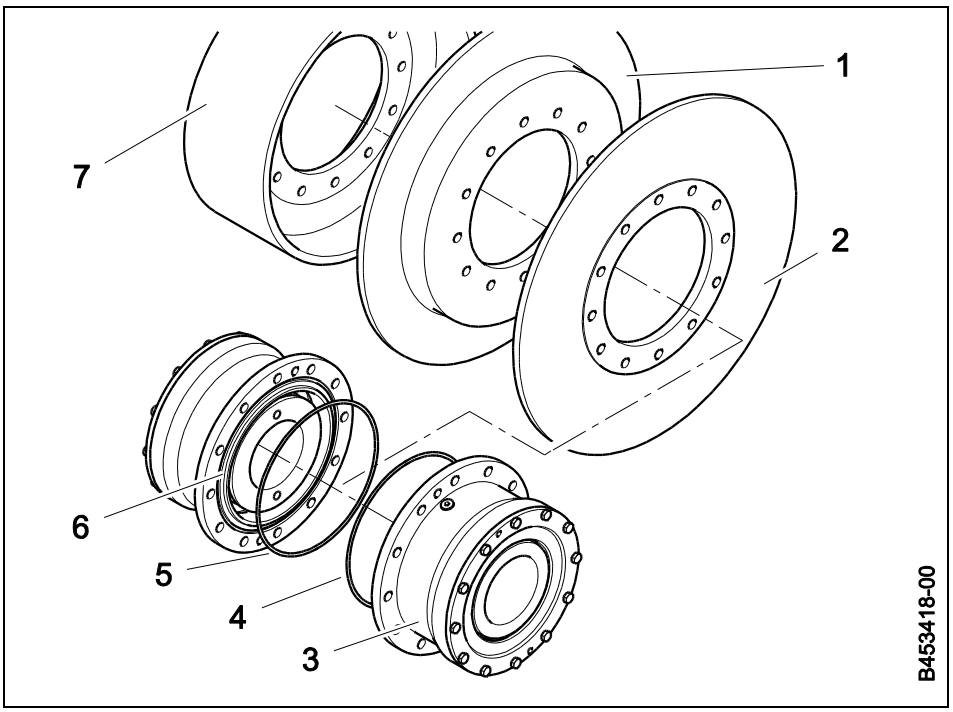


Fig. 13: SBD and SBT couplings

Key

1 SBT brake disc, offset
2 SBT brake disc, straight
3 Housing
4 O-ring
5 O-ring
6 Groove for O-ring
7 SBD brake disc

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Push the two housings (**3**) as far as possible toward the machines being coupled.
- Push the brake disc (**1**, **2** or **7**) between the two coupling halves and put it down on the back of a hub.
- Now you can align the two shafts being coupled.
- Insert the O-rings (**4** and **5**) into the grooves (**6**) on the two housings.
- Push the two housings and the brake disc carefully together. Take care not to squash the O-rings in doing so.

After that, continue with Chapter 5.7.

5.6.8 Coupling for vertical installation (VSB)

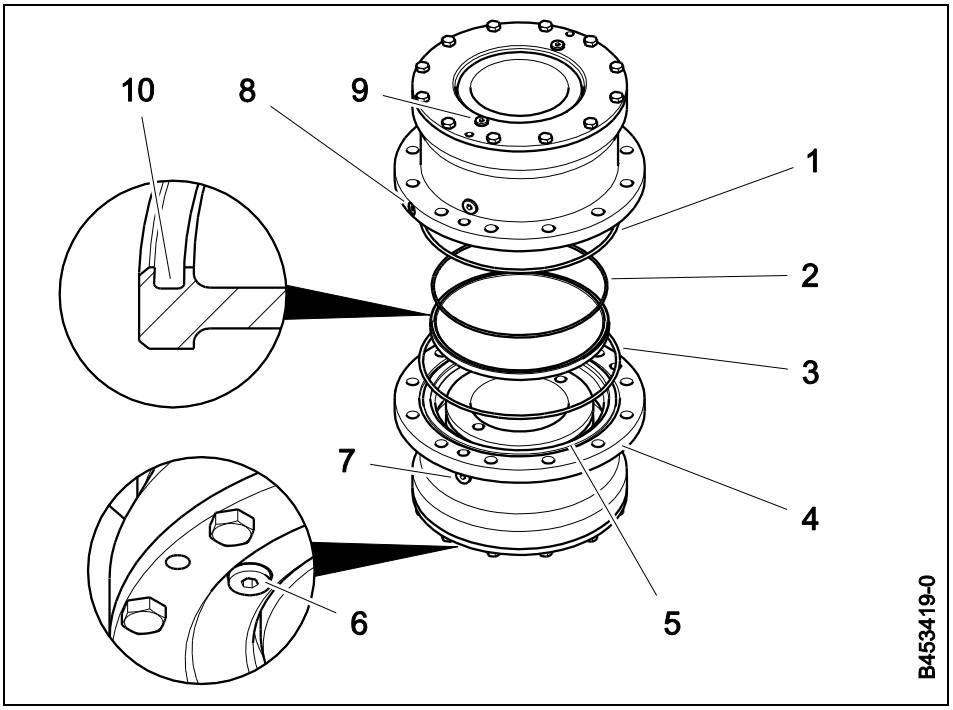


Fig. 14: VSB coupling

Key

1 O-ring	6 Screw plug
2 O-ring, intermediate disc	7 Screw plug
3 O-ring	8 Screw plug
4 Housing	9 Screw plug
5 Groove for O-ring	10 Intermediate disc

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the two shafts being coupled.
- Insert two O-rings (**1** and **3**) into the grooves (**5**) on the two housings.
- Engage the lower housing into the toothing and push it upwards.
- Insert the intermediate disc (**10**) with the upward facing groove for the O-ring (**2**) into the centring of the lower housing.
- Insert the O-ring into the groove for the intermediate disc.
- Carefully push the two housings together. Take care not to squash the three O-rings in doing so.

After that, continue with Chapter 5.7.

5.6.9 Electrically insulated coupling (all series ending with "i")

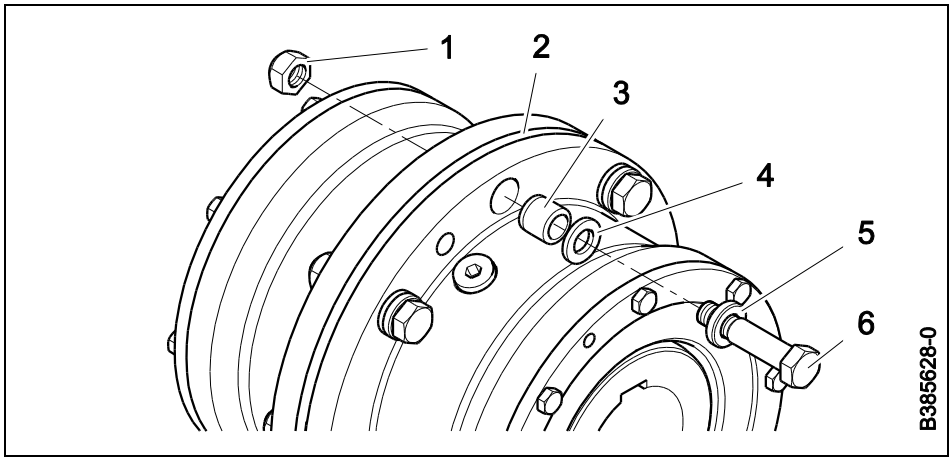


Fig. 15: Electrically insulated coupling (i)

Key

1	Hexagon nut	4	Insulating washer
2	Insulating disc	5	Washer
3	Insulating bush	6	Fitted bolt

NOTICE

Risk of damaging the coupling due to welding!

The electrical insulation fails if insulating bushes or insulating discs are missing.

- Replace missing insulating bushes or insulating discs during assembly.

After you have installed and lubricated the coupling halves as described in Chapter 5.5:

- Align the two shafts being coupled.
- Check whether the insulating bushes (**3**) are inserted in all bore holes. Where applicable, reorder any missing insulating bushes at RENK AG (Rheine plant).
- Insert the O-rings into the grooves on the two housings.
- Position the insulating disc (**2**) between the two housings.
- Carefully push the two housings together. Take care not to squash the O-rings and the insulating disc.

After that, continue with Chapter 5.7.

5.7 Screwing together the coupling

NOTICE

Risk of damaging the coupling due to screws being torn off!

The required friction coefficient (μ = 0.14) of the screws is changed owing to coating with grease, paste or similar.

- Only coat the screws with a thin film of lubricating oil. In doing so, never use grease, paste or similar that reduces friction. Observe the tightening torques for the screws.

NOTICE

Risk of damaging the coupling due to screws becoming undone!

The hexagon nuts lose their self-locking function after being undone several times.

- Replace the self-locking hexagon nuts at the latest after they have been undone five times.

5.7.1 Screwing together the coupling (not for series ending with "i")

- Turn the two coupling halves such that the markings are next to one another (e.g. "A0" and "B0"). The markings are attached to the outer diameters of the one housing and the other housing, or the outer diameters of the spacer or the flange (see Fig. 1 on Page 16).
- For spacer or intermediate shaft versions, connect the components with the markings "A0" to "A0" and "B0" to "B0".
- Insert the fitted bolts through the bore holes and tighten them in crosswise fashion using hexagon nuts. Observe the tightening torques specified in Chapter 12.3!

5.7.2 Screwing together electrically insulated coupling (all series ending with "i")

NOTICE

Risk of damaging the coupling due to welding!

The electrical insulation fails if the insulating washers are incorrect or not mounted.

- Observe the correct order for the washer and insulating washer.
- Observe the tightening torques for the fitted bolts in the insulating bushes.

- Turn the two coupling halves such that the markings are next to one another (e.g. "A0" and "B0"). The markings are attached on the outer diameters of the one housing and on the other housing, or on the spacer or the flange (see Fig. 1 on Page 16).
- For spacer or intermediate shaft versions, connect the components with the markings "A0" to "A0" and "B0" to "B0".
- Firstly, slide a washer (**5**) onto the fitted bolt (**6**).
- Then slide an insulating washer (**4**) onto the fitted bolt.
- Insert the fitted bolts prepared in this way through the bore holes and tighten them in crosswise fashion using hexagon nuts. In doing so, observe the reduced tightening torques specified in Chapter 12.3 for the fitted bolts in insulating bushes.

5.7.3 Tightening torques for large size couplings

If, through lack of space, it is not possible to tighten the fitted bolts in the larger couplings (M27 to M36 threads) using a torque wrench, then use the change in length when tightening in order to determine and comply with the specified tightening torque.

- Measure the total length of the fitted bolts prior to tightening.
- Then carefully tighten the fitted bolts and measure the change in length ΔI several times.

If the changes in length ΔI specified in Tab. 5 are reached, then the specified tightening torque has been reached (also see Chapter 12.3).

Thread	Change in length ΔI for the fitted bolts [mm]	Change in lengthΔI for the fitted bolts in insulating bushes [mm]
M 27	0.11 – 0.12	0.09 – 0.10
M 33	0.13 – 0.14	On request
M 36	0.15 – 0.16	On request

Tab. 5: Change in length ΔI for the fitted bolts

5.8 Using distance plates

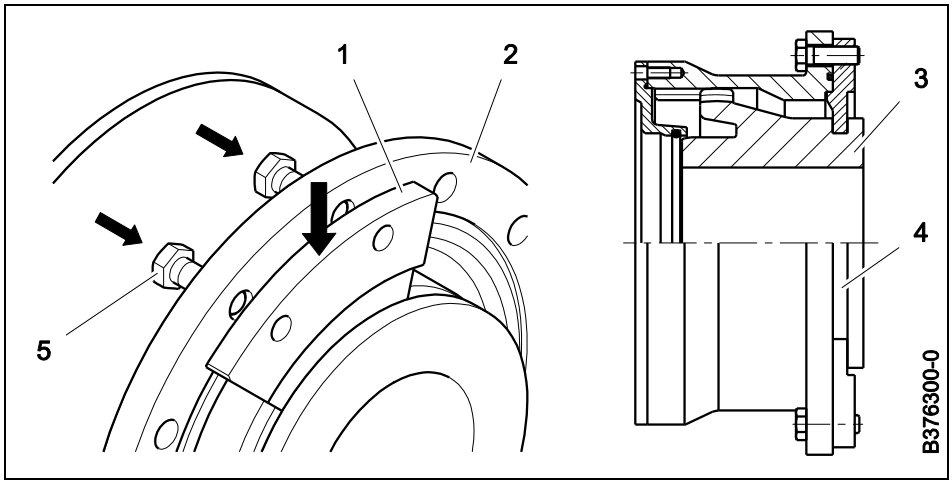


Fig. 16: Using distance plates

Key

1 Distance plates
2 Housing
3 Hub
4 Groove
5 Hexagon head bolt

NOTICE

Risk of damaging the coupling due to slipping!

The distance plates could be overloaded during continuous operation and the coupling may get damaged.

- Only use the coupling with distance plates for short tests.

You can use distance plates (**1**) mounted on the coupling to test the motor or prime mover for a short period of time. The distance plates facilitate the axial and radial guide for the housing (**2**) if a processing machine is not coupled up.

- Push the two distance plates on the opposite sides of the hub (**3**) into the groove (**4**) in the hub and screw them down on the housing using two hexagon head bolts (**5**) respectively. Observe the tightening torques specified in Chapter 12.3!

6 Lubrication

DANGER

Risk of fatal injury due to a coupling that is not ready for operation!

Ejected coupling elements can lead to life threatening injuries. Insufficient lubrication can lead to overheating and failure in the coupling.

- Do not put the coupling into operation until it has been completely assembled and filled with lubricant, and all guards are ready for operation.

NOTICE

Risk of damaging the coupling due to insufficient lubrication!

The toothing can be destroyed if there is no lubrication or if an unsuitable lubrication is used.

- Always use the coupling with the appropriate lubrication and the stipulated amount of lubrication.
- Use lubricant to coat the toothing prior to joining the housings with the hubs, as described in Chapter 5.5.

You can either use lubricating oil or grease to operate the coupling. The maintenance interval depends on the lubricant selected (see chapter 9.2.1).

	Oil lubrication	Grease lubrication
Advantages	Easy change	Long maintenance intervals
Disadvantages	Short maintenance intervals	Time consuming change

Tab. 6: Advantages and disadvantages of the lubrication types

After installation or for each change of lubricant, the coupling needs to be filled with lubricant.

– Never start up the coupling without lubricant nor with too small an amount of lubricant.
– It is vital that the coupling be filled with lubricant as described in this manual.
– Observe the technical data and the details given in the dimension sheet (if supplied).
– Always use a suitable lubricant for the temperatures on site.

If spacers are used, then an additional amount of lubricant is only required if the spacer is not sealed by bottom parts.
All spacers with a length greater than 400 mm have bottom parts.

Observe the stipulated amounts of lubricant and the recommended lubricants (see chapter 12.4).

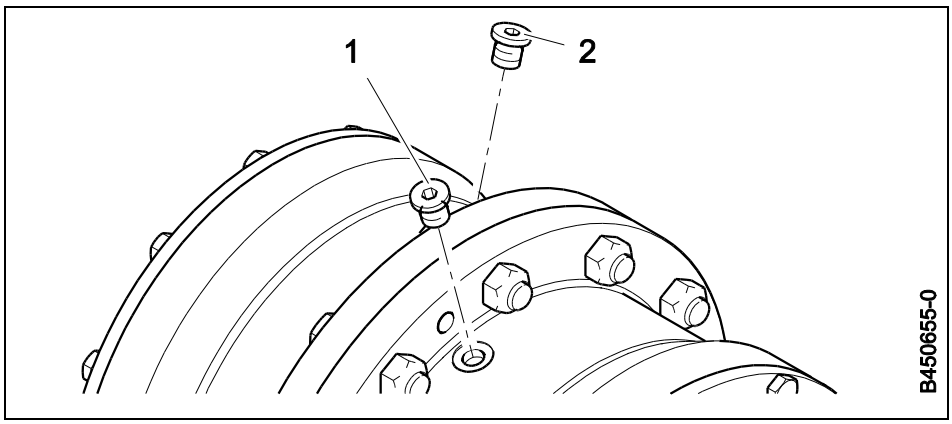


Fig. 17: Screw plugs

Key

1 Screw plug
2 Screw plug

6.1 Oil lubrication

You can heat it up a little so that the oil flows more easily.

Only for vertically installed VSB couplings:

- Undo the screw plugs (**7** and **9** in Fig. 14) and unscrew and remove them from the housing.

Other couplings:

- Rotate the coupling such that the screw plugs (**1** and **2**) for the coupling halves are aligned facing upwards.
- Undo the upper screw plugs and unscrew and remove them from the housing.

- In each coupling half, inject half of the amount of oil stipulated in Chapter 12.4 using an injector or fill them up by using a funnel.
- Check the seals on the self-sealing screw plugs for damage and, if necessary, replace the screw plugs.
- Screw in the screw plugs again and tighten them using the tightening torque specified in Chapter 12.3.

6.2 Lubrication with grease

RENK Longlife Grease is particularly good for long-term lubrication. If the sealing for the coupling is intact, changing the grease will not be due until after 25.000 operating hours or five years – depending on which comes first.

Only for vertically installed VSB couplings:

- Undo the screw plugs (**7** and **9** in Fig. 14) and unscrew and remove them from the housing.

Other couplings:

- Rotate the coupling such that the screw plugs (**1** and **2**) for the coupling halves are aligned facing upwards.
- Undo the upper screw plugs and unscrew and remove them from the housing.
- Also unscrew and remove the second screw plug at the rear of the coupling housing respectively in order to prevent air overpressure.

- In each coupling half, use a grease injector or a cartridge of RENK Longlife Grease to inject half (2/6) of the prescribed quantity of grease (see chapter 5.5) previously divided up.
- Check the seals on the self-sealing screw plugs for damage and, if necessary, replace the screw plugs.
- Screw in the screw plugs again and tighten them using the tightening torque given in Chapter 12.3.

7 Operation

DANGER

Risk of fatal injury due to a coupling that is not ready for operation!

Ejected coupling elements can lead to life threatening injuries. Insufficient lubrication can lead to overheating and failure in the coupling.

- Do not put the coupling into operation until it has been completely assembled and filled with lubricant, and all guards are ready for operation.

DANGER

Risk of fatal injury due to the coupling bursting!

The ejection of coupling elements or the spurting of lubricants out of a bursting coupling could lead to potentially fatal injuries.

- If any changes emerge in the operational behaviour (e.g. noises or vibrations) or if the coupling is faulty, then shut down the coupling immediately and remedy the causes.

8 Detecting faults and troubleshooting

If the toothing is damaged, please always notify RENK AG (Rheine plant).

The coupling must run quietly and with low vibration in all operating phases. Any deviating behaviour is deemed as a malfunction and needs to be rectified immediately. When trying to find the fault, you always have to take both the coupling and the machines being coupled into consideration.

The following malfunctions are only a selection of possible problems.

Malfunction	
Leak.	
Possible cause	**Solution**
O-ring missing.	Insert O-ring.
O-ring defective.	Replace O-ring.
O-ring overheated when shrink fitting the hub.	Replace O-ring.
Too much lubricant due to regreasing - with too much lubricant - between the maintenance intervals.	Correct the amount of lubricant. Only regrease the coupling after large leaks or during maintenance.
Sealing surface of hub back damaged.	Straighten out minor damage to the sealing surface. If the damage is severe, replace the hub.
Screw plug has a leak.	Check the tightening torque. Check the seal on the screw plug and replace it if necessary. Check the sealing surface and straighten out, if necessary.
Leak at the fitting key groove.	Seal the fitting key groove.
Malfunction	
Screw torn off.	
Possible cause	**Solution**
Check the tightening torque.	Select the tightening torque according to the data given in the tables.
Thread coated with paste.	Do not coat the thread using paste. Replace the screw and nut. Thoroughly clean the internal thread for cover screws.
Incorrect screw.	Check the strength of the screw. Replace screw with the original part.
Unacceptably high system torque.	Reduce the system torque. Check the system.

Tab. 7: Detecting faults and troubleshooting

Malfunction	
Vibrations or noises.	
Possible cause	**Solution**
Toothing worn.	Replace the toothed components.
Unbalance.	Check the coupling and correct the unbalance.
Displacement too great.	Check the alignment and correct it, if necessary.
Malfunction	
Tooth flanks damaged.	
Possible cause	**Solution**
Lubricant used up.	Replace the lubricant. Observe the maintenance intervals.
Incorrect lubricant.	Use a lubricant as per lubricant recommendation.
Too little lubricant.	Correct the amount of lubricant.
Incorrect installation.	Coat the toothing with lubricant prior to installing the housings.
Vibrations in the drive train.	Determine the cause of the vibrations and reduce them.
Displacement too great.	Check the alignment.
Unacceptably high system torque.	Reduce the system torque. Check the system.

Tab. 8: Detecting faults and troubleshooting (continued)

9 Servicing

⚠ DANGER

Risk of fatal injury due to unintended rotary motion of the machine parts!

Coupling elements or tools ejected from the machine, and being caught up by rotating machine parts can lead to fatal injuries.

- Switch off the engaged machinery train for all work and secure the control devices against unwanted activation.

⚠ DANGER

Risk of fatal injury due to the coupling or machine parts still running for some time after the drive has been shut down!

Fatal injuries or loss of limbs are possible.

- Before removing the guard, wait for the coupling and adjacent machine parts to come to a standstill.

⚠ CAUTION

Risk of burns due to heated coupling or components!

Components or lubricants can cause burns.

- Before starting work, allow the coupling and adjacent machine parts enough time to cool down.
- Wear suitable protective clothing.

⚠ DANGER

Risk of fatal injury due to a coupling that is not ready for operation!

Ejected coupling elements can lead to life threatening injuries. Insufficient lubrication can lead to overheating and failure in the coupling.

- Do not put the coupling into operation until it has been completely assembled and filled with lubricant, and all guards are ready for operation.

NOTICE

Risk of damaging the coupling due to screws becoming undone!

The hexagon nuts lose their self-locking function after being undone several times.

- Replace the self-locking hexagon nuts at the latest after they have been undone five times.

9.1 Checking the condition

DANGER

Risk of fatal injury due to fire or explosion!

Insufficient lubrication can lead to overheating and failure in the coupling.

- If possible, check the coupling every four weeks for leaks, but certainly no later than three months.
- Check the coupling for external damage and missing parts, e.g. screws.
- If leaks occur, shut down the coupling, replace the O-rings and regrease the coupling in the event of large leaks.

DANGER

Risk of fatal injury due to the coupling bursting!

The ejection of coupling elements or the spurting of lubricants out of a bursting coupling could lead to potentially fatal injuries.

- If any changes emerge in the operational behaviour (e.g. noises or vibrations) or if the coupling is faulty, then shut down the coupling immediately and remedy the causes.

- Please pay careful attention to the operating behaviour when using the coupling:
  - Vibrations.
  - Noises.
  - Changes in the noise level.

9.2 Maintenance

9.2.1 Changing the lubricant

You can either use lubricating oil or grease to operate the coupling. The maintenance interval depends on the selected lubricant and in accordance with the specified operating hours or years reached, depending on which comes first.

Lubricant	Maintenance interval	
	Oil lubrication	Lubrication with grease
Mineral lubricant	8000 h or 2 years	8000 h or 2 years
Synthetic lubricant	16.000 h or 3 years	16.000 h or 3 years
RENK Longlife Grease	-	25.000 h or 5 years

Tab. 9: Lubricants and maintenance intervals

9.2.2 Changing the lubricating oil (only for oil lubrication)

- Remove the guard.
- Place a sufficiently large vessel under the coupling, which can easily be removed from underneath the coupling and emptied, even if it is filled up.

Only for vertically installed VSB couplings:

- Undo the screw plugs (**6** and **8** in Fig. 14) and unscrew and remove them from the housing.

Other couplings:

- Rotate the coupling such that the screw plugs (**1** and **2** in Fig. 17) for the coupling halves are aligned facing upwards at a minimum angle of 45°.
- Undo the upper screw plugs and unscrew and remove them from the housing.
- Rotate the coupling such that the thread holes are aligned facing downwards and so that the lubricating oil can run into the vessel underneath the coupling.

- Allow the lubricating oil to run completely out of the coupling.
- Dispose of the waste lubricating oil in accordance with the national regulations applicable at the operating site.
- Fill lubricating oil into the coupling as described in Chapter 6.1.

Even during oil lubrication, clean the coupling every five years as described in the following section.

9.2.3 Changing the lubricating grease (only for grease lubrication)

- Remove the guard.
- Remove the coupling cover.
- Make sure that the housings can be moved axially by several millimetres (only if retaining ring type less than 1 mm is used).
- Continue to disassemble the coupling as described in Chapter 10.2.
- Wash all coupling elements using solvent-free cleaning agents. Remove lubricant residues and dirt as much as possible from the interior. Collect the cleaning agents and lubricant residues and dispose of them properly.
- Dispose of the waste lubricants and cleaning agents in accordance with the national regulations applicable at the operating site.
- Check the coupling teeth for damage. In the event of any damage, please contact RENK AG (Rheine plant).
- Check the O-rings and immediately replace damaged O-rings.
  Replace all O-rings after five years at the latest!
- Check all sealing surfaces for damage and straighten them out, if necessary.
- Check the alignment of the machines towards one another and realign, if necessary.
- Lubricate the toothing and install the coupling as described in Chapter 5.5 and Chapter 5.6.

9.3 Ordering spare parts

All spare parts must comply with the technical requirements defined by RENK AG (Rheine plant). This is always assured when the parts used are original spare parts from RENK AG (Rheine plant).

Only use original spare parts from RENK AG (Rheine plant) as replacements for supplied parts.

Specify the following when ordering spare parts:

– RENK order number (matching the label on the largest outer diameter on the coupling, see Fig. 1 on Page 16).
– Part name.
– Part number (matching the dimension sheet or the technical data).
– Size of the part (if known).
– Required quantity.

The contact address can be found on the back cover of this manual.

10 Disassembly

⚠ DANGER

Risk of fatal injury due to unintended rotary motion of the machine parts!

Coupling elements or tools ejected from the machine, and being caught up by rotating machine parts can lead to fatal injuries.

- Switch off the engaged machinery train for all work and secure the control devices against unwanted activation.

⚠ DANGER

Risk of fatal injury due to the coupling or machine parts still running for some time after the drive has been shut down!

Fatal injuries or loss of limbs are possible.

- Before removing the guard, wait for the coupling and adjacent machine parts to come to a standstill.

⚠ CAUTION

Risk of burns due to heated coupling or components!

Components or lubricants can cause burns.

- Before starting work, allow the coupling and adjacent machine parts enough time to cool down.
- Wear suitable protective clothing.

10.1 Draining the lubricating oil (only for oil lubrication)

- Remove the guard.
- Place a sufficiently large vessel under the coupling, which can easily be removed from underneath the coupling and emptied, even if it is filled up.

Only for vertically installed VSB couplings:

- Undo the screw plugs (**6** and **8** in Fig. 14) and unscrew and remove them from the housing.

Other couplings:

- Rotate the coupling such that the screw plugs (**1** and **2** in Fig. 17) for the coupling halves are aligned facing upwards at a minimum angle of 45°.
- Undo the upper screw plugs and unscrew and remove them from the housing.
- Rotate the coupling such that the thread holes are aligned facing downwards and so that the lubricating oil can run into the vessel underneath the coupling.

- Allow the lubricating oil to run completely out of the coupling.
- Dispose of the waste lubricating oil in accordance with the national regulations applicable at the operating site.

10.2 Disassembling the coupling

10.2.1 Disassembling the coupling without an intermediate shaft or spacer

⚠ CAUTION

Risk of injury due to falling retaining ring or brake disc!

If a coupling with a retaining ring or brake disc is used, then the retaining ring and, if applicable, the brake disc can fall to the floor when being extracted and result in injuries.

- Take care to ensure that the retaining ring and, if applicable, the brake disc do not fall to the floor when being extracted.

- Remove the guard, if necessary.
- Undo the hexagon nuts and unscrew them from the fitted bolts.
- Replace the hexagon nuts after they have been undone five times!
- Screw the forcing screws into the threaded extraction holes in the flanges for the housings and separate the parts from one another in doing so.
- Collect the escaping lubricants and dispose of them properly.
- Move the machines away from each other.
- Unscrew the housing cover and remove it from the housing.
- Pull the housing off the hub.

10.2.2 Disassembling the coupling with an intermediate shaft or spacer

⚠ CAUTION

Risk of injury due to falling retaining ring or brake disc!

If a coupling with a retaining ring or brake disc is used, then the retaining ring and, if applicable, the brake disc can fall to the floor when being extracted and result in injuries.

- Take care to ensure that the retaining ring and, if applicable, the brake disc do not fall to the floor when being extracted.

- Remove the guard, if necessary.
- Undo the hexagon nuts and unscrew them from the fitted bolts.
- Replace the hexagon nuts after they have been undone five times!
- Secure the spacer or intermediate shaft against being dropped.
- Screw the forcing screws into the threaded extraction holes in the flanges for the housings and separate the parts from one another in doing so.
- Collect the escaping lubricants and dispose of them properly.
- Remove the intermediate shaft or spacer.
- Unscrew the housing cover and remove it from the housing.
- Pull the housing off the hub.

10.3 Pulling off the hubs or flanges

If it is necessary to pull the hub or flange off one of the shafts, then proceed in accordance with the withdrawal method suited to the respective connection between shaft and hub, or flange.

10.3.1 Key connection or splines in accordance with DIN 5480

You will need a suitable mechanical detaching device for doing the pulling off.

Work quickly so that the shaft does not heat up too much.

⚠ CAUTION

Risk of burns due to heated device or components!

Burns on parts of the body are possible.

- Wear suitable protective clothing.

- Evenly heat the hub all around using a suitable device (e.g. burner or inductively) up to a temperature of 80 °C. Observe the instructions from the device manufacturer in doing so.
- Remove the heated hub or flange from the shaft (and at the same time secure the hub or flange against dropping) using a detaching device in accordance with the instructions from the detaching device manufacturer.

10.3.2 Tapered interference fit

If press fits are used, remove the hub or flange using a suitable hydraulic detaching device and a pressurised oil device.

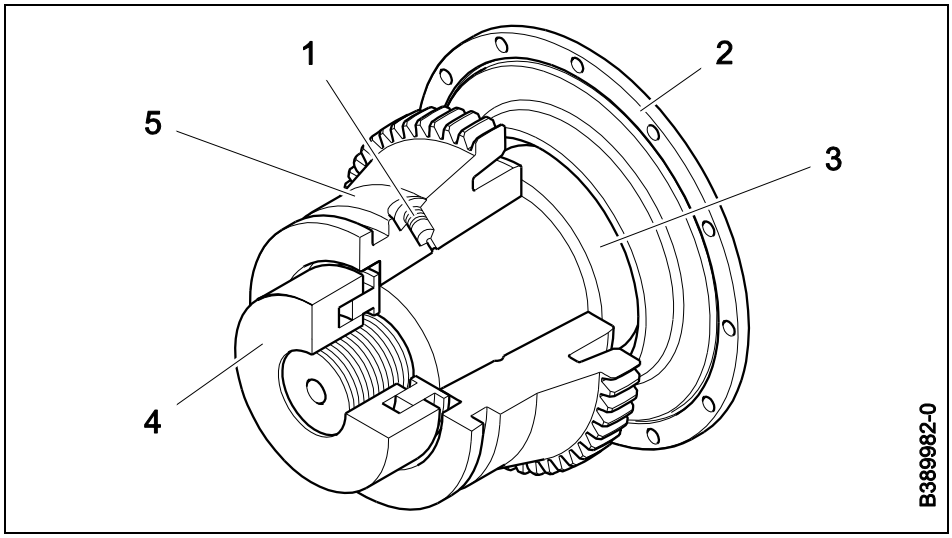


Fig. 18: Tapered interference fit

Key

1 Oil connection for radial pressure
2 Housing cover
3 Machine shaft
4 Hydraulic nut
5 Hub

Required tools:

– Suitable pneumatic pump or motor pump (pressurised oil device) for generating the radial pressure. If mating parts with more than one oil connection are used, then you will need a pump for every single connection.
– Suitable (hand operated) pump for generating the axial pressure.
– Hydraulic nut (**4**), if possible with sufficient stroke.
– Lifting tackle for holding the hub.
– Oil for generating pressure.

Required data:

– Required and maximum expansion pressure.

Please refer to the dimension sheet for the required data or contact the system planner or RENK AG (Rheine plant).

⚠ DANGER

Risk of injury due to sudden release of the press fit!

When being removed, the hub or flange can be released very suddenly from the shaft and lead to injuries!

- Secure the hub or flange axially during removal.
- Under no circumstances should anyone be standing in front of the hub in the direction in which the hub is being released during removal

⚠ DANGER

Risk of fatal injury due to the coupling elements bursting!

Hubs or flanges that have been expanded too far or fitted on too far can burst immediately or when being removed, and ejected coupling elements can lead to life threatening injuries.

- Do not exceed the maximum expansion pressure.
- Remove the coupling elements carefully.

- Mount and operate the hydraulic detaching device and the associated pressurised oil device in accordance with the manufacturer's instructions.

Recommendations for hydraulic removal using a hydraulic nut: Proceed in a similar manner if you use a different fitting tool.

- Remove the shaft nut.
- Extend the hydraulic nut to its maximum and observe the permissible piston stroke in doing so.
- Screw on the hydraulic nut.
- Unscrew the screw plugs out of the oil connections and connect up the pump or pumps.
- Secure the hub or flange against dropping.
- Apply full pressure to the hydraulic nut.
- Apply the radial expansion pressure stipulated in the dimension sheet to the pump or pumps.
  1st step: 50 % of the required pressure, allow 10 minutes to take effect
  2nd step: Increase the pressure by 200 bar. Allow the pressure 2 minutes to take effect.
  Repeat the second step for as long as it takes until the required expansion pressure is reached.
- If pressurised oil assemblies are used without a sealing ring, only inject the pressurised oil until it escapes to the full extent on both sides of the hub or flange and the hub or flange "floats".

- If pressurised oil assemblies are used with a sealing ring, only inject the pressurised oil until it escapes to the full extent at the end of the shaft and the hub or flange "floats".

The oil outlet can be covered at the shaft end by the structural shape of the fitting tool used.

- Slowly release the pressure in the hydraulic nut and allow the hub or flange to slide from the shaft.

If the pull up dimension is greater than the hydraulic nut stroke:

- Push on the hub or flange by a further 1 to 2 mm.
- Release the expansion pressure.
- Release the pressure in the hydraulic nut.
- Wait approx. two to three hours so that the radial pressure can reduce fully.
- Turn the hydraulic nut back as far as is required.
- Apply full pressure to the hydraulic nut.
- Continue with removal.

If the hub or flange does not release when the maximum expansion pressure is fully exhausted:

- Use oil with a higher viscosity (ISO VG 220).
- Allow the interference fit to be pressurised for one hour.
- Attempt removal once again.

If the hub or flange still cannot be released:

- Increase the maximum pressure by 5%.
- Attempt removal once again.

After the hub or flange has been released:

- Release the pressure from the two pumps.
- Unscrew the hydraulic nut.
- Remove the oil pipes.
- Pull the hub or the flange carefully down from the shaft so as not to damage the surfaces of the shaft.
- Set down the hub or flange.
- Examine the parts for any damage. Straighten out any minor damage. In the event of any serious damage, please contact RENK AG (Rheine plant).
- Protect the hub or flange bore and shaft against corrosion.
- Screw the screw plugs into the oil connections.

10.3.3 Cylindrical or stepped cylindrical interference fit

If cylindrical or stepped press fits are used, remove the hub or flange using a hydraulic detaching device and pressurised oil device.

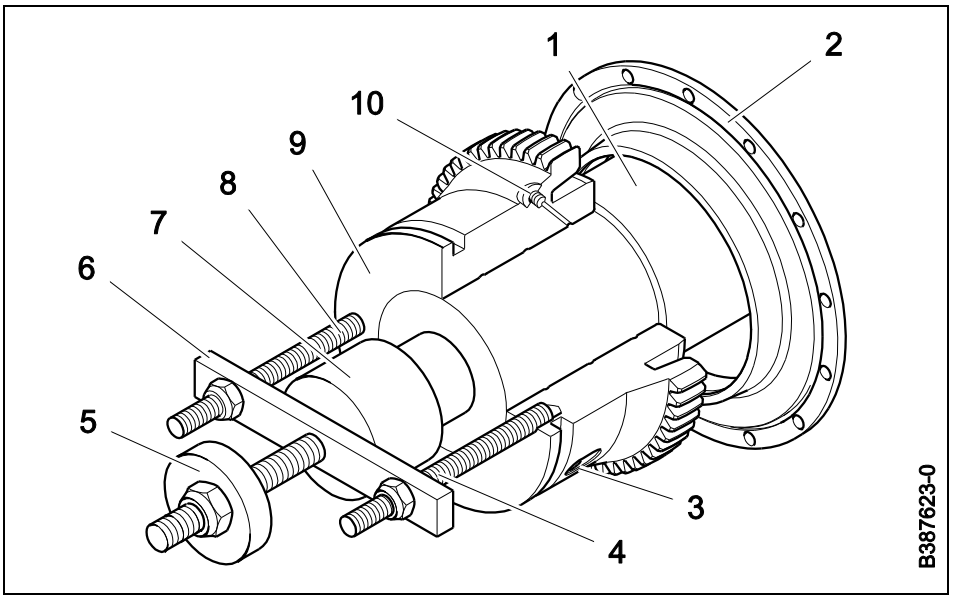


Fig. 19: Cylindrical interference fit (example)

Key

1 Machine shaft
2 Housing cover
3 Oil connection 1 for radial pressure
4 Threaded rod
5 Stop plate
6 Retaining plate
7 Hydraulic cylinder
8 Threaded rod
9 Hub
10 Oil connection 2 for radial pressure

Required tools:

– Suitable pneumatic pump or motor pump (pressurised oil device) for generating the radial pressure. If mating parts with more than one oil connection are used (**3** or **10**), then you will need a pump for every single connection.
– Suitable (hand operated) pump for generating the axial pressure.
– Hydraulic cylinder (**7**).
– Detaching device, e.g. consisting of a retaining plate (**6**) and threaded rods (**4** and **8**) needing to be of the correct size for the axial force required.
Only for stepped cylindrical interference fit:
Stop plate (**5**) with threaded rod screwed into the shaft.
– Lifting tackle for holding the hub and detaching device.
– Oil for generating pressure.

Required data:

– Required and maximum expansion pressure.
– Required axial removal force.

Please refer to the dimension sheet for the required data or contact the system planner or RENK AG (Rheine plant).

⚠ DANGER **Risk of injury due to sudden release of the press fit!**

When being removed, the hub or flange can be released very suddenly from the shaft and lead to injuries!

- Secure the hub or flange axially during removal.
- Under no circumstances should anyone be standing in front of the hub in the direction in which the hub is being released during removal

⚠ DANGER **Risk of fatal injury due to the coupling elements bursting!**

Hubs or flanges that have been expanded too far or fitted on too far can burst immediately or when being removed, and ejected coupling elements can lead to life threatening injuries.

- Do not exceed the maximum expansion pressure.
- Remove the coupling elements carefully.

NOTICE Risk of damaging the shaft and hub or flange, due to tilting!

The hub or flange could tilt on the shaft if you stop pulling it off and leave it in position.

- Pull the hub or flange off evenly and in one go.

- Mount and operate the detaching device and the associated pressurised oil device in accordance with the manufacturer's instructions.

For stepped cylindrical interference fit:

- Install the stop plate (**5**). There has to be a little more than half the length of a hub in space between the retaining plate and stop.

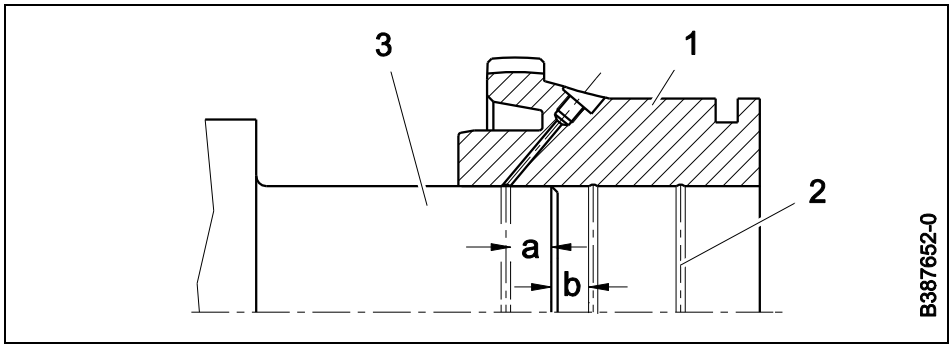


Fig. 20: Detaching intervals

Key

1 Hub
2 Oil groove
3 Shaft

If the stroke of the hydraulic cylinder does not suffice for removing the hub (**1**) completely from the shaft (**3**) in one go, then select the position for readjustment such that the shaft end is centred (**a** = **b**) between two oil grooves (**2**).

Wait enough time prior to readjustment (approx. two to three hours) until the radial pressure has dropped completely.

Recommendations for hydraulic removal:

- Secure the hub, detaching device and hydraulic cylinder against dropping.
- Unscrew the screw plugs out of the oil connections and connect up the pump or pumps.
- Apply the radial expansion pressure given in the dimension sheet to the pump.
  1st step: 50% of the required pressure, allow 10 minutes to take effect
  2. step: Increase the pressure by 200 bar. Allow the pressure 2 minutes to take effect.
  Repeat the second step for as long as it takes until the required expansion pressure is reached.
- If pressurised oil assemblies are used without a sealing ring, only inject the pressurised oil until it escapes to the full extent on both sides of the hub or flange and the hub or flange "floats".
- If pressurised oil assemblies are used with a sealing ring, only inject the pressurised oil until it escapes to the full extent at the end of the shaft and the hub or flange "floats".

The oil outlet can be covered at the shaft end by the structural shape of the fitting tool used.

If a stepped cylindrical interference fit is used, the hub or the flange can automatically be released very suddenly after the required expansion pressure has been reached.

- Apply pressure to the hydraulic cylinder.
- Remove the hub, using readjustment if necessary.

If the hub or flange does not release when the maximum expansion pressure is fully exhausted:

- Use oil with a higher viscosity (ISO VG 220).
- Allow the interference fit to be pressurised for one hour.
- Attempt removal once again.

If the hub or flange still cannot be released:

- Increase the maximum pressure by 5%.
- Attempt removal once again.

After the hub or flange has been released:

- Release the pressure from the two pumps.
- Set down the hub or flange.
- Remove the oil pipes.
- Dismount the detaching device.
- Examine the parts for any damage. Straighten out any minor damage. In the event of any serious damage, please contact RENK AG (Rheine plant).
- Protect the hub or flange bore and shaft against corrosion.
- Screw the screw plugs into the oil connections.

11 Disposal

- Degrease and clean the machine parts prior to disposal.
- Dispose of the components separately, according to material groups.
- When machine parts need to be serviced, dispose of the cleaning agents and lubricants in accordance with the national regulations applicable to the operating site.

12 Technical data

The technical data for the couplings vary greatly according to the series and the order.

- Please refer to the dimension sheet (if supplied) or this operation manual for your coupling's technical data.
- Before commencing work, please contact RENK AG (Rheine plant) for more information in the event of missing or unclear technical data.

In couplings larger than 340, one order-specific dimension sheet is always created which you can refer to for the technical data.

12.1 General data

Permissible angular offset	
Coupling without retaining ring	+/- 1.5 degrees
Coupling with retaining ring[1)]	+/- 0.6 degrees
[1)] Valid for axial clearances as set out in the dimension lists below.	

Tab. 10: Angular offset for couplings with and without a retaining ring

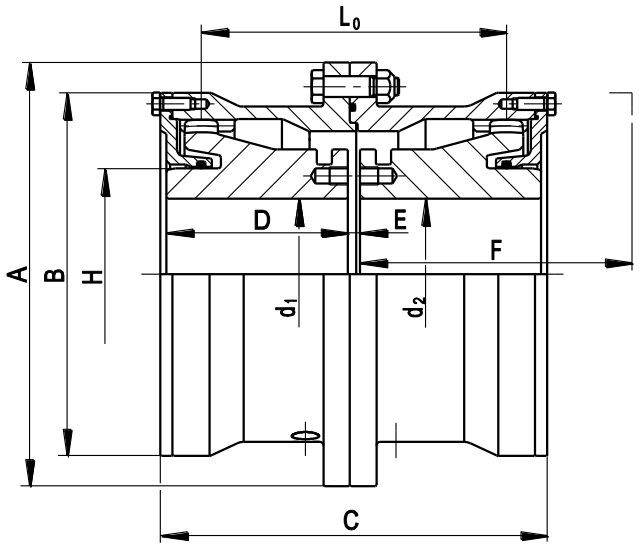
The angular offset and the radial offset must not occur to the full amount at the same time.

Designation	**Symbol**	**Unit**	**Formula**
Nominal power of coupling	P_{KN}	kW	
Speed	n	rpm	
Nominal torque of coupling	T_{KN}	Nm	$T_{KN} = 9550 \cdot P_{KN}/n$
Perm. coupling peak torque	T_{KP}	Nm	$= 1.5 \cdot T_{KN}$ (for 10^5 load cycles)
Perm. coupling momentary torque	T_{Kmax}	Nm	$= 3.0 \cdot T_{KN}$ (for 10^3 load cycles)

Tab. 11: Power and torques

12.2 Figures with dimensions

12.2.1 Dimensions for SB and TS couplings

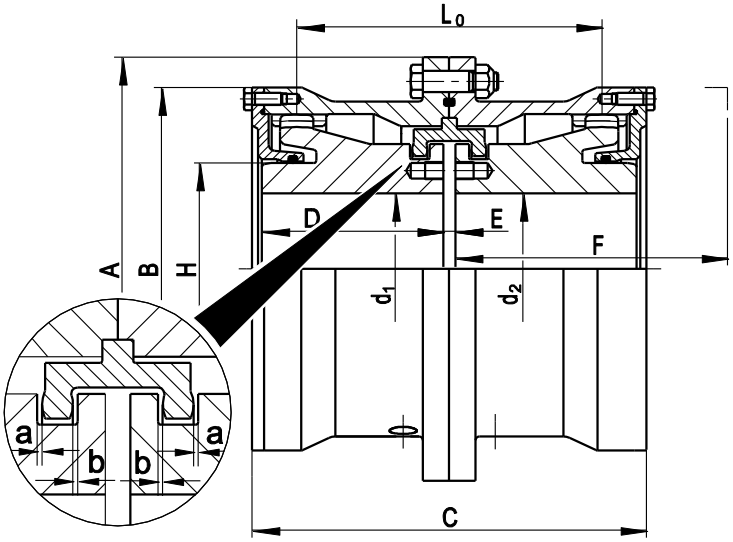


B376332-1

Size	Nominal torque	Speed	Bore hole $d_1;d_2$		Dimensions								Max. static radial displacement $\Delta K_{r\,max}$ [1]	Mass moment of inertia [2]	Weight [2]
	T_{KN}	n_{max}	min	max	A	B	C	D	E	F [3]	H	L_0			
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	34	118	92	108	50	5	75	45	77	1.95	0.006	4.4
40	2.1	6900	22	46	145	115	128	60	5	90	60	96	2.7	0.017	7.5
50	3.5	6300	22	58	165	135	148	70	5	110	75	113	3.0	0.033	11.2
60	5.9	5900	28	70	200	160	172	80	6	120	90	132	3.45	0.082	18.4
70	9	5400	28	78	220	178	192	90	6	130	100	148	3.9	0.133	26
80	13	5000	32	92	240	196	212	100	6	150	120	166	4.35	0.2	32
90	18	4700	32	100	270	225	236	110	8	170	130	184	4.8	0.38	47
100	23	4300	55	110	280	240	256	120	8	180	140	202	5.25	0.49	54
110	30.5	4000	65	120	310	265	276	130	8	190	155	218	5.7	0.82	72
125	42	3700	75	138	340	295	320	150	10	215	175	250	6.45	1.35	100
140	61	3400	85	156	390	325	350	165	10	230	200	276	7.2	2.41	142
160	90	3100	120	180	435	370	404	190	12	270	230	320	8.4	4.3	199
180	130	2900	140	200	480	415	456	220	12	300	260	366	9.6	7.5	285
200	189	2700	160	225	545	465	512	245	14	340	290	408	10.8	14.1	420
220	245	2400	160	273	580	510	556	270	16	360	355	452	12.0	19.7	514
240	330	2200	180	300	645	560	598	290	18	380	390	486	12.8	29.9	657
260	390	2100	200	319	680	595	640	310	20	400	415	524	13.5	42.3	797
280	535	2000	220	354	745	660	702	340	22	440	460	568	14.25	69	1065
300	580	1900	240	369	775	675	744	360	24	470	480	608	15.0	84	1220
320	740	1800	260	404	825	725	786	380	26	500	525	638	16.5	119	1470
340	950	1700	280	431	915	795	808	390	28	520	560	638	16.5	184	1870

[1] Relating to a permissible angular displacement of $\Delta K_{w\,perm.}$=1.5° for each coupling half.
[2] Values for the complete coupling for bore hole d_1, d_2 max.
[3] The dismounting dimension F is required for the vertical installation and removal of the machine and for changing the O-rings.

12.2.2 Dimensions for the SBR and TUR couplings

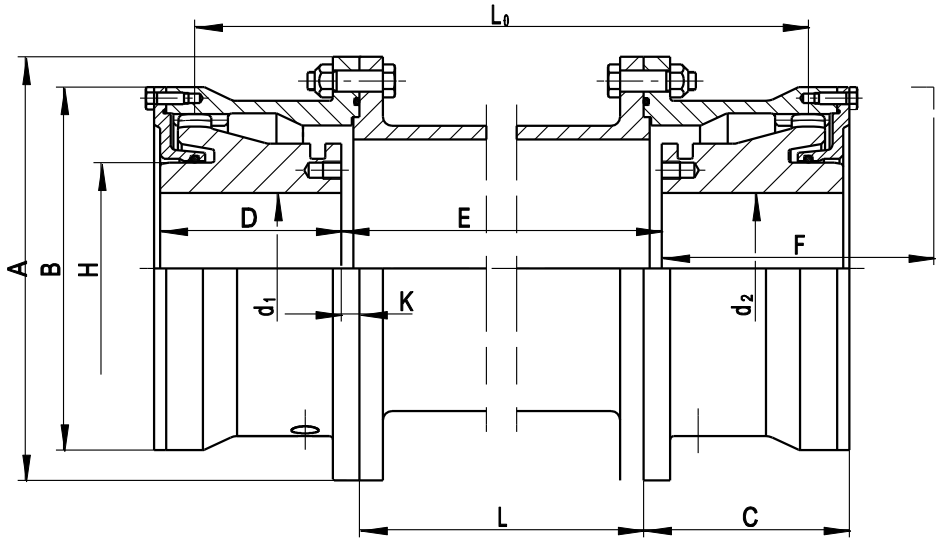


B376339-1

Size	Nominal torque	Speed	Bore hole $d_1;d_2$		Dimensions								Axial clearances a and b[1]	Mass moment of inertia[2]	Weight[2]
	T_{KN}	n_{max}	min	max	A	B	C	D	E	F[3]	H	L_0			
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	34	118	92	110	50	5	75	45	77	0.5	0.006	4.7
40	2.1	6900	22	46	145	115	131	60	5	90	60	96	0.5	0.017	7.8
50	3.5	6300	22	58	165	135	151	70	5	110	75	113	0.5	0.035	12
60	5.9	5900	28	70	200	160	175	80	6	120	90	132	0.5	0.085	19.4
70	9	5400	28	78	220	178	197	90	6	130	100	148	0.5	0.14	27.3
80	13	5000	32	92	240	196	217	100	6	150	120	166	0.5	0.21	33
90	18	4700	32	100	270	225	241	110	8	170	130	184	0.5	0.4	50
100	23	4300	55	110	280	240	261	120	8	180	140	202	1	0.52	57
110	30.5	4000	65	120	310	265	282	130	8	190	155	218	1	0.83	74
125	42	3700	75	138	340	295	325	150	10	215	175	250	1	1.41	105
140	61	3400	85	156	390	325	355	165	10	230	200	276	1	2.45	148
160	90	3100	120	180	435	370	410	190	12	270	230	320	1	4.51	209
180	130	2900	140	200	480	415	462	220	12	300	260	366	1	7.8	297
200	189	2700	160	225	545	465	519	245	14	340	290	408	1	14.6	428
220	245	2400	160	273	580	510	556	270	16	360	355	452	1.5	21.7	540
240	330	2200	180	300	645	560	598	290	18	380	390	486	1.5	32.5	682
260	390	2100	200	319	680	595	640	310	20	400	415	524	1.5	44.3	832
280	535	2000	220	354	745	660	702	340	22	440	460	568	1.5	73	1130
300	580	1900	240	369	775	675	744	360	24	470	480	608	1.5	88	1275
320	740	1800	260	404	825	725	786	380	26	500	525	638	1.5	124	1535
340	950	1700	280	431	915	795	808	390	28	520	560	638	2	185	1900

[1] With these axial clearances, the permissible angular displacement $\Delta K_{w\ perm.} = 0.6°$ for each coupling half.
[2] Values for the complete coupling for bore hole d_1, d_2 max.
[3] The dismounting dimension F is required for the vertical installation and removal of the machine and for changing the O-rings.

12.2.3 Dimensions for the SBL, SBZ, TSL and TSZ couplings

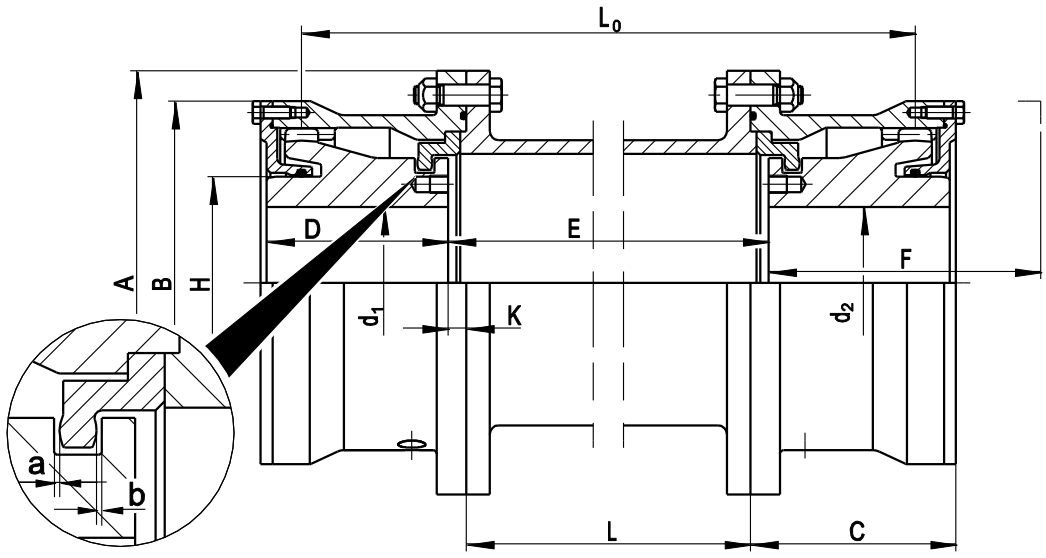


B376338-1

Size	Nominal torque	Speed[3]	Bore hole d1;d2		Dimensions									Mass moment of inertia[1]	Weight[1]
	T_{KN}	n_{max}	min	max	A	B	C	D	F[2]	H	K	L	L_0		
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	34	118	92	55	50	75	45	3.5	E-7	E+72	0.007	4.5
40	2.1	6900	22	46	145	115	68.5	60	90	60	7	E-14	E+91	0.018	8
50	3.5	6300	22	58	165	135	78.5	70	110	75	7	E-14	E+108	0.035	11.8
60	5.9	5900	28	70	200	160	91.5	80	120	90	8.5	E-17	E+126	0.085	19.2
70	9	5400	28	78	220	178	102	90	130	100	9	E-18	E+142	0.138	26.4
80	13	5000	32	92	240	196	112	100	150	120	9	E-18	E+160	0.21	32.5
90	18	4700	32	100	270	225	126	110	170	130	12	E-24	E+176	0.4	50
100	23	4300	55	110	280	240	136	120	180	140	12	E-24	E+194	0.51	57
110	30.5	4000	65	120	310	265	146	130	190	155	12	E-24	E+210	0.85	75
125	42	3700	75	138	340	295	170	150	215	175	15	E-30	E+240	1.65	104
140	61	3400	85	156	390	325	185	165	230	200	15	E-30	E+266	2.45	147
160	90	3100	120	180	435	370	213	190	270	230	17	E-34	E+308	4.51	208
180	130	2900	140	200	480	415	239	220	300	260	17	E-34	E+354	7.8	295
200	189	2700	160	225	545	465	269	245	340	290	20	E-40	E+394	14.1	422
220	245	2400	160	273	580	510	294	270	360	355	24	E-48	E+436	20.4	532
240	330	2200	180	300	645	560	316	290	380	390	26	E-52	E+468	31.9	687
260	390	2100	200	319	680	595	338	310	400	415	28	E-56	E+504	43.7	832
280	535	2000	220	354	745	660	370	340	440	460	30	E-60	E+546	71	1110
300	580	1900	240	369	775	675	390	360	470	480	30	E-60	E+584	85.8	1255
320	740	1800	260	404	825	725	410	380	500	525	30	E-60	E+612	121	1515
340	950	1700	280	431	915	795	430	390	520	560	40	E-80	E+610	188	1930

[1] Values for the complete coupling without spacer for bore hole d_1, d_2 max.
[2] The dismounting dimension F is required for the vertical installation and removal of the machine and for changing the O-rings.
[3] Speed n_{max} depends on the length and on the weight of the spacer.

12.2.4 Dimensions for the SRL and TURL couplings

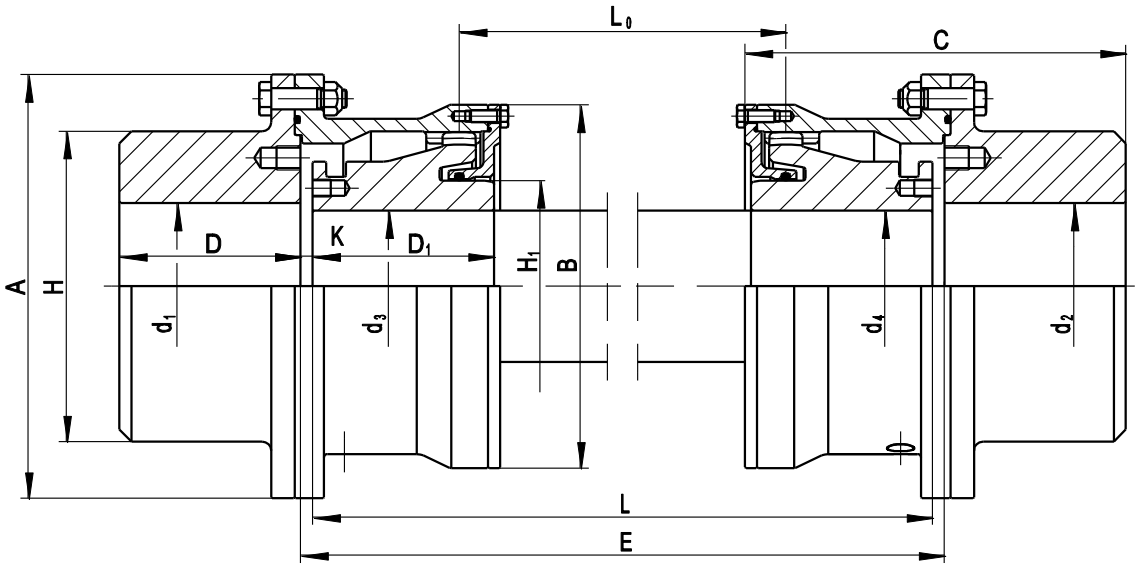


B376344-1

Size	Nominal torque	Speed[4]	Bore hole $d_1;d_2$		Dimensions									Axial clearances a and b[1]	Mass moment of inertia[2]	Weight[2]
	T_{KN}	n_{max}	min	max	A	B	C	D	F[3]	H	K	L	L_0			
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	34	118	92	55	50	75	45	3.5	E-7	E+72	0.5	0.01	4.7
40	2.1	6900	22	46	145	115	68.5	60	90	60	7	E-14	E+91	0.5	0.02	8.3
50	3.5	6300	22	58	165	135	78.5	70	110	75	7	E-14	E+108	0.5	0.04	12.4
60	5.9	5900	28	70	200	160	91.5	80	120	90	9	E-18	E+126	0.5	0.09	20
70	9	5400	28	78	220	178	102	90	130	100	9	E-18	E+142	0.5	0.14	27.7
80	13	5000	32	92	240	196	112	100	150	120	9	E-18	E+160	0.5	0.22	34
90	18	4700	32	100	270	225	126	110	170	130	12	E-24	E+176	0.5	0.42	53
100	23	4300	55	110	280	240	136	120	180	140	12	E-24	E+194	1	0.54	60
110	30.5	4000	65	120	310	265	146	130	190	155	12	E-24	E+210	1	0.88	79
125	42	3700	75	138	340	295	170	150	215	175	15	E-30	E+240	1	1.7	108
140	61	3400	85	156	390	325	185	165	230	200	15	E-30	E+266	1	2.55	153
160	90	3100	120	180	435	370	213	190	270	230	17	E-34	E+308	1	4.71	217
180	130	2900	140	200	480	415	239	220	300	260	17	E-34	E+354	1	8.1	306
200	189	2700	160	225	545	465	269	245	340	290	20	E-40	E+394	1	14.5	443
220	245	2400	160	273	580	510	294	270	360	355	24	E-48	E+436	1.5	21.4	559
240	330	2200	180	300	645	560	316	290	380	390	26	E-52	E+468	1.5	33.5	722
260	390	2100	200	319	680	595	338	310	400	415	28	E-56	E+504	1.5	45.7	872
280	535	2000	220	354	745	660	370	340	440	460	30	E-60	E+546	1.5	75	1170
300	580	1900	240	369	775	675	390	360	470	480	30	E-60	E+584	1.5	91.4	1335
320	740	1800	260	404	825	725	410	380	500	525	30	E-60	E+612	1.5	128	1610
340	950	1700	280	431	915	795	430	390	520	560	40	E-80	E+610	2	198	2040

[1] With these axial clearances, the permissible angular displacement $\Delta K_{w\,perm.}$=0.6° for each coupling half.
[2] Values for the complete coupling without spacer for bore hole d_1, d_2 max.
[3] The dismounting dimension F is required for the vertical installation and removal of the machine and for changing the O-rings.
[4] Speed n_{max} depends on the length and on the weight of the spacer.

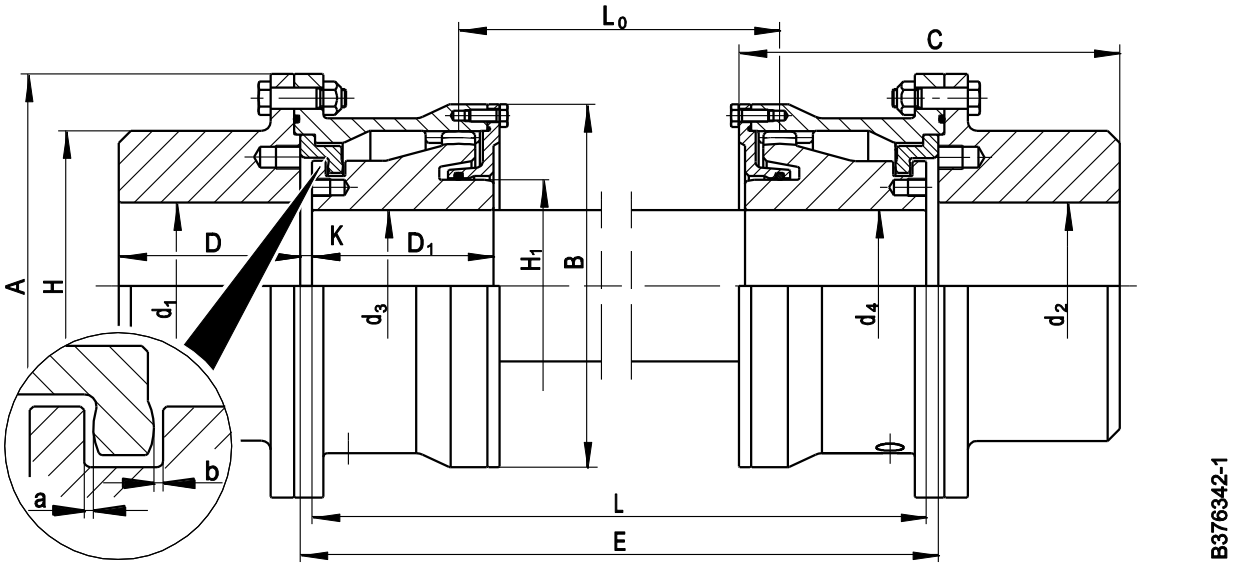
12.2.5 Dimensions for the SBG and TSG couplings



Size	Nominal torque	Speed[2]	Dimensions												Mass moment of inertia[1]	Weight[1]
			Bore hole $d_1;d_2$		Bore hole $d_3;d_4$											
	T_{KN}	n_{max}	min	max	min	max	A	B	C	D	H	H_1	K	L_0		
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	61	12	34	118	92	105	50	80	45	3.5	E-79	0.01	7.7
40	2.1	6900	22	73	22	46	145	115	126.5	60	95	60	5	E-101	0.03	12.6
50	3.5	6300	22	86	22	58	165	135	146.5	70	112	75	5	E-118	0.06	19
60	5.9	5900	28	100	28	70	200	160	169	80	130	90	6	E-138	0.14	31
70	9	5400	28	115	28	78	220	178	189	90	150	100	6	E-154	0.23	45
80	13	5000	32	131	32	92	240	196	209	100	170	120	6	E-172	0.36	56
90	18	4700	32	146	32	100	270	225	232	110	190	130	8	E-192	0.67	83
100	23	4300	55	158	55	110	280	240	252	120	205	140	8	E-210	0.88	97
110	30.5	4000	65	173	65	120	310	265	272	130	225	155	8	E-226	1.45	129
125	42	3700	75	192	75	138	340	295	315	150	250	175	10	E-260	2.4	180
140	61	3400	85	219	85	156	390	325	345	165	285	200	10	E-286	4.34	252
160	90	3100	110	250	120	180	435	370	398	190	325	230	12	E-332	8.1	365
180	130	2900	134	277	140	200	480	415	454	220	360	260	12	E-378	13.8	508
200	189	2700	150	315	160	225	545	465	508	245	410	290	14	E-422	25.3	742
220	245	2400	160	346	160	273	580	510	556	270	450	355	16	E-468	36.9	934
240	330	2200	180	369	180	300	645	560	598	290	480	390	18	E-504	54.5	1175
260	390	2100	200	400	200	319	680	595	640	310	520	415	20	E-544	77	1450
280	535	2000	220	423	220	354	745	660	700	340	550	460	20	E-586	120	1885
300	580	1900	240	446	240	369	775	675	740	360	580	480	20	E-624	150	2170
320	740	1800	260	477	260	404	825	725	780	380	620	525	20	E-652	208	2620
340	950	1700	280	500	280	431	915	795	808	390	650	560	28	E-666	316	3310

[1] Values for the complete coupling without an intermediate shaft for bore hole d_1; d_2 max and d_3; d_4 max.
[2] Speed n_{max} depends on the length and on the weight of the intermediate shaft.

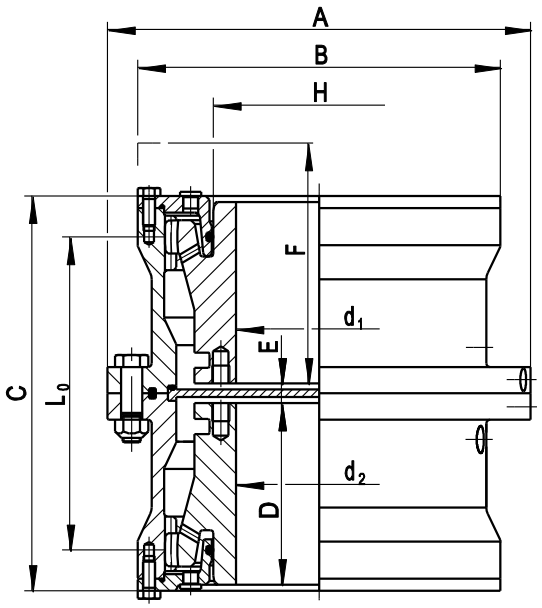
12.2.6 Dimensions for the SRG and TURG couplings



Size	Nominal torque	Speed[3]	Bore hole $d_1;d_2$		Bore hole $d_3;d_4$		Dimensions								Axial clearances a and b[1]	Mass moment of inertia[2]	Weight[2]
	T_{KN}	n_{max}	min	max	min	max	A	B	C	D	H	H_1	K	L_0			
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	61	12	34	118	92	105	50	80	45	3.5	E-79	0.5	0.01	8
40	2.1	6900	22	73	22	46	145	115	126.5	60	95	60	5	E-101	0.5	0.03	13
50	3.5	6300	22	86	22	58	165	135	146.5	70	112	75	5	E-118	0.5	0.06	19.8
60	5.9	5900	28	100	28	70	200	160	169	80	130	90	6	E-138	0.5	0.14	32
70	9	5400	28	115	28	78	220	178	189	90	150	100	6	E-154	0.5	0.24	46
80	13	5000	32	131	32	92	240	196	209	100	170	120	6	E-172	0.5	0.38	58
90	18	4700	32	146	32	100	270	225	232	110	190	130	8	E-192	0.5	0.69	86
100	23	4300	55	158	55	110	280	240	252	120	205	140	8	E-212	1	0.9	99
110	30.5	4000	65	173	65	120	310	265	272	130	225	155	8	E-226	1	1.49	133
125	42	3700	75	192	75	138	340	295	315	150	250	175	10	E-260	1	2.7	187
140	61	3400	85	219	85	156	390	325	345	165	285	200	10	E-286	1	4.42	259
160	90	3100	110	250	120	180	435	370	398	190	325	230	12	E-332	1	8.2	374
180	130	2900	134	277	140	200	480	415	454	220	360	260	12	E-378	1	14.1	521
200	189	2700	150	315	160	225	545	465	508	245	410	290	14	E-422	1	25.6	765
220	245	2400	160	346	160	273	580	510	556	270	450	355	16	E-468	1.5	37.9	964
240	330	2200	180	369	180	300	645	560	598	290	480	390	18	E-504	1.5	57.3	1210
260	390	2100	200	400	200	319	680	595	640	310	520	415	20	E-544	1.5	79.3	1485
280	535	2000	220	423	220	354	745	660	700	340	550	460	20	E-586	1.5	124	1950
300	580	1900	240	446	240	369	775	675	740	360	580	480	20	E-624	1.5	155	2255
320	740	1800	260	477	260	404	825	725	780	380	620	525	20	E-652	1.5	216	2710
340	950	1700	280	500	280	431	915	795	808	390	650	560	28	E-666	2	326	3420

[1] With these axial clearances, the permissible angular displacement $\Delta K_{w\,perm.}$=0.6° for each coupling half.
[2] Values for the complete coupling without an intermediate shaft for bore hole d_1; d_2 max and d_3; d_4 max.
[3] Speed n_{max} depends on the length and on the weight of the intermediate shaft.

12.2.7 Dimensions for the VSB coupling

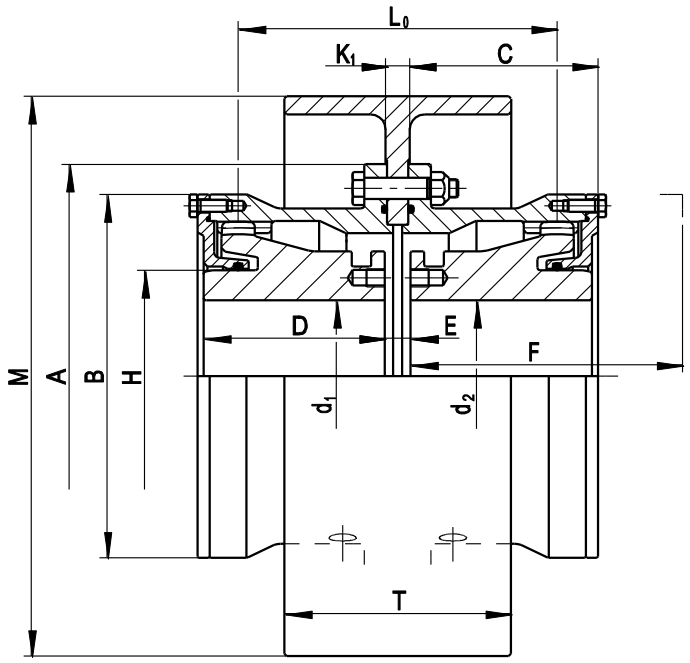


B376345-1

Size	Nominal torque	Speed		Bore hole $d_1;d_2$		Dimensions								Max. static radial displacement $\Delta K_{r\,max}$ [1]	Mass moment of inertia [2]	Weight [2]
	T_{KN}	n_{min}	n_{max}	min	max	A	B	C	D	E	F [3]	H	L_0			
	kNm	rpm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	1300	7500	12	34	118	92	110	50	7	75	45	E+72	1.95	0.007	4.6
40	2.1	1300	6900	22	46	145	115	131	60	8	90	60	E+91	2.70	0.018	7.9
50	3.5	1300	6300	22	58	165	135	151	70	8	110	75	E+108	3.00	0.035	11.8
60	5.9	900	5900	28	70	200	160	175	80	9	120	90	E+126	3.45	0.084	19.1
70	9	900	5400	28	78	220	178	197	90	11	130	100	E+142	3.90	0.14	27
80	13	900	5000	32	92	240	196	217	100	11	150	120	E+160	4.35	0.21	34
90	18	650	4700	32	100	270	225	241	110	13	170	130	E+176	4.80	0.40	49
100	23	650	4300	55	110	280	240	261	120	13	180	140	E+194	5.25	0.57	56
110	30.5	650	4000	65	120	310	265	282	130	14	190	155	E+210	5.70	0.85	75
125	42	650	3700	75	138	340	295	325	150	15	215	175	E+240	6.45	1.4	104
140	61	500	3400	85	156	390	325	355	165	15	230	200	E+266	7.20	2.5	147
160	90	500	3100	120	180	435	370	410	190	18	270	230	E+308	8.40	4.41	204
180	130	500	2900	140	200	480	415	462	220	18	300	260	E+354	9.60	7.62	292
200	189	500	2700	160	225	545	465	519	245	21	340	290	E+394	10.80	14.3	430

[1] Relating to a permissible angular displacement of $\Delta K_{w\,perm.}$=1.5° for each coupling half.
[2] Values for the complete coupling without brake disc for bore hole d_1, d_2 max.
[3] The dismounting dimension F is required for the vertical installation and removal of the machine and for changing the O-rings.

12.2.8 Dimensions for the SBD coupling



B376335-1

Size	Nominal torque	Speed[4]	Bore hole $d_1;d_2$		Dimensions								Max. static radial displacement $\Delta K_{r\,max}$[1]	Mass moment of inertia[2]	Weight[2]
	T_{KN}	n_{max}	min	max	A	B	C	D	E	F[3]	H	L_0			
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	34	118	92	53	50	K_1+3	75	45	K_1+75	1.95	0.007	4.4
40	2.1	6900	22	46	145	115	62.5	60	K_1+2	90	60	K_1+93	2.70	0.016	7.4
50	3.5	6300	22	58	165	135	72.5	70	K_1+2	110	75	K_1+110	3.00	0.029	11.1
60	5.9	5900	28	70	200	160	84.5	80	K_1+3	120	90	K_1+129	3.45	0.075	18.3
70	9	5400	28	78	220	178	93.5	90	K_1+1	130	100	K_1+143	3.90	0.13	25.4
80	13	5000	32	92	240	196	103.5	100	K_1+1	150	120	K_1+161	4.35	0.19	31.4
90	18	4700	32	100	270	225	115.5	110	K_1+3	170	130	K_1+179	4.80	0.37	46
100	23	4300	55	110	280	240	125.5	120	K_1+3	180	140	K_1+197	5.25	0.47	54
110	30.5	4000	65	120	310	265	135	130	K_1+2	190	155	K_1+212	5.70	0.81	72
125	42	3700	75	138	340	295	157.5	150	K_1+5	215	175	K_1+245	6.45	1.31	100
140	61	3400	85	156	390	325	172.5	165	K_1+5	230	200	K_1+271	7.20	2.35	140
160	90	3100	120	180	435	370	199	190	K_1+6	270	230	K_1+314	8.40	4.2	198
180	130	2900	140	200	480	415	225	220	K_1+6	300	260	K_1+360	9.60	7.4	283
200	189	2700	160	225	545	465	252.5	245	K_1+7	340	290	K_1+401	10.80	14	417

[1] Relating to a permissible angular displacement of $\Delta K_{w\,perm.}$=1.5° for each coupling half. These values only apply to the couplings, not to the braking equipment.
[2] Values for the complete coupling without brake disc for bore hole d_1, d_2 max.
[3] The dismounting dimension F is required for the vertical installation and removal of the machine and for changing the O-rings.
[4] Speed n_{max} depends on the permissible circumferential speed of the brake disc. Observe the brake manufacturer's specifications!
K_1, M, T see Page 67

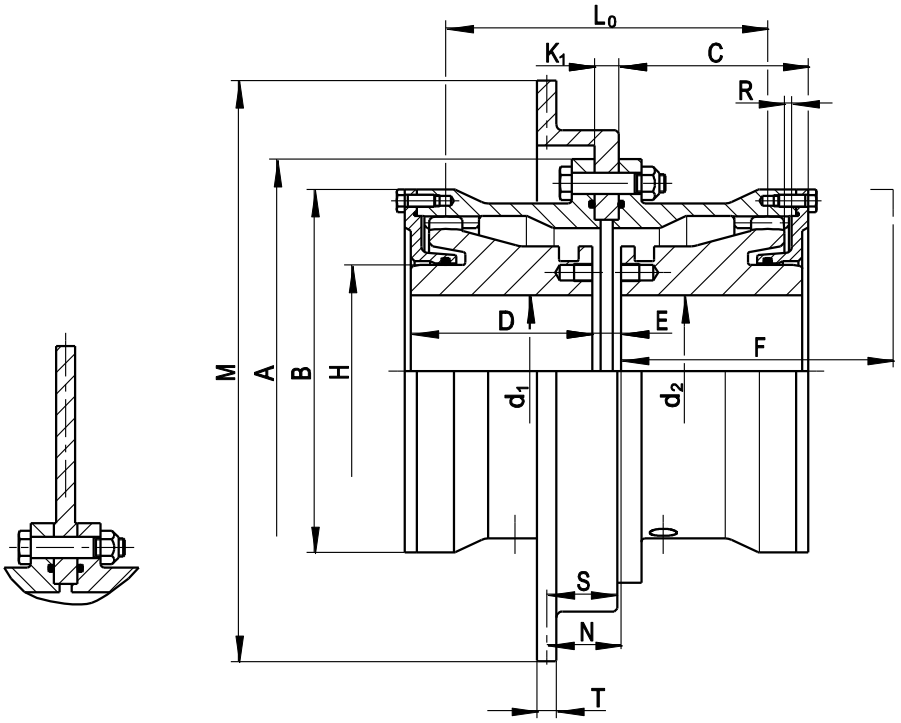
Size	Brake disc diameter M		
	mm	mm	mm
30	200	250	-
40	200	250	315
50	200	250	315
60	250	315	400
70	250	315	400
80	315	400	-
90	315	400	500
100	315	400	500
110	400	500	630
125	400	500	630
140	500	630	710
160	500	630	710
180	630	710	-
200	630	710	-

Tab. 12: Recommended assignment of SBD couplings to brake discs

Brake disc dimensions			Mass moment of inertia [1]	Weight [1]
M	T	K_1		
mm	mm	mm	kgm^2	kg
200	75	8	0.033	4.22
250	95	9	0.09	7.25
315	118	11	0.28	13.5
400	150	14	0.9	28
500	190	18	2.35	45
630	236	22	7.5	94
710	265	22	12.5	123
[1] Weights and mass moment of inertia relating to the largest coupling size assigned.				

Tab. 13: Dimensions for the SBD brake discs

12.2.9 Dimensions for the SBT coupling



B376340-1

Size	Nominal torque	Speed[5]	Bore hole $d_1;d_2$		Dimensions										Max. static radial displacement $\Delta K_{r\,max}$[1]	Mass moment of inertia[2]	Weight[2]
	T_{KN}	rpm	min	max	A	B	C	D	E	F[3]	H	N	R[4]	L_0			
	kNm	min^{-1}	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
30	0.95	7500	12	34	118	92	53	50	K1+3	75	45	36.15	2	K_1+75	1.95	0.007	4.4
40	2.1	6900	22	46	145	115	62.5	60	K1+3	90	60	36.15	2	K_1+94	2.70	0.016	7.4
50	3.5	6300	22	58	165	135	72.5	70	K1+4	110	75	49.65	2	K_1+112	3.00	0.029	11.1
60	5.9	5900	28	70	200	160	84.5	80	K1+5	120	90	50.15	2	K_1+131	3.45	0.075	18.3
70	9	5400	28	78	220	178	93.5	90	K1+5	130	100	50.15	2	K_1+147	3.90	0.13	25.4
80	13	5000	32	92	240	196	103.5	100	K1+5	150	120	50.15	2	K_1+165	4.35	0.19	31.4
90	18	4700	32	100	270	225	115.5	110	K1+5	170	130	50.15	3	K_1+181	4.80	0.37	46
100	23	4300	55	110	280	240	125.5	120	K1+7	180	140	51.15	3	K_1+201	5.25	0.47	54
110	30.5	4000	65	120	310	265	135	130	K1+6	190	155	50.65	3	K_1+216	5.70	0.81	72
125	42	3700	75	138	340	295	157.5	150	K1+11	215	175	53.15	3	K_1+251	6.45	1.31	100
140	61	3400	85	156	390	325	172.5	165	K1+11	230	200	53.15	3	K_1+277	7.20	2.35	140
160	90	3100	120	180	435	370	199	190	K1+14	270	230	54.65	3	K_1+322	8.40	4.2	198
180	130	2900	140	200	480	415	225	220	K1+16	300	260	55.65	3	K_1+370	9.60	7.4	283
200	189	2700	160	225	545	465	252.5	245	K1+19	340	290	57.15	4	K_1+413	10.80	14	417

[1] Relating to a permissible angular displacement of $\Delta K_{w\,perm.}$=1.5° for each coupling half. These values only apply to the couplings, not to the braking equipment.
[2] Values for the complete coupling without brake disc for bore hole d_1, d_2 max.
[3] The dismounting dimension F is required for the vertical installation and removal of the machine and for changing the O-rings.
[4] Check the clearance R with the axial clearance for the brake clamps.
[5] Speed n_{max} depends on the permissible circumferential speed of the brake disc. Observe the brake manufacturer's specifications!
K_1, M, S, T seePage 69

Size	Brake disc diameter M (nominal size)		
	mm	mm	mm
30	300	-	-
40	300	-	-
50	350	-	-
60	400	460	515
70	400	460	515
80	460	515	610
90	460	515	610
100	515	610	710
110	515	610	710
125	610	710	810
140	610	710	810
160	710	810	915
180	710	810	915
200	810	915	-

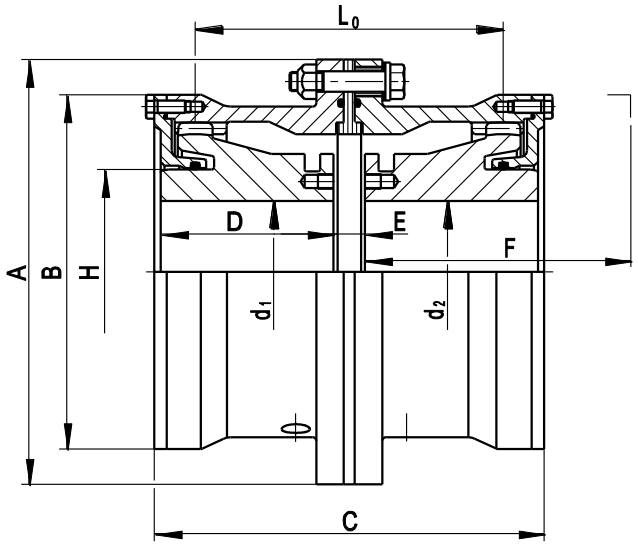
Tab. 14: Recommended assignment of SBT couplings to brake discs

Brake disc dimensions						
Nominal size M mm	**Actual size M** mm	**T** mm	**K_1** mm	**S** mm	**Mass moment of inertia**[1] **kgm²**	**Weight**[1] **kg**
300	300	12.7	8	34.65	0.099	6.7
350	356	12.7	10	47.65	0.19	10.0
400	406	12.7	13	47.65	0.30	12.0
460	457	12.7	16	47.65	0.48	16.0
515	514	12.7	16	47.65	0.57	20
610	610	12.7	16	47.65	1.5	26
710	711	12.7	18	47.65	2.9	39
810	812	12.7	23	47.65	5.8	61
915	915	12.7	23	47.65	10	92

[1] Weights and mass moment of inertia relating to the largest coupling size assigned.

Tab. 15: Dimensions for the SBT brake discs

12.2.10 Dimensions for the SBi coupling



B376337-2

Size	Nominal torque	Speed	Bore hole d1;d2		Dimensions								Max. static radial displacement $\Delta K_{r\,max}$ [1]	Mass moment of inertia [2]	Weight [2]
	T_{KN}	n_{max}	min	max	A	B	C	D	E	F [3]	H	L_0			
	kNm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kgm^2	kg
40	2.1	6900	22	46	145	115	135	60	9	90	60	100	2.70	0.017	8
50	3.5	6300	22	58	165	135	155	70	9	110	75	117	3.00	0.033	11.8
60	5.9	5900	28	70	200	160	180	80	11	120	90	137	3.45	0.082	19.2
70	9	5400	28	78	220	178	203	90	12	130	100	154	3.90	0.133	26.4
80	13	5000	32	92	240	196	223	100	12	150	120	172	4.35	0.2	32.5
90	18	4700	32	100	270	225	248	110	15	170	130	191	4.80	0.38	50
100	23	4300	55	110	280	240	268	120	15	180	140	209	5.25	0.49	57
110	30.5	4000	65	120	310	265	289	130	15	190	155	225	5.70	0.82	75
125	42	3700	75	138	340	295	333	150	18	215	175	258	6.45	1.35	104
140	61	3400	85	156	390	325	363	165	18	230	200	284	7.20	2.41	147
160	90	3100	120	180	435	370	418	190	20	270	230	328	8.40	4.3	208
180	130	2900	140	200	480	415	470	220	20	300	260	374	9.60	7.5	295
200	189	2700	160	225	545	465	527	245	22	340	290	416	10.80	14.1	422

[1] Relating to a permissible angular displacement of $\Delta K_{w\,perm.}$=1.5° for each coupling half.
[2] Values for the complete coupling for bore hole d_1, d_2 max.
[3] The dismounting dimension F is required for vertical installation and dismantling of the machine and for changing the O-rings.

12.3 Tightening torques

12.3.1 Tightening torques for self-sealing screw plugs

Self-sealing screw plugs	Tightening torque
M8x1	7 Nm
M10x1	15 Nm
M12x1.5	18 Nm

Tab. 16: Tightening torques for self-sealing screw plugs

12.3.2 Tightening torques for screws used by couplings in the insulated version

Thread	Tightening torque (Nm)	Thread	Tightening torque (Nm)
M5	4	M18	195
M6	6.7	M20	275
M8	16.7	M22	365
M10	33	M24	470
M12	57	M27	700
M14	90	M33	1250
M16	140	M36	On request

Tab. 17: Tightening torques for fitted bolts in insulating bushes (friction coefficient μ = 0.14)

12.3.3 Tightening torques for other screws

Thread	Tightening torque (Nm)	Thread	Tightening torque (Nm)
M5	6	M18	290
M6	10	M20	410
M8	25	M22	550
M10	49	M24	710
M12	86	M27	1050
M14	135	M33	1900
M16	210	M36	2450

Tab. 18: Tightening torques for screws (friction coefficient μ = 0.14)

12.4 Lubricants

Lubricants	
Lubricating oil or lubricating grease	If nothing else is stipulated in the dimension sheet, then as per "Table of lubricants for Curved Tooth Couplings with lubricant filling".
All lubricants used have to be suitable for the temperature range.	
Temperature range	- 20°C to + 90°C Higher temperatures only following consultation with RENK AG (Rheine plant).

Tab. 19: Lubricants

Size	Total quantity of lubricant											
	SB, TS		SBR, TUR		SBG, TSG		SRG, TURG		SBD, SBT		SBi	
	kg	litres	kg	litres	kg	litres	kg	litres	kg	litres	kg	litres
30	0.09	0.03	0.08	0.08	0.09	0.04	0.09	0.09	0.09	0.03	0.09	0.04
40	0.09	0.04	0.16	0.16	0.10	0.06	0.17	0.17	0.09	0.04	0.10	0.06
50	0.17	0.07	0.26	0.26	0.18	0.09	0.27	0.27	0.17	0.07	0.18	0.09
60	0.25	0.11	0.43	0.43	0.26	0.13	0.45	0.45	0.25	0.11	0.26	0.13
70	0.35	0.15	0.57	0.57	0.36	0.16	0.59	0.59	0.35	0.15	0.36	0.16
80	0.40	0.20	0.74	0.74	0.41	0.21	0.77	0.77	0.40	0.20	0.41	0.21
90	0.60	0.30	1.2	1.2	0.62	0.32	1.3	1.3	0.60	0.30	0.62	0.32
100	0.75	0.35	1.4	1.4	0.77	0.37	1.5	1.5	0.75	0.35	0.77	0.37
110	1.0	0.45	1.8	1.8	1.1	0.53	1.9	1.9	1.0	0.50	1.1	0.53
125	1.3	0.65	2.4	2.4	1.4	0.68	2.5	2.5	1.3	0.65	1.4	0.68
140	1.6	0.85	3.1	3.1	1.7	0.9	3.2	3.2	1.6	0.85	1.7	0.9
160	2.6	1.4	4.5	4.5	2.7	1.5	4.7	4.7	2.6	1.4	2.7	1.5
180	3.3	1.8	7.0	7.0	3.4	1.9	7.2	7.2	3.3	1.8	3.4	1.9
200	4.8	2.5	10.7	10.7	4.9	2.6	11.0	11.0	4.8	2.5	4.9	2.6
220	5.0	2.5	11.5	11.5	5.2	2.8	11.8	11.8	-	-	5.2	2.8
240	7.0	3.5	12.5	12.5	7.3	3.5	12.8	12.8	-	-	7.3	3.5
260	8.0	4.0	14.0	14.0	8.3	4.0	14.4	14.4	-	-	8.3	4.0
280	10.0	6.0	17.0	17.0	10.5	6.0	17.5	17.5	-	-	10.5	6.0
300	11.0	8.0	20.0	20.0	11.5	8.0	21.5	21.5	-	-	11.5	8.0
320	13.0	9.0	24.0	24.0	13.5	9.0	22.0	22.0	-	-	13.5	9.0
340	20.0	11.0	28.0	28.0	21.0	11.0	29.0	29.0	-	-	21.0	11.0
360	26.0	12.0	-	-	27.0	12.0	-	-	-	-	-	-
380	29.0	13.0	-	-	30.0	13.0	-	-	-	-	-	-
400	32.0	15.0	-	-	33.0	15.0	-	-	-	-	-	-

Tab. 20: SB lubricant quantity

Size	Lubricant quantity without spacer				Lubricant quantity per 10 mm spacer			
	SBL, SBZ, TSL, TSZ		SRL, TURL		SBL		SRL	
	kg	litres	kg	litres	kg	litres	kg	litres
30	0.09	0.04	0.09	0.09	0.002	0.0016	0.0058	0.0054
40	0.10	0.06	0.17	0.17	0.0019	0.0015	0.0056	0.0052
50	0.18	0.09	0.27	0.27	0.0037	0.0027	0.014	0.013
60	0.26	0.13	0.45	0.45	0.0053	0.0033	0.025	0.023
70	0.36	0.16	0.59	0.59	0.0058	0.0038	0.015	0.014
80	0.41	0.21	0.77	0.77	0.0095	0.0065	0.045	0.042
90	0.62	0.32	1.3	1.3	0.012	0.0075	0.056	0.052
100	0.77	0.37	1.5	1.5	0.014	0.0097	0.058	0.054
110	1.1	0.53	1.9	1.9	0.029	0.018	0.11	0.099
125	1.4	0.68	2.5	2.5	0.032	0.022	0.13	0.12
140	1.7	0.9	3.2	3.2	0.036	0.026	0.14	0.13
160	2.7	1.5	4.7	4.7	0.032	0.022	0.12	0.11
180	3.4	1.9	7.2	7.2	0.069	0.049	0.28	0.26
200	4.9	2.6	11.0	11.0	0.035	0.025	0.11	0.1
220	5.2	2.8	11.8	11.8	-	-	-	-
240	7.3	3.5	12.8	12.8	-	-	-	-
260	8.3	4.0	14.4	14.4	-	-	-	-
280	10.5	6.0	17.5	17.5	-	-	-	-
300	11.5	8.0	21.5	21.5	-	-	-	-
320	13.5	9.0	22.0	22.0	-	-	-	-
340	21.0	11.0	29.0	29.0	-	-	-	-

Tab. 21: Lubricant quantity for SB coupling with spacer

If spacers are used, then an additional amount of lubricant is only required if the spacer is not sealed by bottom parts.
All spacers with a length greater than 400 mm have bottom parts.

In couplings with a spacer, you can calculate the total amount of lubricant using two values Tab. 21:

Total amount of lubricant =
quantity of lubricant without spacer + (length in mm / 10 mm) • Additional quantity of lubricant for every 10 mm spacer.

Example

SBL 100 coupling, spacer L = 200 mm

Lubricant quantity for SBL 100:	0.75 kg
Lubricant quantity for spacer:	(200 mm / 10 mm) • 0.014 kg = 0.28 kg
Total quantity of lubricant:	0.75 kg + 0.28 kg = 1.03 kg

Size	Grease quantity		Oil quantity					
				Low speed			High speed	
	upper half	lower half	n_{max}	upper half	lower half	n_{max}	upper half	lower half
	kg	kg	rpm	litres	litres	rpm	litres	litres
30	0.07	0.016	1300	0.07	0.016	7500	0.04	0.016
40	0.095	0.025	1300	0.095	0.025	6900	0.05	0.025
50	0.17	0.07	1300	0.17	0.07	6300	0.06	0.07
60	0.29	0.11	900	0.29	0.11	5900	0.13	0.11
70	0.36	0.15	900	0.36	0.15	5400	0.16	0.15
80	0.50	0.21	900	0.50	0.21	5000	0.22	0.21
90	0.78	0.31	650	0.78	0.31	4700	0.35	0.31
100	0.98	0.43	650	0.98	0.43	4300	0.40	0.43
110	1.3	0.57	650	1.3	0.57	4000	0.54	0.57
125	1.6	0.70	650	1.6	0.70	3700	0.68	0.70
140	2.1	0.93	500	2.1	0.93	3400	0.90	0.93
160	3.1	1.3	500	3.1	1.3	3100	1.3	1.3
180	4.5	1.5	500	4.5	1.5	2900	2.0	1.5
200	6.8	2.3	500	6.8	2.3	2700	2.8	2.3

Tab. 22: Amount of lubricant for VSB (for vertical type)

12.5 Parts list and part numbers

12.5.1 Parts list and spare parts list

Part no.	Designation	Type									
		SB TS	SBR TUR	SBL, SBZ TSL, TSZ	SRL TURL	SBG TSG	SRG TURG	SBD	SBT	VSB	SBi
9010	Housing A	•	•	•	•	•	•	•	•	•	•
9020	Housing B	•	•	•	•	•	•	•	•	•	•
9030	Hub A	•	•	•	•	•	•	•	•	•	•
9040	Hub B	•	•	•	•	•	•	•	•	•	•
9050	Cover A	•	•	•	•	•	•	•	•	•	•
9060	Cover B	•	•	•	•	•	•	•	•	•	•
9070	Flange A					•	•				
9080	Flange B					•	•				
9090	Intermediate shaft					•	•				
9100	Spacer			•	•						
9110	Retaining ring		•		•		•				
9120	Intermediate disc									•	
9125	Insulating disc										•
9126	Insulating washer										•
9140	Fitted bolt	•	•	•	•	•	•	•	•	•	•
9150	Hexagon head bolt	•	•	•	•	•	•	•	•	•	•
9160	Screw plug	•	•	•	•	•	•	•	•	•	•
9161	Screw plug									•	
9162	Screw plug									•	
9180	O-ring	•	•	•	•	•	•	•	•	•	•
9181	O-ring	•	•	•	•	•	•	•	•	•	•
9182	O-ring	•	•	•	•	•	•	•	•	•	•
9183	O-ring									•	
9370	Nut, self-locking	•	•	•	•	•	•	•	•	•	•
9530	Insulating bush										•
9570	Washer										•
9670	Brake disc							•	•		

Tab. 23: SB parts list and spare parts list

12.5.2 Figures with part numbers

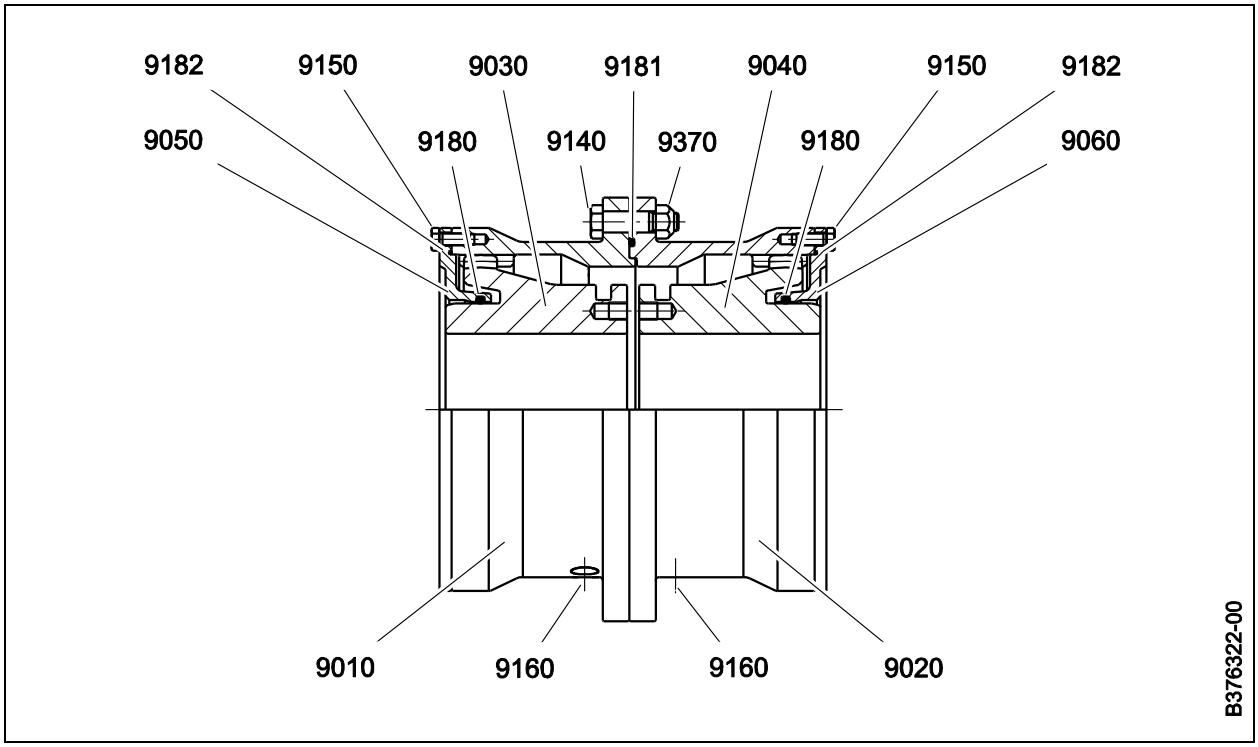


Fig. 21: Part numbers for the SB and TS couplings

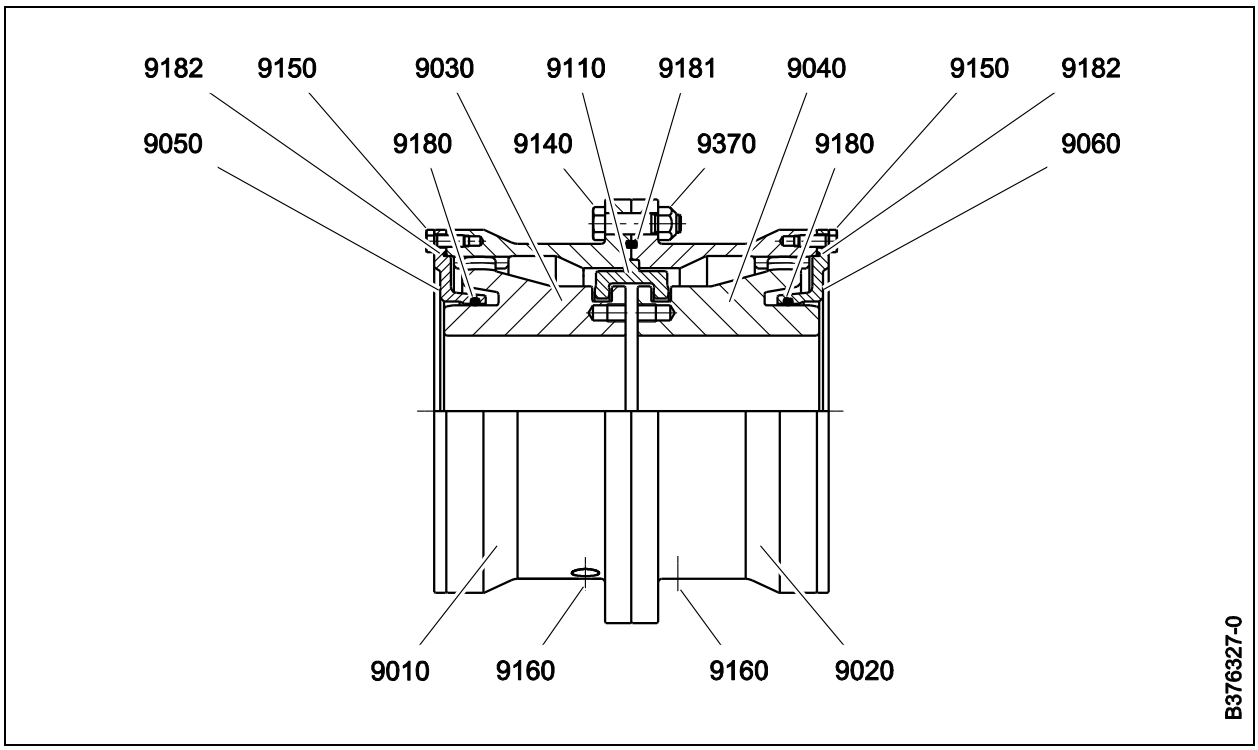


Fig. 22: Part numbers for the SBR and TUR couplings

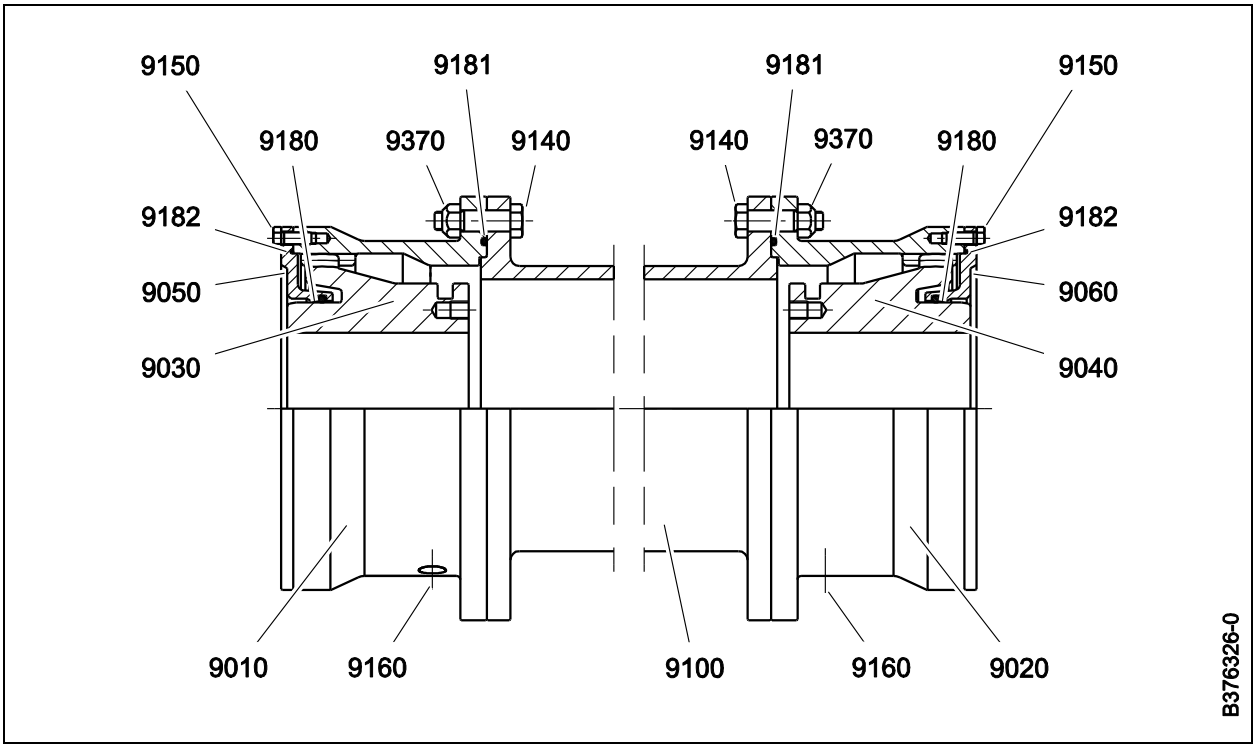


Fig. 23: Part numbers for the SBL, SBZ, TSL and TSZ couplings

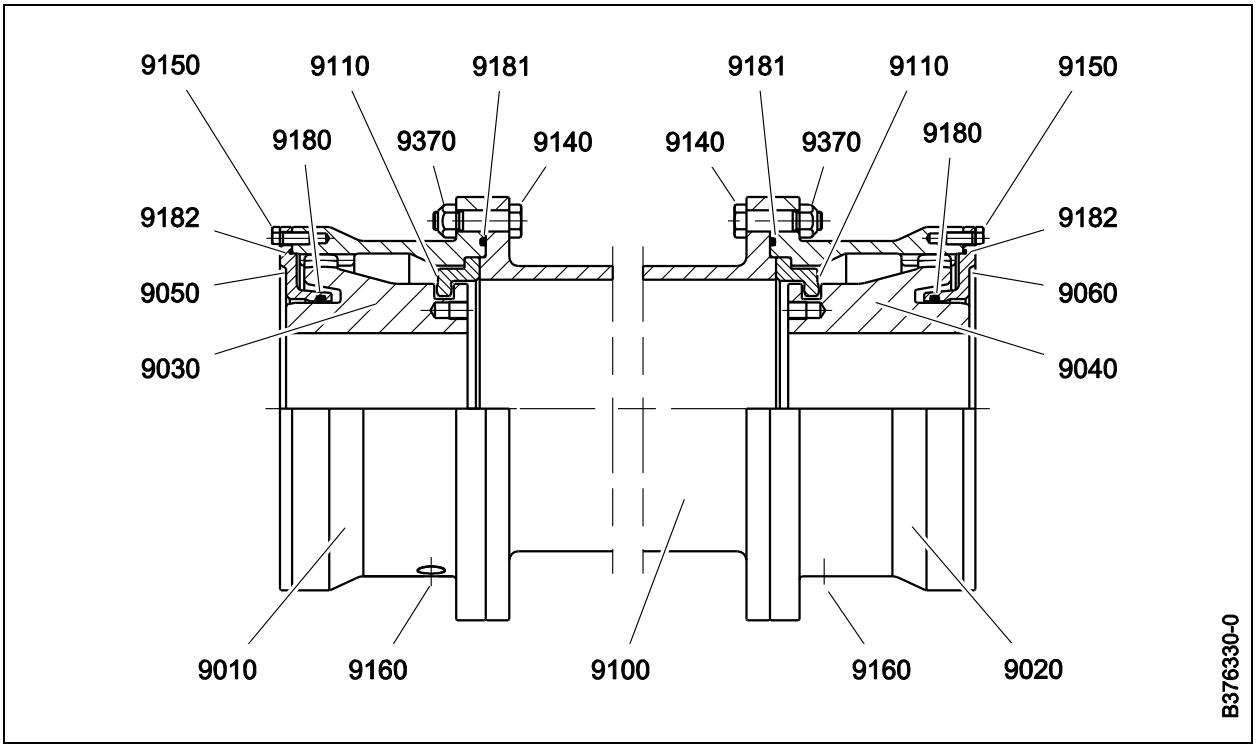


Fig. 24: Part numbers for the SRL and TURL couplings

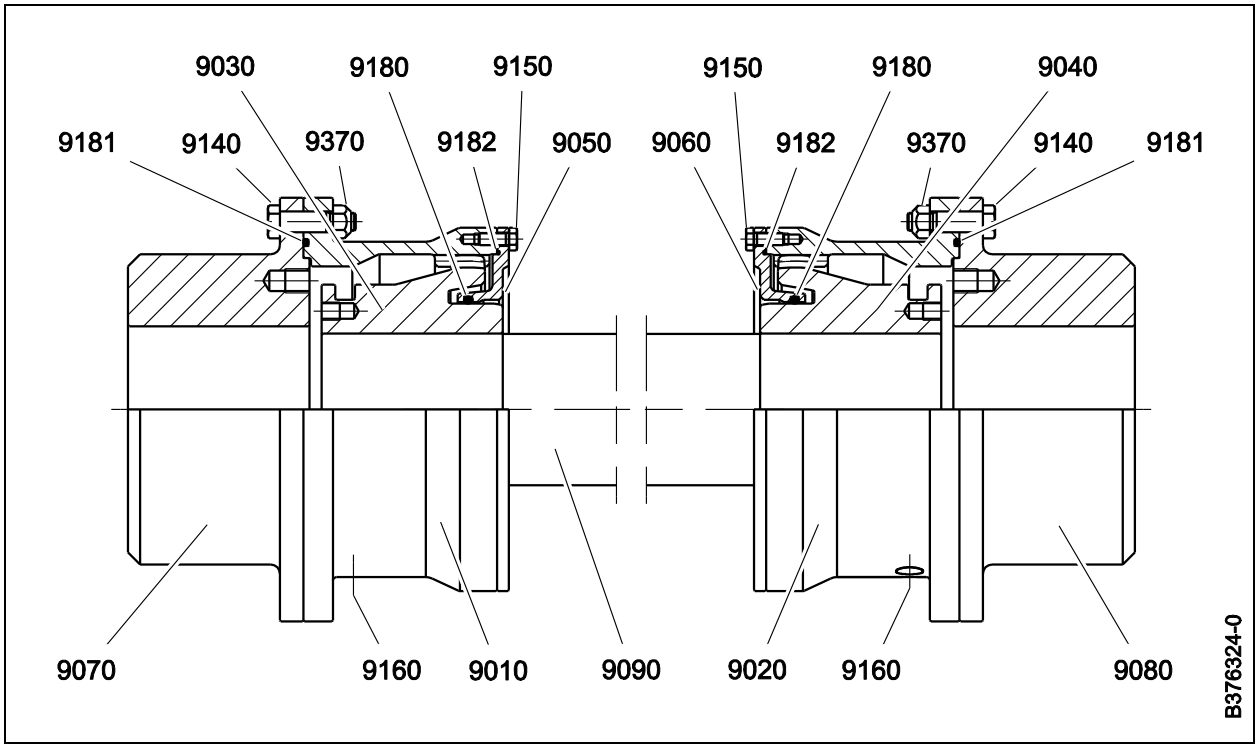


Fig. 25: Part numbers for the SBG and TSG couplings

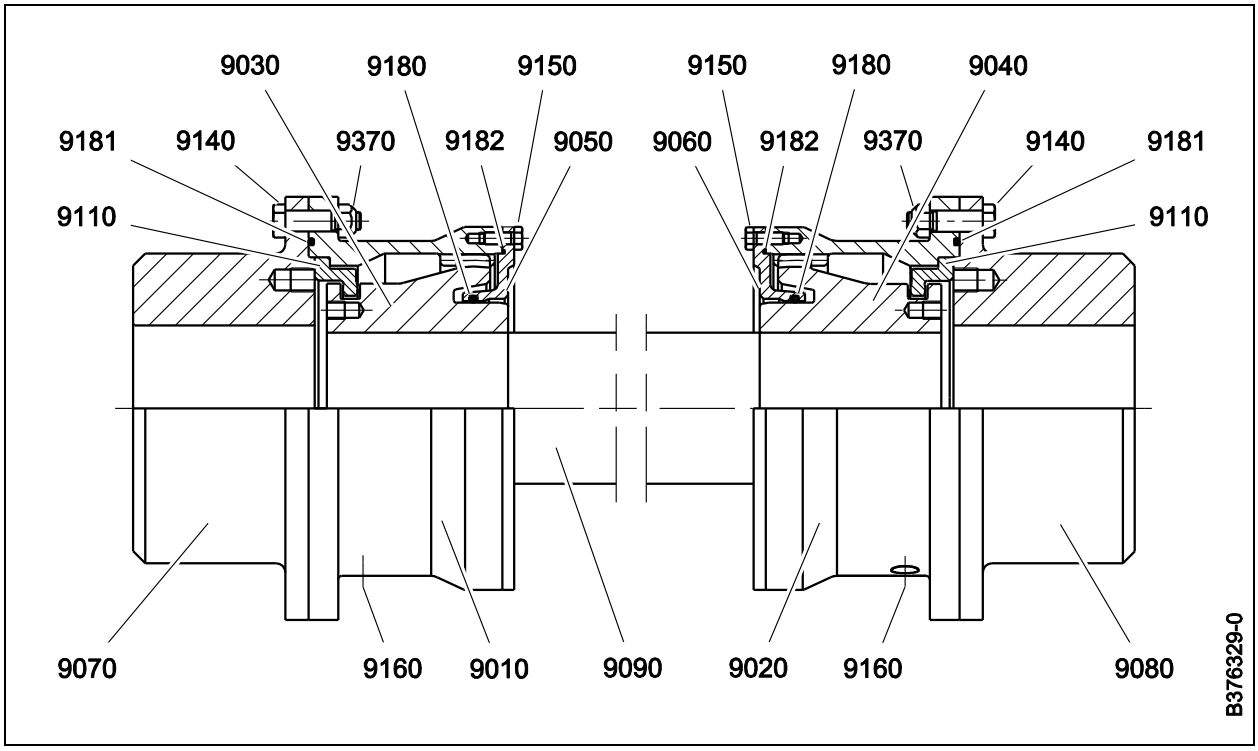


Fig. 26: Part numbers for the SRG and TURG couplings

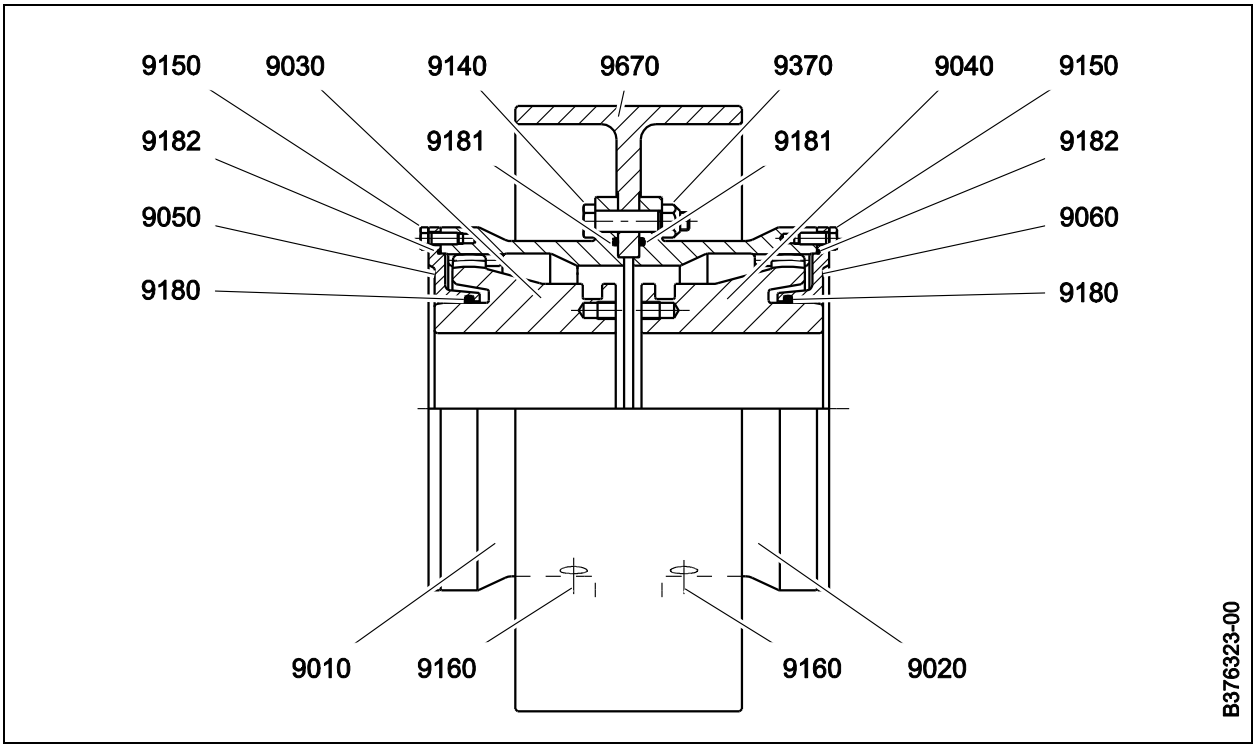


Fig. 27: Part numbers for the SBD coupling

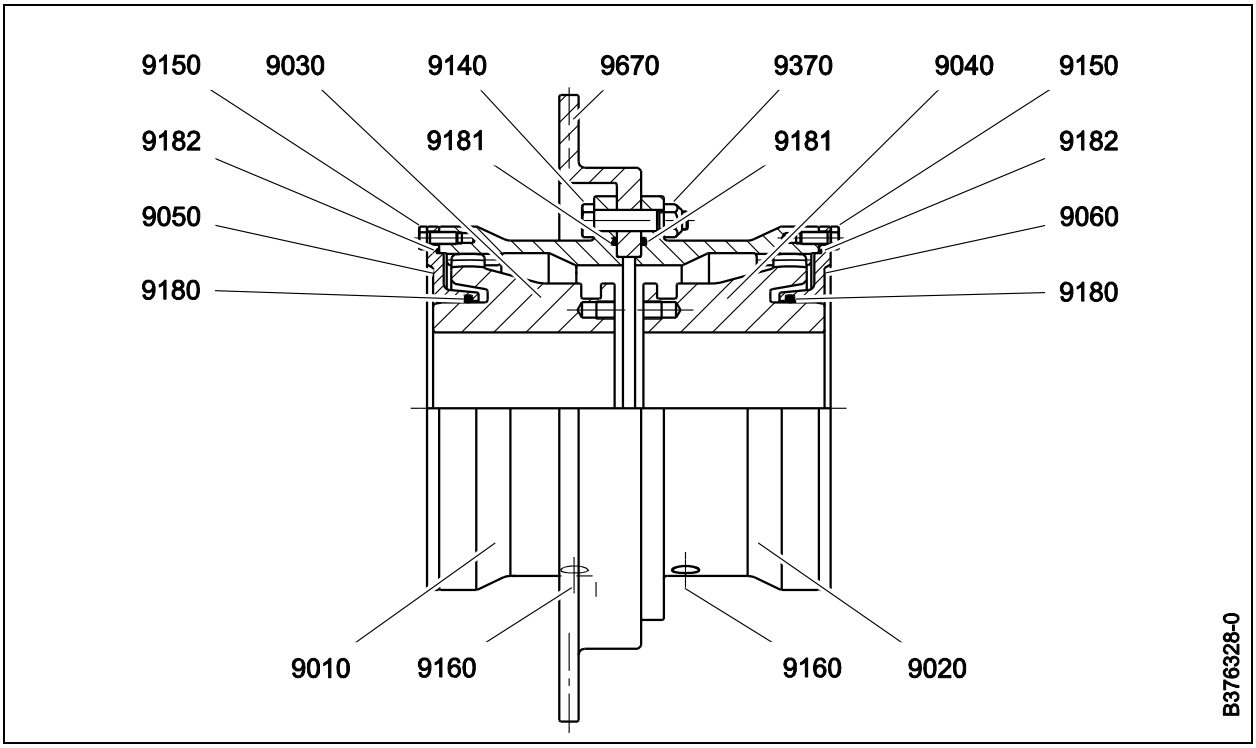


Fig. 28: Part numbers for the SBT coupling

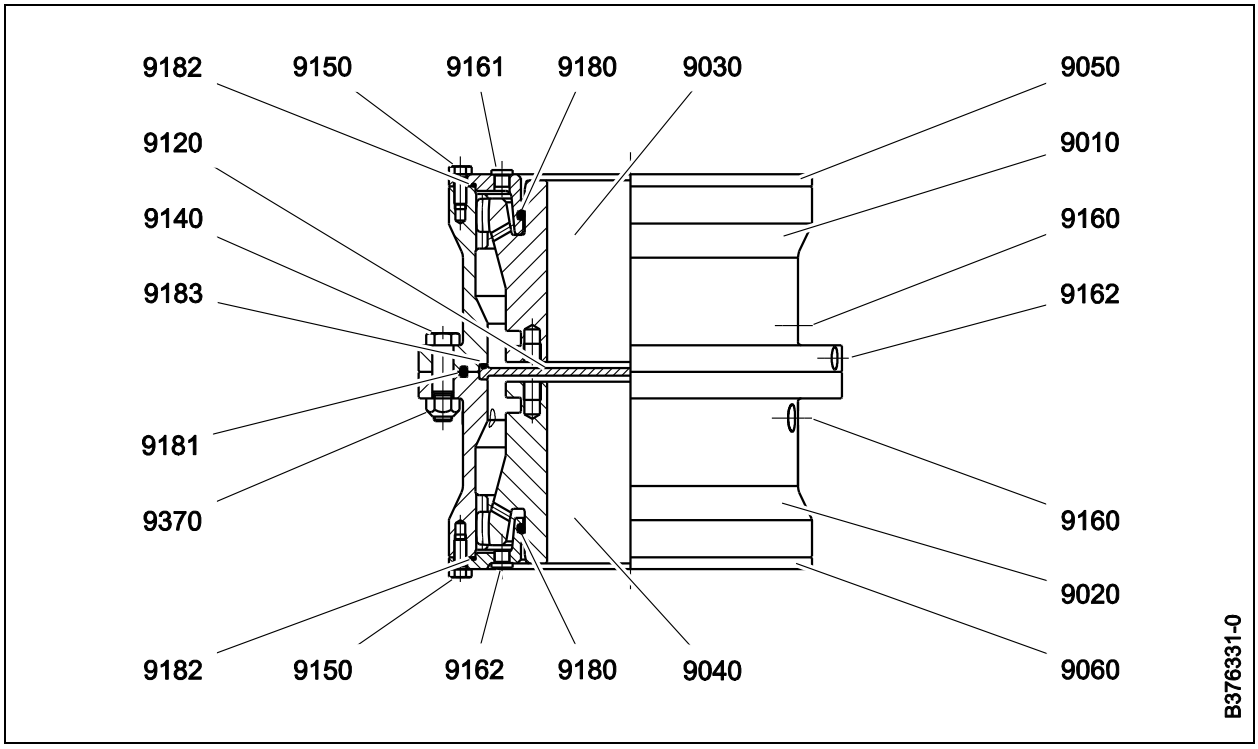


Fig. 29: Part numbers for the VSB coupling

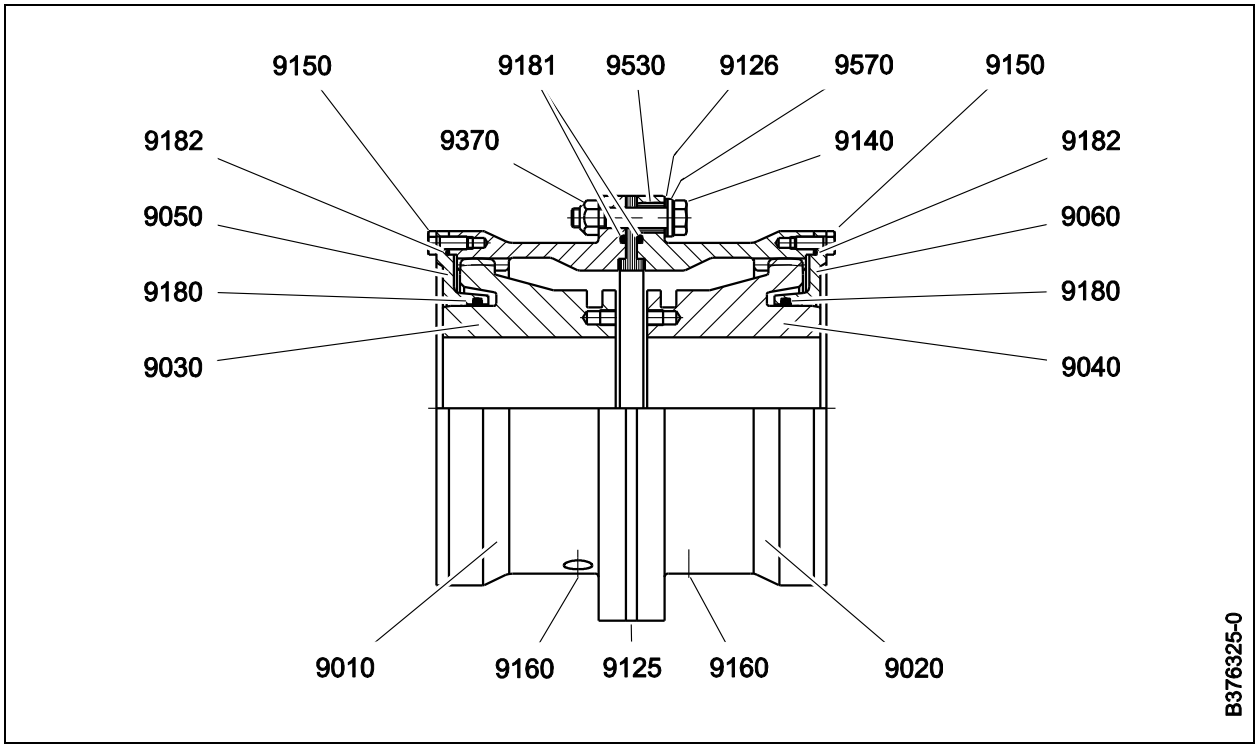


Fig. 30: Part numbers for the SBi coupling

13 Index of technical terms

Threaded extraction hole

Thread attached in a component. If, during removal, one component needs to be released from one facing it, then you can turn a screw into the threaded extraction hole.

Stepped cylindrical interference fit

The stepped cylindrical interference fit, also known as step seat, is a sub-type of the cylindrical interference fit. The seat length of the interference fit is divided up into two "steps" of the same length. The difference in the diameters of the two steps is usually 2 mm. The graduation facilitates the disassembly of the component, the axial path for release is halved.

Distance plates

Distance plates are used for short term operation of the prime mover without a coupled processing machine, e.g. for determining the direction of rotation of the electric motor. The distance plate takes over the axial and radial guidance for the housing when the coupling is open. Two segments need to be fastened to the housing for each coupling half using screws.

Pull up dimension

The pull up dimension is the axial path that the tapered hub needs to be pushed onto the shaft in order to be able to transmit the required torque. The pull up dimension is measured starting from the zero position.

Floating to the surface or bloating

Interference fits must be radially expanded for removal. The hub can be pulled off axially as soon as it has been fully released from the shaft and is floating on the oil film.

Expansion pressure

The oil is pressed into the interference fit so that the hub/flange can be expanded radially. When the required expansion pressure is reached, the hub is normally released from the shaft. The expansion pressure must not exceed the maximum permissible expansion pressure, otherwise the hub will be overstretched and may tear.

Dismounting dimension F

The dismounting dimension F identifies the minimum required space between the housing and the adjacent machine. This space is needed in order to install or remove the machine vertically, to change the O-ring or to remove the retaining ring.

Pressurised oil assembly with sealing ring

If tapered interference fits are used, it is possible to seal the large taper diameter using an O-ring (or O-ring/supporting ring combination). This prevents the fitted joint from opening too quickly, which would prevent the required pressure from building up. When this sealing type is used, it is not possible to detect that the fit is floating.

Flange

In contrast to the hub, the flange component does not have external teeth.

Joint clearance

The joint clearance is the gap (clearance) between the bore hole and shafts (after heating up). The joint clearance prevents the interference fit from sticking during the joining process. It is recommended that a joint clearance of 0.001 • d be calculated in.

Housing

External component with internal teeth. This is screwed together with a second housing or, for example, a spacer/intermediate shaft or flange.

Retaining ring

The retaining ring reduces the axial clearance in the coupling and enables axial guidance of the motor shaft via the shaft for the processing machine. The couplings with a retaining ring are limited in their ability to adjust shaft misalignments by contrast to the normal versions. All series with an "R" in the type designation include a retaining ring.

Gap

A gap indicates the obliquity of the fronts of the two hubs or flanges and thus the angular offset of the two shafts towards one another (see Fig. 8 on Page 28). The value "y-z" is the difference between the largest gap "y" and the smallest gap "z".

Hub

The hub is the coupling component with external teeth which, as a general rule (for other options, see Flange) is drawn onto the shaft of the prime mover or processing machine.

Zero position

The zero position is reached when the hub/flange (when it is not hot) has been pushed so far onto the shaft that the fitting surfaces lie on top of each other without pressure.

Zero setting

The zero setting (position of the number 0) is used for the correct assembly of the main coupling components. The two zeros must always be opposite each other on the components.

Oversize

Difference between the diameter of the bore hole and shaft diameter prior to joining in interference fits.

Surface for balancing run

The coupling elements are placed on these surfaces on the balancing machine.

14 Index

Kontaktadresse / contact address

RENK Aktiengesellschaft Werk Rheine
Rodder Damm 170
48432 Rheine
Germany

Phone: +49 5971 790 0
E-Mail: info.rheine@renk.biz
http: // www.renk.eu