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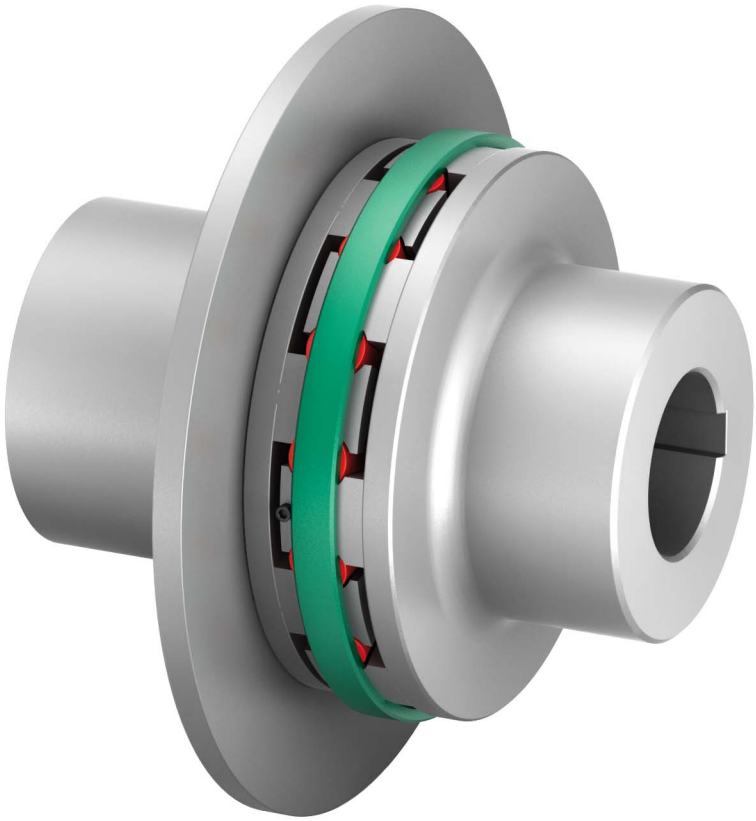
RINGFEDER

Elastomer Jaw Couplings
RINGFEDER® TNB BHD-BS

Installation and Operation Manual



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1 Safety Instructions

This installation and operation manual (IOM) is an essential component of the coupling delivery. Always keep this manual in a readily accessible place near the coupling.
The German version of this manual is the predominant and binding version.

Make sure that all persons being charged with the installation, operation, maintenance and repair of the coupling read and understand this IOM and that all instructions contained herein are carefully observed in order to:

- Avoid danger to life and limb of the user and third parties.
- Ensure the operational safety of the coupling.
- Preclude operation failures and environmental damage due to wrong handling and misuse.

The relevant instructions and regulations regarding safety at work and environmental protection must be observed while transporting mounting and dismounting the coupling.

The coupling may only be operated, mounted, serviced and maintained by authorised and trained personnel.

The user must take into account that the bolting elements of coupling parts may be adversely affected by the heat produced by a brake disk/ brake drum due to the resultant friction. Make sure that the combination of the employed brake lining with the material of the brake disk/ brake drum does not lead to sparks or impermissible thermal growth. The brake disk is normally made of steel, and the brake drum is normally made of cast iron with nodular graphite. In case of any doubt, please consult the supplier!

In the interest of further development, we reserve the right to carry out modifications serving the technical progress.

We do not assume any liability or warranty for any damage resulting from the use of accessories and parts that are not originally manufactured by RINGFEDER POWER TRANSMISSION.

2 Technical Description

The RINGFEDER® TNB BHD-BS coupling is a torsionally flexible, puncture proof claw cou-pling. It compensates for angular, radial and axial shaft misalignments within defined limits. The coupling transmits torque through elastic buffers loaded in compression. These buffers come in perbunan (PB) or polyurethane (Vk), as a standard VkR.
These elastic buffers dampen shocks and torsional vibrations and are resistant to oil. Buffers made of perbunan are electrically conductive.
When the intermediate part is removed (BHD-BS) respectively when the claw ring is pulled back (BHD-BS) it is easily possible to check the rotational direction of the drive.
The coupling is suitable for use in every direction of rotation and installation position.

2.1 Intended application

- The coupling must only be operated in normal industrial atmospheres. Since aggressive media may attack the coupling components, screws and elastic buffer rings, they represent a risk for the operational safety of the coupling. Consult RINGFEDER POWER
- TRANSMISSION in such cases.
- In order to ensure trouble-free and reliable operation, the coupling has to be sized according to the design specifications, e.g. according to DIN 740, part 2, (or acc. to Product Paper & Tech Paper ”Elastomer Jaw Couplings“), with a service factor appropriate for the service conditions.
- Except for the production of a finish bore with keyway, no further modifications are allowed to be carried out on the coupling!
- The coupling shall only be used and operated within the frame of the conditions as defined in the performance or delivery contract.
- Any change in the operation conditions or service parameters requires the verification of the coupling design.

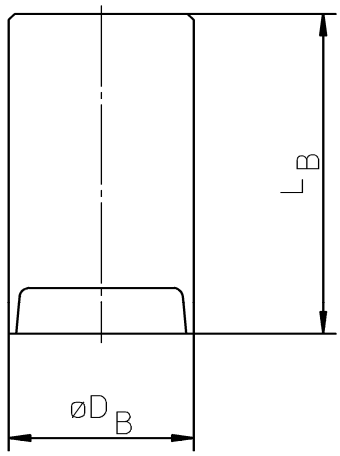
3 Coupling Marking

3.1 Marking of Elastic Buffers

The elastic buffers are labelled at the front end with:
- Coupling size and material code (Vk for Polyurethane or Pb for Perbunan)

- Pb82 = Perbunan with a hardness of approx. 82 Shore(A) / black
- VkR = Polyurethane with a hardness of approx. 93 Shore(A) / red
- VkW = Polyurethane with a hardness of approx. 96 Shore(A) / white

The table contains the size and quantity Z for each coupling:



Size	D_B [mm]	L_B [mm]	Z
240	40	49,5	10
300	50	63	10
350	50	70	12
400	55	79	12
450	55	79	14
500	60	104	14
550	60	104	16
600	60	104	18
650	65	113	18
700	70	139	16
800	70	139	20
900	70	139	24
1050	70	139	28
1275	70	139	34

In case of particularly high balance requirements, the elastic buffers are weight balanced per set for each coupling.
Do not mix these buffers with those of other couplings and do not replace single buffers of a set.

4 Storage

On receipt of the goods, immediately check that all parts are on hand and are as ordered. Shipping damage and / or missing parts have to be reported in writing.

The coupling parts can be stored as delivered in a dry place under roof at normal ambient temperatures for a period of 6 months. Storage for a longer time requires the application of a long-term preservation (please consult RINGFEDER POWER TRANSMISSION). The elastic buffers must not be ex-posed to ozonic media, direct sun light or intensive light sources with UV-light. The relative humidity must not exceed 65%. If the parts are properly stored, the quality characteristics of the elastic buffers remain almost unchanged for up to three years.

5 Construction

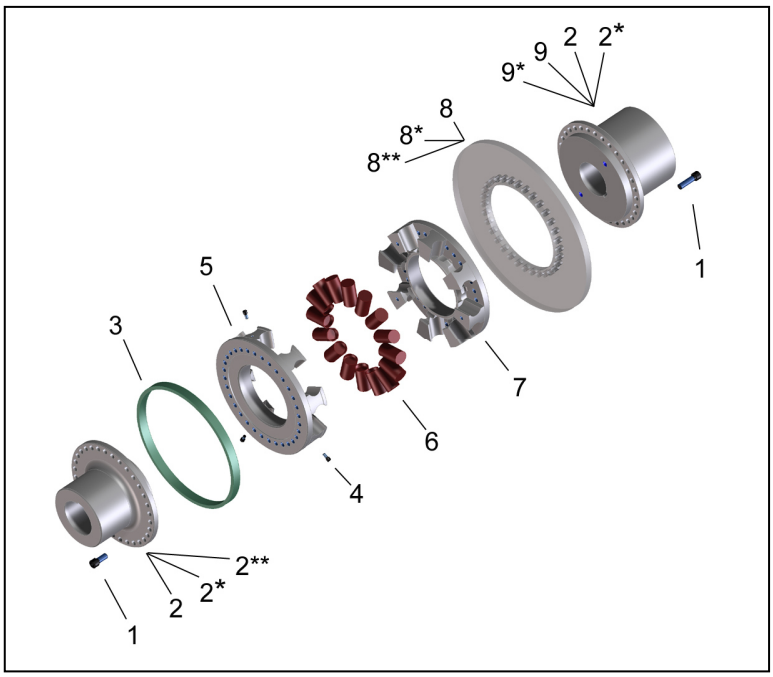


Fig. 1 Construction RINGFEDER® TNB BHD-BS

1	Cheese head screw DIN 912
2	Flanged hub BHDD part 411
2*	Flanged hub BHDD reinforced part 424
2**	Hidden flanged hub BHDDV part 423
3	Retaining ring part 408 / GFK
4	Retaining screw
5	Claw ring part 434 – with collar for retaining ring part 408
6	Elastic buffer part 043
7	Claw ring part 434
8	Brake disk part 505
8*	Brake disk deducted part part 505
8**	Brake drum part 500
9	Flanged hub BHDD-BS part 419
9*	Flanged hub BHDDV-BS part 423

The different types arise from the combination of the different hub designs:

- BHDD-BS = 2 or 2* with 9
- BHDDV-BS = 2** with 9, 2 or 2* with 9*
- BHDDVV-BS = 2** with 9*
- BHDDV-BS-deducted = 2** with 2 or 2* and 8*
- BHDD-BS- deducted = 2 or 2* with 2 or 2* and 8*

Note:
Flanged hub (2,2*,2**) with Claw ring (5), as well as Claw ring (7), Brake disk / -drum (8,8*,8**) and Flanged hub (9,9*,2,2*,2**) are bolted to each other when supplied. Balanced parts are match marked to each other.

6 Technical Data

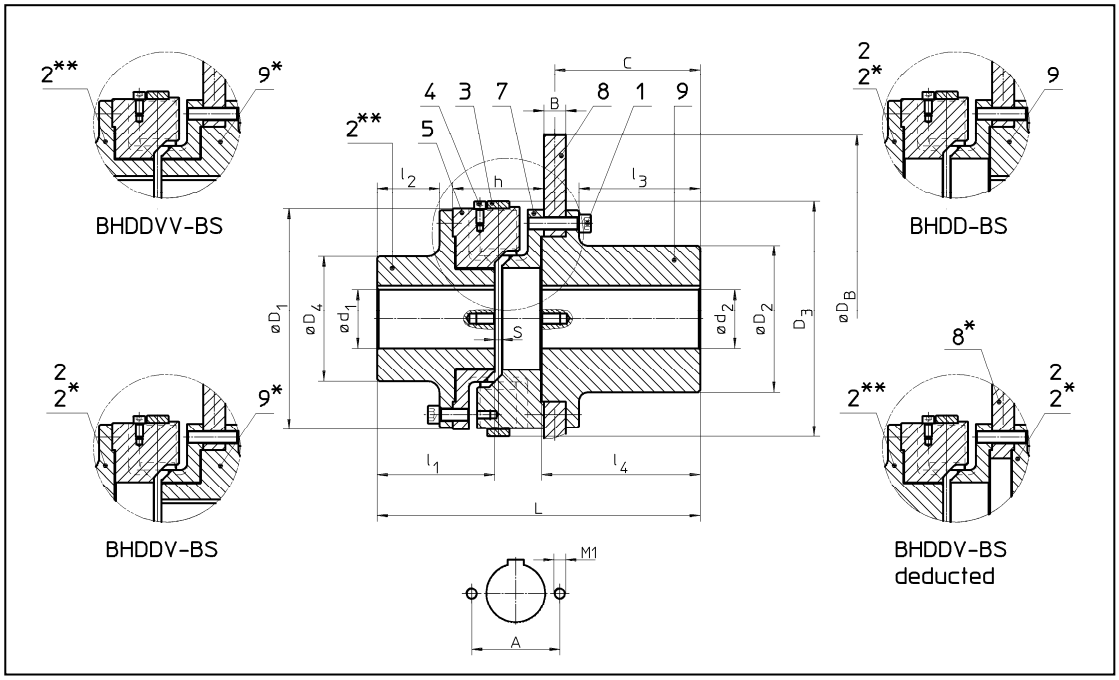


Fig. 2 RINGFEDER® TNB BHD-BS

Table 1 Technical Data RINGFEDER® TNB BHD-BS

Size BHD-BS		d_1 max [mm]	$d_{2,}$ max [mm]	D_1 [mm]	D_2 [mm]	D_3 [mm]	D_4	h [mm]	L [mm]	S [mm]
BHD	240	85	100	240	150	260	140	104	365	10
BHD	300	110	135	300	200	320	170	124	440	10
BHD	350	120	170	350	250	370	180	124	505	10
BHD	400	140	190	400	280	420	210	138	530	10
BHD	450	170	205	450	300	470	250	138	540	10
BHD	500	180	225	500	330	530	270	160	620	14
BHD	550	200	240	550	350	580	280	160	620	14
BHD	600	235	265	600	385	630	330	170	675	14
BHD	650	250	265	650	385	680	350	182	680	14
BHD	700	260	310	700	450	740	370	200	775	14
BHD	800	320	340	800	490	840	450	200	835	14
BHD	900	340	400	900	590	940	480	214	875	14

Size BHD-BS		l_1 [mm]	l_2 [mm]	l_3 [mm]	l_4 [mm]	Puller hole M1 [mm]	Puller hole A 2** [mm]	Puller hole A 9 [mm]	D_B [mm]	B [mm]	C [mm]	m [kg]
BHD	240	130	68	133	180	M16		125	Dependent on size of the brake disc or brake drum			
BHD	300	160	85	165	216	M16		175				
BHD	350	180	105	210	261	M16	145	220				
BHD	400	190	106	216	269	M20	170	245				
BHD	450	200	116	216	269	M20	210	265				
BHD	500	228	130	250	309	M24	215	290				
BHD	550	228	130	250	309	M24	245	310				
BHD	600	258	155	270	329	M24	290	340				
BHD	650	258	146	266	329	M27	310	340				
BHD	700	298	175	310	375	M30	315	400				
BHD	800	338	215	330	395	M30	380	440				
BHD	900	338	203	358	429	M30	400	540				

Table 2 Technical Data

Size		Standard design				For couplings with enlarged axial clearance with straight claw			
BHD-BS	n_{max} [min^{-1}]	Pb82		VkR		Pb82		VkR	
		T_{Knom} [Nm]	T_{Kmax} [Nm]	T_{Knom} [Nm]	T_{Kmax} [Nm]	T_{Knom} [Nm]	T_{Kmax} [Nm]	T_{Knom} [Nm]	T_{Kmax} [Nm]
300	Dependent on size of the brake disc or brake drum	2000	6000	6000	18000	65 %			
350		3400	10200	10500	31500				
400		5050	15150	16000	48000				
450		6850	20550	21000	63000				
500		10300	30900	35000	110000				
550		13200	39600	45000	135000				
600		16500	49500	55000	165000				
650		19700	59100	65000	195000				
700		26700	80100	90000	270000				
800		39000	117000	120000	360000				
900		54000	162000	180000	540000				
1050		73500	220500	245000	735000				
1275		108375	325125	361000	1083000				

The torques TKnom and TKmax. are valid for:
- Ambient temperatures of –30°C up to +30°C for Polyurethane (Vk),
- Ambient temperatures of –30°C up to +60°C for Perbunan (Pb),
- Operation within the range of the specified alignment values.

For determining the size of the coupling according to DIN 740, part 2, (or to Product Paper & Tech Paper ”Elastomer Jaw Couplings“) various factors have to be taken into account:
- the temperature factor Sυ in case of higher temperatures,
- the start-up factor Sz depending on the frequency of starts,
- the shock factor SA, SL depending on the service conditions.

For circumferential speeds above 22 m/s, referred to the nominal size of the coupling, we recommend balancing of the coupling.

7 Installation

7.1 To be observed prior to installation

- **Danger of injuries!**
- **Disconnect the drive before carrying out any work on the coupling!**
- **Secure the drive against unintentional re-start and rotation!**
- **Incorrectly tightened bolts can cause serious personal injuries and property damages!**
- **Assemble the coupling outside of the danger zone. Take care that suitable transportation means are at disposal and that the transportation ways are free of obstacles.**
  In compliance with accident prevention regulations, you are obliged to protect all freely rotating parts by means of permanently installed guards/ covers against unintentional contact and falling down objects.
- **The covers have to fulfil the requirements of protection type IP2X as a minimum.**
- **The covers have to be designed to prevent dust from depositing on the coupling.**
- **The cover must not contact the coupling or impair the proper function of the coupling.**

- Make sure that the speeds, torques and ambient temperatures as stated in chapter 6 ‘Technical Data’ are not exceeded.
- The maximum permissible bore diameters must not be exceeded.
- Check whether the shaft-hub connections safely transmit the occurring operating torques.
- The standard tolerance of RINGFEDER® TNB for finish bores is fit H7.
- Standard keyways comply with DIN 6885, sheet 1.
- Check the dimensions and tolerances of shafts, hub bores, keys and keyways.
- Set screws as required

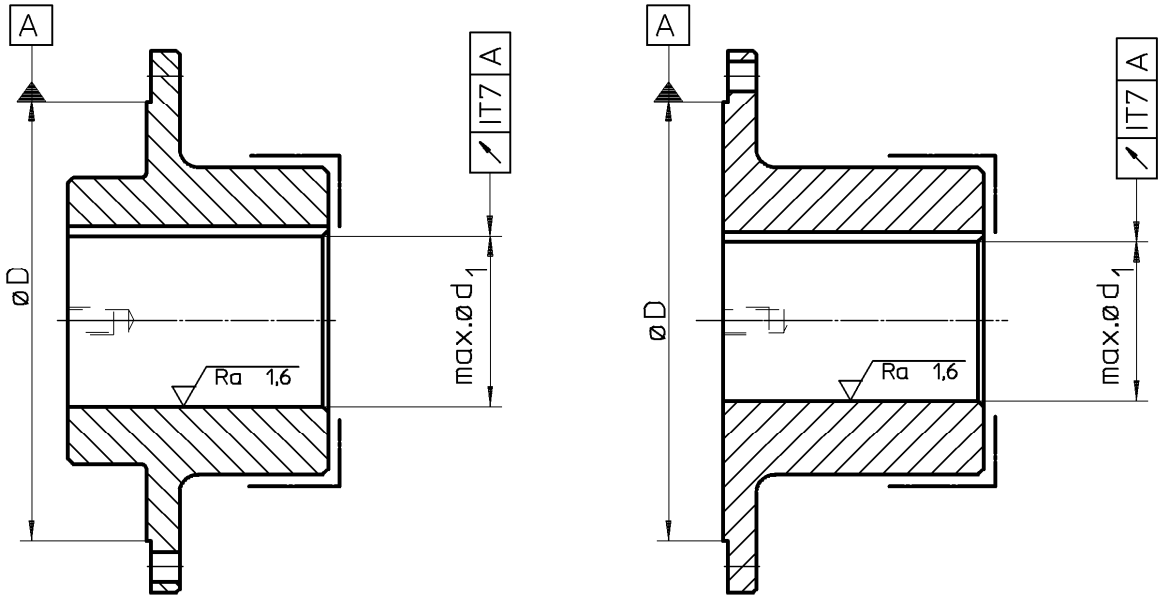
7.2 Finish Bores

The following procedure has to be observed to produce a finish bore in a coupling hub:

- Clean and remove all preservatives from the coupling hub.
- Mount the coupling hub in between the surfaces marked with ⌈ and carefully align the coupling hub.
- The values for ød1max/ ød2max listed in table 1 are valid for keyed connections according to DIN 6885/1 and must not be exceeded.
- Select the bore fit so that an interference fit such as H7/m6 results when mating it with the shaft tolerance.
- Axially lock the hub, for example by means of a setscrew on the back of the hub above the keyway.

Consult RINGFEDER POWER TRANSMISSION in case of other shaft-hub connections.

- **The stated maximum bore diameters are valid for keyed connections according to DIN 6885/1 and must not be exceeded.**
- **If these values are exceeded, the coupling can break.**
- **Flying off coupling fragments are a danger to life!**



7.3 Coupling Installation

- Unscrew the retaining screws at the retaining ring (Fig. 3, Pos.1) and deposit the ring on the appropriate shaft end (Fig 3, Pos. 2).
- Take out the elastic buffers (Fig 3, Pos. 3).
- Prior to installation, carefully clean the bores of the coupling hubs and the shaft ends. The surfaces must be clean, dry and free of grease.
- For larger couplings use suitable mounting tools and hoisting devices such as cranes or pulley blocks.
- Mount the coupling hubs in the proper position on the shaft ends (Fig 3, Pos.2).
- If coupling is installed vertically the hub with the shoulder for the retaining ring has to be mounted on the lower shaft end

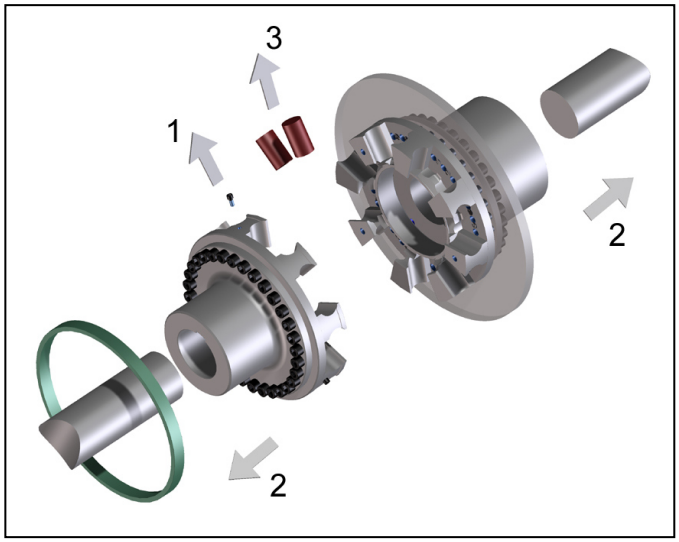


Fig. 3

Note:
To facilitate mounting, the hubs with bolted claw ring can be uniformly heated to 80°C to 120°C.

- **Warning!**
- **Always wear heat-resistant gloves to protect yourself against injuries due to hot coupling components**

- Mount the hubs in such a manner that the shaft ends are flush with the inner bore openings (Fig. 4).
  Observe deviant agreements, which may exist!
- When tightening setscrews, secure them with an adhesive, such as e.g. Loctite 222, to prevent the screws from working loose and dropping out.

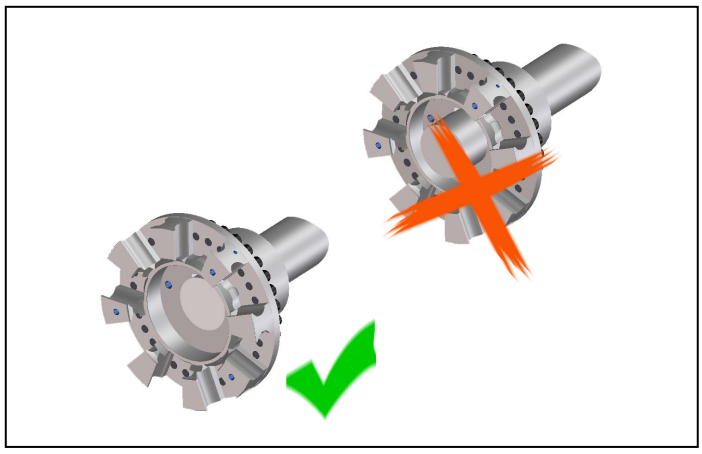


Fig. 4

ATTENTION!
Let the hot hubs cool down to ambient temperature, before inserting the buffers

- Push together the shaft ends with the mounted coupling halves while observing the mounting dimension ‘h’ acc. to table 6 (Fig. 8).
- To facilitate mounting, the elastic buffers can be coated with a lubricant (for ex. talcum for Perbunan Pb, or commercial roller bearing grease for polyurethane Vk).
- Mount the buffers with the **hollow pointing inwards** (Fig 5, Pos. 4).
- Push on the retaining ring until it contacts the hub face, so that the ring is seated centrically above the elastic buffers (Fig 5, Pos. 2).
- Secure the retaining ring with the retaining screws on the claws of the coupling hub. Tighten the retaining screws at the retaining ring (Fig. 5, Pos. 3) to the tightening torque M_A specified in table 3.
- Align the coupling in accordance with the instructions given in chapter 8 ‘Coupling Alignment’.

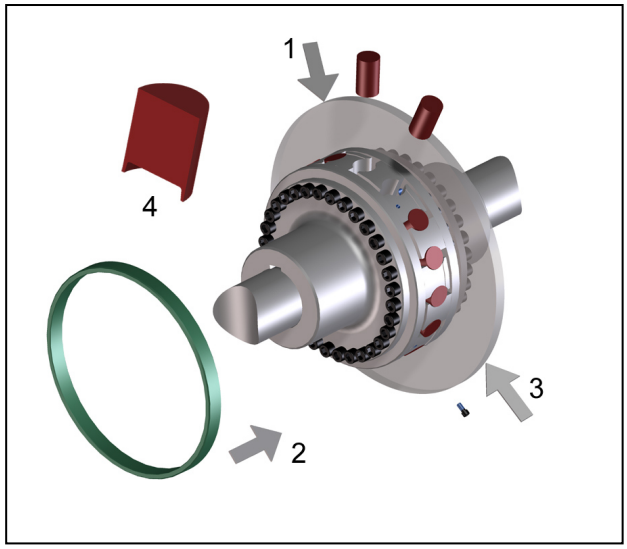


Fig. 5

Table 3 Tightening torque M_A for retaining ring screws:

BHDD.. Size	240	300	350	400	450	500	550	600	650	700	800	900
DIN 912 8.8	M10	M10	M10	M12	M12	M12	M12	M12	M12	M12	M12	M12
M_A [Nm]	49	49	49	86	86	86	86	86	86	86	86	86

8 Coupling Alignment

- **Danger of injuries!**
- **Disconnect the drive before carrying out any work on the coupling!**
- **Secure the drive against unintentional re-start and rotation!**
- **Note:**
- **Accurate alignment of the coupling prolongs the lifetime of the elastic buffers**
- **It is of utmost importance to observe the recommended alignment values. Exceeding the permissible misalignment values results in coupling damages and failures!**

- When aligning the cold equipment take into account the expected thermal growth of the components, so that the permissible misalignment values for the coupling are not exceeded in operation.
- Be aware that the coupling under misalignment imposes restoring forces on the adjacent shafts and bearings. Take into account that the larger the misalignment, the greater the restoring forces will be.
- The maximum permissible misalignment values stated in the tables 4 to 6 are guiding values. It is advisable not to fully utilize these values when aligning the equipment in order to have sufficient reserves for thermal growth, foundation settlings etc. during operation.
- In special applications involving high demands on quiet running characteristics or higher speeds, alignment accuracies of ≤ 0.1 mm may be necessary for the three misalignment levels.
- If the coupling is fitted into a closed housing or guard, so that re-alignment at a later point of time is no longer possible, make sure that the geometry and fitting accuracy of the contact faces ensure precise alignment of the shafts within the stated tolerances during operation.

8.1 Angular alignment ΔK_w

- Measure one complete rotation (360°) on the face of the outer diameter. Determine the largest deviation K_{w1} and the smallest deviation K_{w2} (Fig 6).
- Calculate the angular misalignment $\Delta K_w = K_{w1} - K_{w2}$.
- The values according to table 4 are valid for a reference speed of 1500 rpm.

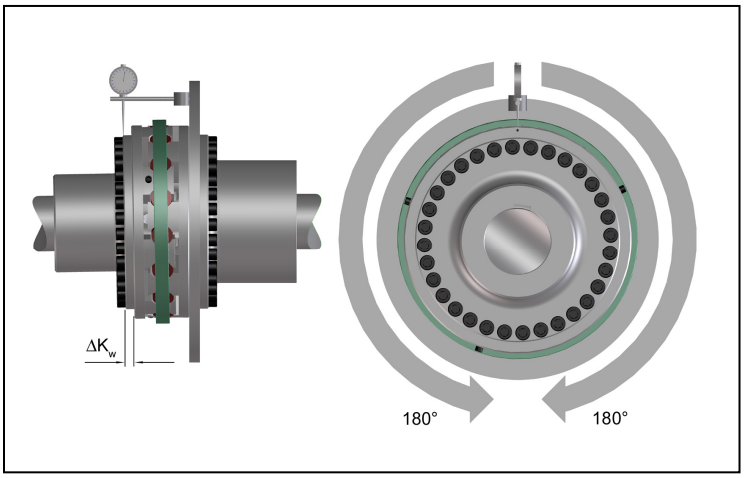


Fig. 6

Table 4 Recommended angular alignment values:

Size	240	300	350	400	450	500	550	600	650	700	800	900
$\Delta K_{w\,max}$ [mm]	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,25	1,25	1,25	1,25

8.2 Radial alignment ΔK_r

- Measure one complete revolution (360°). Determine the largest deviation K_{r1} and the smallest deviation K_{r2} (Fig 7).
- Calculate the radial misalignment $\Delta K_r = 0{,}5 \times (K_{r1} - K_{r2})$. Observe the preceding sign of the measured values.
- The values according to table 5 are valid for a reference speed of 1500 rpm.

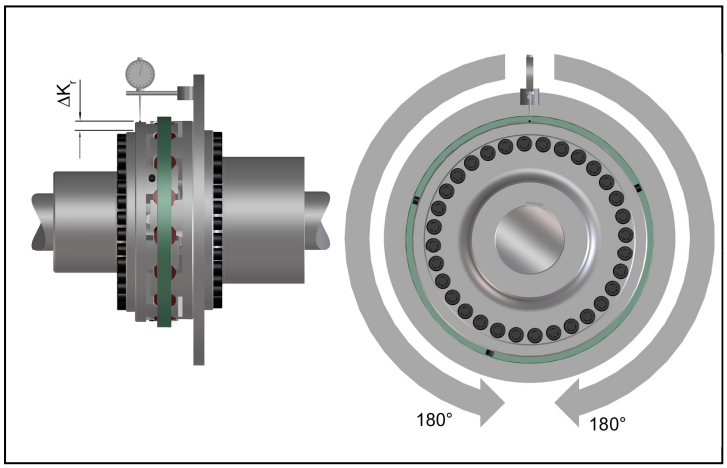


Fig. 7

Table 5 Recommended radial alignment values:

Size	240	300	350	400	450	500	550	600	650	700	800	900
$\Delta K_{r\,max}$ [mm]	0,25	0,30	0,35	0,35	0,40	0,50	0,55	0,55	0,55	0,55	0,65	0,70

8.3 Axial alignment

- Measure the axial flange distance ‘h’ according to fig. 8.
- When aligning observe the flange distance dimension ‘h’ with the max. permissible tolerance Δx according to table 6.

In operation, twice the misalignments which may occur due to, e.g., thermal growth are permissible at maximum.

ATTENTION!
If larger axial misalignments are expected in operation, contact RINGFEDER POWER TRANSMISSION.

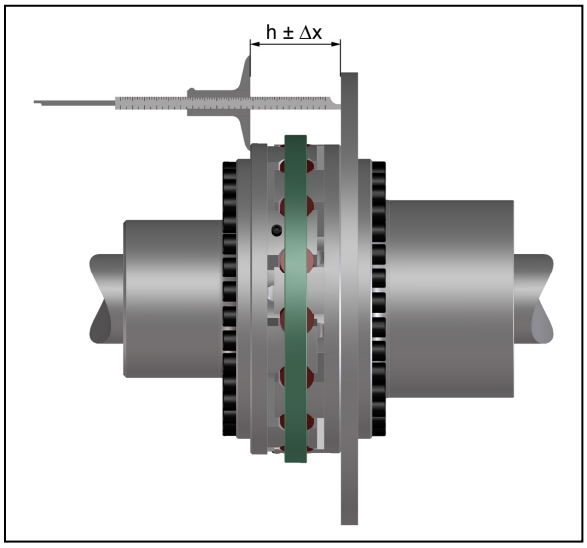


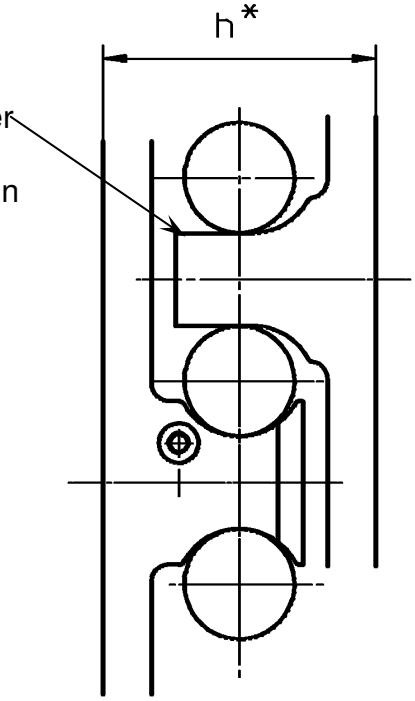
Fig. 8

Table 6 Recommended axial alignment values:

Size	240	300	350	400	450	500	550	600	650	700	800	900
h [mm]	104	124	124	138	138	160	160	170	182	200	200	214
Δx [mm]	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,7	0,7	0,7	0,7

8.4 Couplings with enlarged axial clearance

Couplings with straight claw parts in a claw ring allow a larger axial clearance at reduced coupling torques. Set the axial dimension ‘h*’ as specified in the order-related documentation and layout drawing!
As the elastic buffers are not enclosed by the claw geometry on one side, larger torsion angles result when torque is applied and at displacement of the coupling halves. Make sure to observe the max. permissible buffer wear for this design acc. to table 12!



If the coupling is operated at a higher speed than the reference speed of 1500 rpm, the recommended alignment values stated in the tables have to be reduced accordingly.

Example for coupling size BHD-BS 500 with an operation speed of 1800 rpm:

Ratio of reference speed to operation speed: 1500/1800 = 5/6.

Alignment values acc. to the tables for 1500 rpm:
ΔK_w = 1,0mm ΔK_r = 0,55mm ΔX = 0,5mm

New alignment values for 1800 rpm:
ΔK_w -new = ΔK_w x 5/6 = 1,0mm x 5/6 ΔK_w-new = 0,83mm
ΔK_r -new = ΔK_r x 5/6 = 0,55mm x 5/6 ΔK_r-new = 0,45mm
ΔX-new = ΔX x 5/6 = 0,5mm x 5/6 ΔX-new = 0,41mm

9 Operation

When operating the coupling, its specific technical data have to be carefully observed (see chapter 6 'Technical Data'). These values must never be exceeded without the prior written approval by RINGFEDER POWER TRANSMISSION.
In order to ensure trouble-free and reliable performance of the coupling, the coupling has to be designed according to the selection specifications, e.g. according to DIN 740, part 2, (or acc. to Product Paper & Tech Paper "Elastomer Jaw Couplings"), with a service factor appropriate to the service conditions. Any change in the service conditions or service parameters always necessitates the verification of the coupling design.

- **Danger of injuries!**
- **Disconnect the drive before carrying out any work on the coupling!**
- **Secure the drive against unintentional re-start and rotation!**
- **Improperly tightened screws may cause parts to fly off leading to most serious personal injuries and property damages!**
- **Before putting the coupling into operation, check the alignment and all screwed connections for correct tightening torque and firm fit!**
- **Before starting up the equipment, install all protective guards in order to avoid unintentional contact with freely moving or rotating parts.**
- **The covers have to fulfil the requirements of protection type IP2X as a minimum.**
- **The cover shall be designed to prevent dust from depositing on the coupling parts.**
- **The cover must not touch the coupling and must not impair the proper function of the coupling.**

While operating the coupling, pay attention to:
- Changes in operating noises
- Vibrations
- Lost parts

Attention!
- **Disconnect the drive immediately, if any irregularities are observed while operating the coupling!**
- Identify the cause for the problem using table 7 “Operation Faults and Possible Causes“ and correct the fault.
  The listed problems are some examples to assist you in troubleshooting.
- **All the machinery components and operation modes have to be considered for the determination and correction of faults!**

Table 7 Operation Faults and Possible Causes:

Trouble	Cause	Risk Warning	Correction
Irregular running noises/ vibrations	Alignment fault	Considerable increase of coupling temperature. Premature wear of elastic buffers. Increased reaction forces act on connected machines.	- Disconnect drive - Remove cause for alignment fault - Re-align coupling - Inspect elastic buffers for wear
	Elastic buffers worn out	Coupling claws strike against each other. Spark formation, claw fracture, increased reaction forces	- Disconnect drive - Check coupling components for damages and replace parts, if necessary - Replace elastic buffers
	Unbalance	Considerable increase in coupling temperature. Premature wear of elastic buffers. Increased reaction forces act on connected machines	- Disconnect drive - Verify balance state of plant components and correct it, if necessary - Inspect elastic buffers for wear
	Loose screw connections	Flying off parts can cause serious injuries and considerable damages.	- Disconnect drive - Check coupling parts for damages, replace parts, if necessary - Verify alignment of coupling - Tighten screws to the specified tightening torque and secure them against working loose, if necessary - Inspect elastic buffers for wear

Trouble	Cause	Risk Warning	Correction
Premature wear of elastic buffers	Alignment fault	Considerable increase in coupling temperature. Increased reaction forces act on connected machines	- Disconnect drive - Remove cause for alignment fault - Re-align coupling - Inspect elastic buffers for wear
	Unacceptable temperatures	Material properties of elastic buffers change. The torque transmission capability is adversely affected.	- Disconnect drive - Replace elastic buffers - Re-align coupling - Adjust ambient temperature
	Contact with aggressive products	Material properties of elastic buffers change. The torque transmission capability is adversely affected	- Disconnect drive - Check coupling parts for damages and replace parts, if necessary - Replace elastic buffers - Verify alignment of coupling - Prevent contact with aggressive products
	Torsional vibrations in the drive line	Considerable increase in coupling temperature. Premature wear of elastic buffers. Increased reaction forces act on connected machines.	- Disconnect drive - Analyse and eliminate cause for torsional vibrations - Check coupling parts for damages and replace parts, if necessary - Replace elastic buffers and consult RINGFEDER POWER TRANSMISSION concerning eventual use of another Shore-hardness - Verify coupling alignment
Claw breakage	Wear limit of elastic buffers exceeded ===> contact of claws	Coupling is destroyed. Connected machines can be affected too.	- Disconnect drive - Replace coupling - Inspect the elastic buffers for wear at shorter intervals
	Overload due to too high torque	Coupling is destroyed. Connected machines can be affected too	- Disconnect drive - Verify coupling design in cooperation with RINGFEDER POWER TRANSMISSION - Replace coupling - Install larger coupling, if necessary

9.1 Check of Direction of Rotation

- **Danger of Injuries!**
- **Disconnect the drive before carrying out any work on the coupling!**
- **Secure the drive against unintentional re-start and rotation!**

A rotation test is only possible if the drive is on the coupling side without disc, except when executing BHDD-BS. The disc side must be stationary during the rotation test and is unsecured

Design BHDD-BS:

- Loosen the retaining screws (Fig 3, Pos. 1) at the outer diameter of the retaining ring and push it backward (Fig 3, Pos. 2).
- Take out the elastic buffers (Fig 3, Pos. 3).
- Remove the claw rings (part 434) from the centerings of the flange hubs (part 411 and 424) and push them together (Fig 9).
- Take out the claw rings.
- Push the brake disc (part 505) from the centering of the flange hub and lift it out. For larger couplings use suitable mounting tools and hoisting devices such as cranes or pulley blocks.

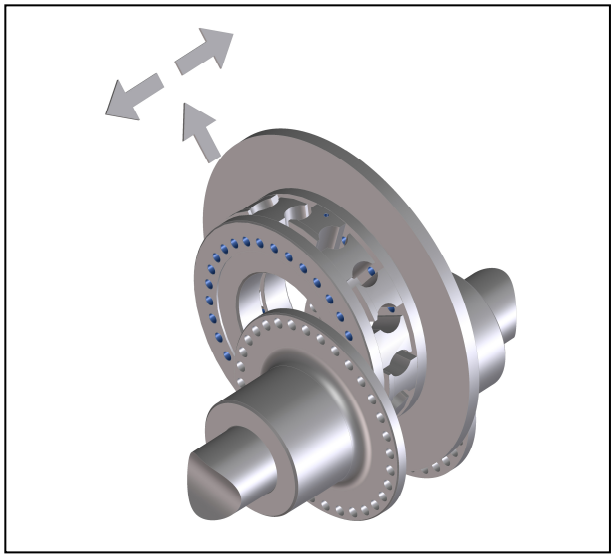


Fig. 9

Design BHDDV-BS und BHDVV-BS:

- Loosen the retaining screws (Fig 3, Pos. 1) at the circumference of the retaining ring and push the ring backward (Fig 3, Pos. 2).
- Take out the elastic buffers (Fig 3, Pos. 3).
- Remove all the cheese head screws from the brake disk side (Fig 10, Pos. 1). This separates the claw ring from the flange hub.
- Remove the cheese head screws from the other coupling half which are located opposite the front side threads in the claws of the loosened ring (Fig 10, Pos. 2 and 3).
- Use longer clamp screws (Fig. 10, Pos. 4) to axially remove the loosened claw ring from its centering seat. Make sure there is a gap between the claw ring and the flange hub or brake disk so that these parts are no longer in contact.

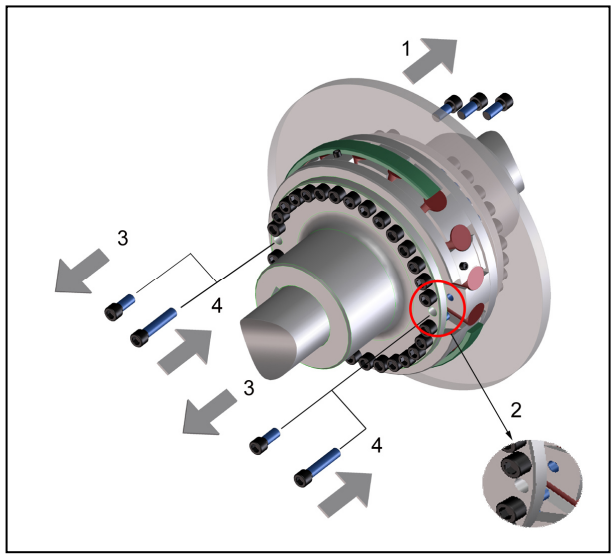


Fig. 10

- **Attention!**
- **Make sure that the shaft ends cannot move axially while checking the direction of rotation.**
- **The rotating coupling half must not contact the stationary coupling half!**

Perform the rotation test.

BHDDV-BS und BHDDVV-BS: After having checked the direction of rotation, remove the clamping screws and install the claw ring to the flange hub using the cheese head screws.

- **BHDD-BS:** Place the claw rings with the brake disk in the proper positions as marked.
- Make sure that the parts do not get canted at the centering seat while mounting them.
- Ensure that the parts are re-assembled in their original positions.

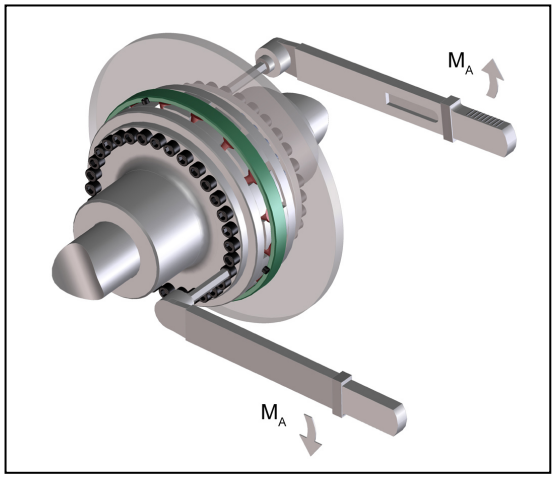


Fig. 11

Attention!
The contact surfaces of the claw rings and flange hubs must be clean, dry and free of grease.
Balanced parts are match marked to each other.

- Tighten the bolts uniformly.
- Tighten the bolts with the torque M_A specified in table 8 (Fig 11).
- Mount new buffers **with the hollow pointing inwards**. To facilitate mounting, the elastic buffers can be coated with a lubricant (for ex. talcum for perbunan Pb, or commercial roller bearing grease for polyurethane Vk).
- Check the alignment of the coupling according to the instructions given in chapter 8 'Coupling Alignment'.
- Advance the retaining ring (Fig. 5, Pos. 2) up to the contact face at the coupling hub, so that the ring is seated centrically above the elastic buffers.
- Install the retaining ring with the locking screws at the claws of the coupling hub. Tighten the screws with the tightening torque M_A specified in table 3 (Fig 5, Pos. 3).

Table 8 Tightening torques M_A for the screwed connections of the claw rings:

Size	240	300	350	400	450	500	550	600	650	700	800	900
DIN 912-10.9	M16	M16	M18	M20	M20	M24	M24	M24	M27	M30	M30	M30
M_A [Nm]	225	225	300	440	440	700	700	700	950	1400	1400	1400

Table 9 Longer clamp screws to tighten the claw ring:

Size	240	300	350	400	450	500	550	600	650	700	800	900
DIN 912	12	M12	M14	M16	M16	M20	M20	M20	M27	M24	M24	M24
Length [mm]	50	60	60	70	70	80	80	90	70	100	100	110

10 Maintenance

The flexible coupling RINGFEDER® TNB BHD-BS
only requires little maintenance during operation. The elastic buffers are subject to wear. The time at which the wear limit of the elastic buffers is reached depends on the service parameters and application conditions.

On the occasion of routine inspections or maintenance of the equipment, check:

- Alignment of coupling,
- State of elastomer
- Firm fit of the fastening elements
- Missing parts
- Remove dust deposits from coupling parts and buffers

10.1 Inspection and maintenance intervals

- **Danger of injuries!**
- **Disconnect the drive before carrying out any work on the coupling!**
- **Secure the drive against unintentional re-start and rotation!**

Perform wear checks, inspections and maintenance operations according to the intervals stated in table 10. If excessive wear is already detected on the occasion of the first inspection, check whether the cause for the problem is listed in table 10 “Operation faults and possible causes”. In such a case the inspection intervals must be adapted to the prevailing service conditions. Special operation conditions may necessitate to perform inspections and maintenance operations at shorter intervals than stated.

Table 10 Inspection and Maintenance Intervals

Industry		
1st inspection	after 4 weeks	visual inspection and wear check of elastomer
1st maintenance	after 6 months	visual inspection and wear check of elastomer
2nd maintenance	after 12 months	visual inspection and wear check of elastomer removal of dust deposits from coupling components
each further maintenance	every 12 months	visual inspection and wear check of elastomer removal of dust deposits from coupling components
Mines		
1st inspection	after 4 weeks	visual inspection and wear check of elastomer
1st maintenance	after 6 months	visual inspection and wear check of elastomer
2nd maintenance	after 6 months	visual inspection and wear check of elastomer removal of dust deposits from coupling components
each further maintenance	every 6 months	visual inspection and wear check of elastomer removal of dust deposits from coupling components

On the occasion of maintenance operations on the drive equipment, however, after 3 years at latest:

- Replace the elastic buffers.
- If the wear limit has been reached or exceeded, replace the buffers immediately, irrespective of the inspection intervals of the equipment.
- Check coupling alignment.
- Remove dust deposits from coupling components and buffers

10.2 Wear Inspection on elastic buffers

- If the elastic buffers are considerably deformed or have cracked, the buffers must be replaced.
- Check the wear of the buffers by measuring the minimum diameter of the individual buffers.
- If the coupling has a distinct torsional backlash, or if the minimum buffer thickness (PD_{min} , Fig. 12) according to table 11 is reached, we recommend to replace the elastic buffers.

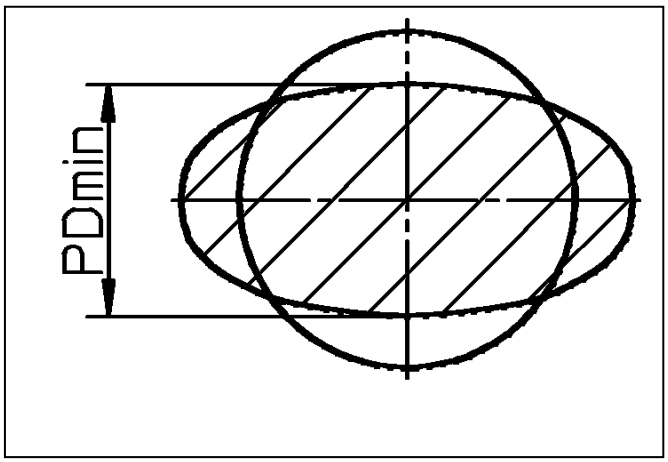


Fig. 12

Table 11 Min. buffer thickness PD_{min}:

Size	240	300	350	400	450	500	550	600	650	700	800	900
PD_{min} [mm]	37	47	47	52	52	57	56	56	61	66	66	66

10.3 Wear inspection on elastic buffers in case of enlarged axial clearance

Couplings with straight claw parts in a claw ring allow a larger axial clearance at reduced coupling torques (see 8.4). As the elastic buffers are not enclosed by the claw geometry on one side, larger torsion angles result when torque is applied and at displacement of the coupling halves. Make sure to observe the max. permissible buffer wear for this design acc. to table 12!

Table 12 Min. buffer thickness PD_{min} for couplings with enlarged axial clearance:

Size	240	300	350	400	450	500	550	600	650	700	800	900
PD_{min} [mm]	39	49	49	54	54	59	59	59	64	69	69	69

Upon completion of the wear measurement, re-install all the protective devices and covers!

10.4 Replacement of elastic buffers

- **Danger of injuries!**
- **Disconnect the drive before carrying out any work on the coupling!**
- **Secure the drive against unintentional re-start and rotation!**

- First, remove the retaining screws (Fig 13, Pos. 3) and then the retaining ring (Fig 13, Pos. 2).
- Remove the buffers (Fig 13, Pos. 1).
- To facilitate mounting, the new elastic buffers can be coated with a lubricant before installing them (e.g. talcum for perbunan Pb, or commercial roller bearing grease for polyurethane Vk).
- Mount new buffers of correct size with the **hollow pointing inwards** (Fig 13, Pos. 4).
- Push on the retaining ring until it contacts the claw ring face, so that the ring is seated centrically above the elastic buffers (Fig 13, Pos. 2).
- Fix the retaining ring with the locking screws on the claws of the claw ring. Tighten the retaining screws at the retaining ring (Fig. 5, Pos. 3) with the tightening torque M_A specified in table 3.
- Check the alignment of the coupling according to the instructions given in chapter 8 'Coupling Alignment'.

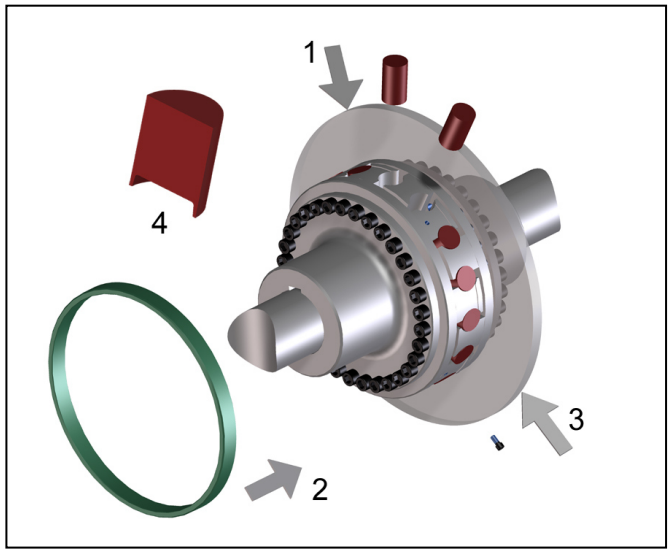


Fig. 13

Warning!

- **Before putting the equipment into service, all safety guards must be installed to prevent unintentional contact with freely rotating parts.**
- **The covers have to fulfil the requirements of protection type IP2X as a minimum.**
- **The covers have to be designed to prevent dust from depositing on the coupling parts.**
- **The cover must not touch the coupling and impair the proper operation of the coupling.**

We do not assume any responsibility or warranty for any damages resulting from the use of accessories or spare parts, which have not originally been manufactured by RINGFEDER POWER TRANSMISSION

11 Disposal

Disposal of the parts has to be arranged in accordance with the specific regulations of the country where the parts are installed.

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