

**Please read the Operational Instructions carefully and follow them accordingly!**

Ignoring these Instructions may lead to malfunctions or to coupling failure, resulting in damage to other parts.

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## Declaration of Conformity

A conformity evaluation for the applicable EU directives has been carried out for this product. The conformity evaluation is set out in writing in a separate document and can be requested if required. It is forbidden to start use of the product until the machine or system into which it should be built is operating in accordance with all applicable EU directives. Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on the ATEX directive

## Safety Regulations

These Installation and Operational Instructions (I+O) are part of the coupling delivery. Please keep them handy and near to the coupling at all times.



### Danger!

This warning applies if:

- the ROBA®-DS couplings are modified.
- the relevant standards for safety and / or installation conditions are ignored.

### User-implemented Protective Measures

- Please cover all moving parts to protect against seizure, dust or foreign body impact.

**To prevent injury or damage, only professionals and specialists should work on the device, following the relevant standards and directives. Please read the Installation and Operational Instructions carefully before installation and operation of the device.**

**These Safety Regulations are user hints only and may not be complete!**

## Safety and Guideline Signs



### Danger!

Danger of injury to personnel and damage to machines.

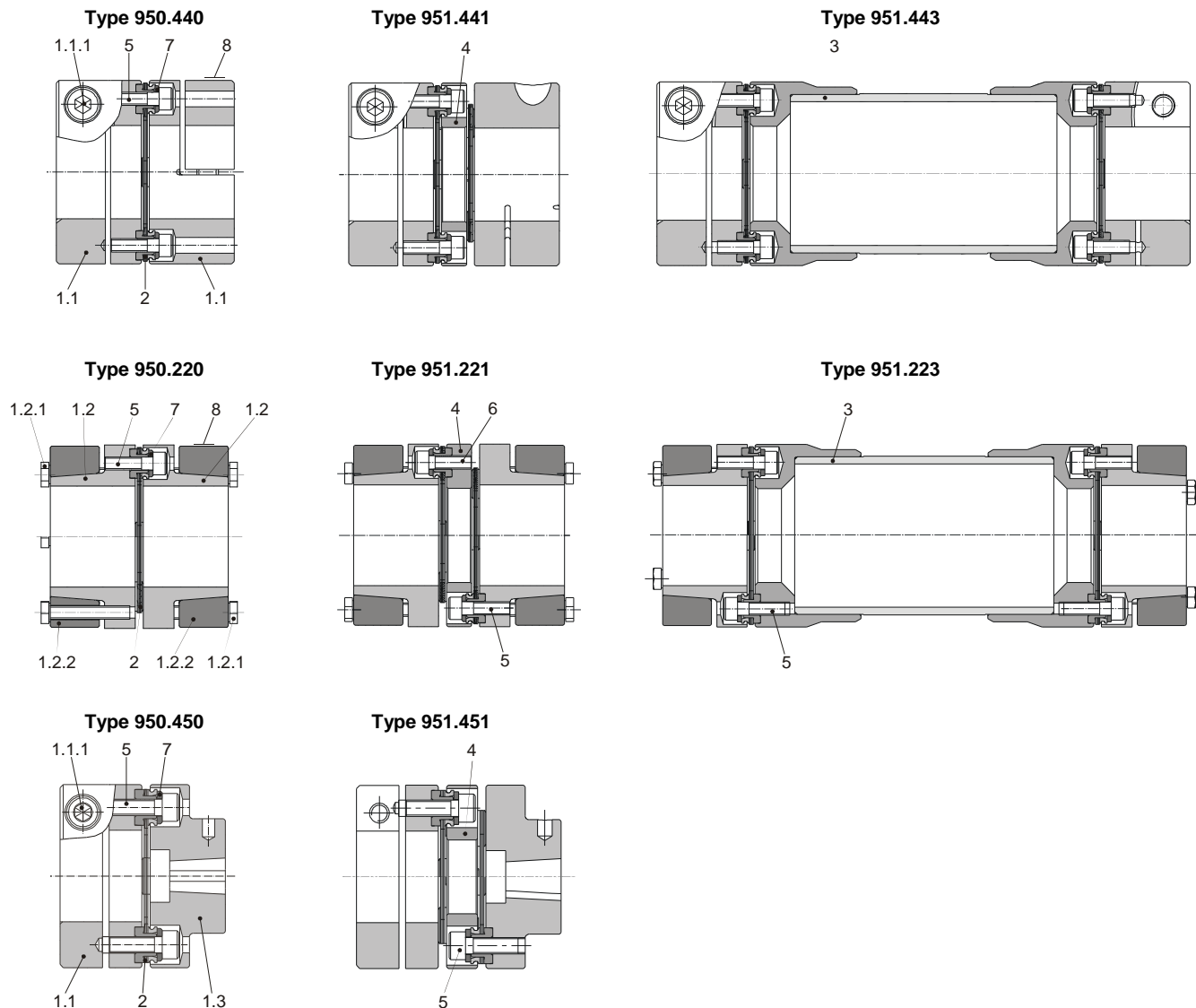


### Please Observe!

Guidelines on important points.

# Installation and Operational Instructions for ROBA®-DS couplings Type 95\_ . \_ \_ \_ Sizes 3 to 15

(B.9.7.1.GB)



**Fig. 1**

## Parts List

Only use **mayr®** original parts.

1.1	Radial clamping hub Type 95_4_ _	2	Disk pack
1.1.1	Cap screw for the radial clamping hub Type 95_4_ _	3	Sleeve "S"
1.2	Shrink disk hub Type 95_2_ _	4	Connection plate
1.2.1	Hexagon head screws for shrink disk hubs (external clamping)	5	Cap screw
1.2.2	Shrink disk	6	Cap screw
1.3	Hub with tapered bore Type 95_ _ 5 _	7	Washer
		8	Type tag



### Please Observe!

According to German notation, decimal points in this document are represented with a comma (e.g. 0,5 instead of 0.5).

# Installation and Operational Instructions for ROBA®-DS couplings Type 95\_ . \_ \_ \_ Sizes 3 to 15

(B.9.7.1.GB)

## Function – Application

ROBA®-DS couplings are shaft connections for torsionally stiff, backlash-free torque transmission. At the same time they compensate for: angular misalignments and axial displacements on single-jointed couplings (Type 950\_ \_ \_ \_), and additionally for radial misalignments on double-jointed couplings (Type 951\_ \_ \_ \_).

All hub designs are available either pilot bored or with a finish bore.

For application with radial clamping hubs, a tolerance connection of H7/k6 should be selected.

The shrink disk hubs should have a tolerance connection of H7/g6 on bores smaller than Ø 25 H7/h6.

## State of Delivery

ROBA®-DS couplings Sizes 3 – 15 are delivered completely manufacturer-assembled.

**All screw connections are to be pre-tensioned to the torque acc. Table 1 during final installation.**

Hubs and sleeves are made of aluminium, the disks are made of rustproof steel. The rest of the connection elements are oiled.

The shrink disks (1.2.2) as steel components are phosphated and therefore provided with a basic corrosion protection.

## Temperature Resistance

Temperature resistance of ROBA®-DS sizes 3 to 15: from - 20 ° up to +100 °C.

The clamping ring hub torques transmitted via frictional locking, however, depend on bores and temperatures (see Table 2).

**Table 1: Technical Data**

ROBA®-DS Size	3	6	10	15				
Bore radial clamping hub Type 95_4_ _ _ (1.1) from – to [mm]	10 – 20	14 – 28	19 – 35	25 – 42				
Bore shrink disk hub Type 95_2_ _ _ (1.2) from – to [mm]	10 – 20	14 – 28	19 – 38	25 – 45				
Bores hub with tapered bore Type 95_ _ 5_ _ (1.3) [mm]	11, 14	11, 14, 16	– – –	– – –				
Coupling nominal torque $T_{KN}$ valid for max. permitted shaft misalignment [Nm]	35	60	100	150				
Coupling alternating torque $T_{KW}$ valid for max. permitted shaft misalignment [Nm]	21	36	60	90				
Coupling impact torque $T_{KS}$ valid in one rotational direction, max. load stress $\leq 10^5$ [Nm]	52	90	150	225				
Max. speed $n_{max}$ on Type 95_2_ _ _ (not valid for sleeve S) [rpm]	22500	18000	15000	13000				
Max. speed $n_{max}$ on Type 95_4_ _ _ (not valid for sleeve S) [rpm]	13500	10800	9000	7800				
Distance dimension "S" (Fig. 3) [mm]	2,5 ±0,2	2,5 ±0,2	3 ±0,2	3,3 ±0,2				
Axial displacement $\Delta K_a$ These values refer to couplings with 2 disk packs. With only one disk pack, the indicated values are halved. Only permitted as static or virtually static values. [mm]	0,5	0,7	0,9	1,1				
Radial misalignment $\Delta K_r$ , connection plate (4) [mm]	0,15	0,15	0,2	0,2				
Radial misalignment $\Delta K_r$ , special sleeve (3) [mm]	(Hs-S) x 0,0174							
Radial misalignment on single-jointed coupling	Exact alignment necessary							
Angular misalignment $\Delta K_w$ per disk pack [°]	1							
ROBA®-DS size	3		6		10		15	
	Dimension [mm]	Tightening torque [Nm]	Dimension [mm]	Tightening torque [Nm]	Dimension [mm]	Tightening torque [Nm]	Dimension [mm]	Tightening torque [Nm]
Cap screw DIN 912 (Item 5)	M4x14	4,5	M5x16	8,5	M5x18	8,5	M5x20	8,5
Cap screw DIN 912 (Item 6)	M4x12	4,5	M5x16	8,5	M5x16	8,5	M5x16	8,5
Cap screw DIN 912 (Item 1.1.1)	M6x20	14	M6x20	13	M8x25	33	M8x30	33
Hexagon head screw DIN 933 (Item 1.2.1)	M4x22	3	M5x25	6	M5x25	6	M5x35	6

# Installation and Operational Instructions for ROBA®-DS couplings Type 95\_ . \_ \_ \_ Sizes 3 to 15

(B.9.7.1.GB)

## Guidelines on Hub Bore and Shaft

### General Guidelines:

- ❑ The maximum bore diameter according to Table 1 must not be exceeded.
- ❑ On radial clamping hubs (1.1) the transmittable torques are dependent on the bores and must be observed acc. Table 2. Table 2 does not take temperatures over +40 °C into account. Please observe the guidelines below Table 2.
- ❑ On the shrink disk hubs (1.2) the transmittable torques are dependent on the bores and must be observed acc. Table 3. These values are valid for the entire permitted temperature range from - 20 °up to +100 °C.
- ❑ The recommended bore tolerances are to be produced according to position and tolerance width. At the same time, please keep to the permitted shaft run-out and axial run-out tolerances of 0,03 mm (Fig. 2).
- ❑ Clean the finish bore with suitable cleaning agents after manufacturing it.
- ❑ The surfaces of the shafts should be finely turned or ground (Ra = 0,8 µm).
- ❑ The shafts used should have a yield point of 350 N/mm<sup>2</sup> (St60, St70, C45, C60).

### When boring the shrink disk hubs and radial clamping hubs (Items 1.1 / 1.2), please observe the following:

- ❑ The shrink disk hubs (1.2) are basically supplied greased and partly assembled. To produce the finish bore, the shrink disk (1.2.2) is disassembled and the shrink disk hub (1.2) is degreased.
- ❑ Deburr the hubs (1.1), particularly in the area of the slots.
- ❑ Clean and re-grease the shrink disk hubs (1.2) in the contact area of the shrink disk or hub.  
Permitted grease: Klüber Alltemp QNB 50

## Installation Position

ROBA®-DS couplings are dimensioned for horizontal installation. For vertical or inclined installation with long sleeves (sleeve S (3)), the sleeve's dead weight must be supported via a vertical support. This vertical support as well as the hub and sleeve processing, is carried out at the site of manufacture.

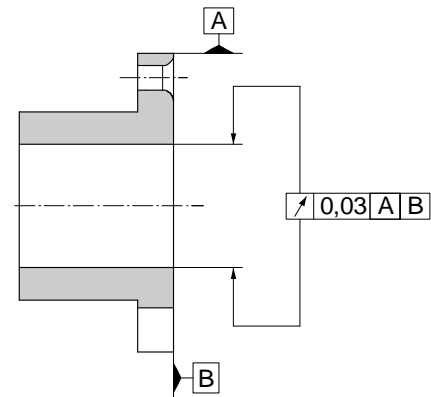


Fig. 2

**Table 2: Transmittable Torques for Radial Clamping Hubs Type 95\_4\_ (dependent on bore)**

Size	Preferred bores $\varnothing d_R$ for the radial clamping hub and the respective frictionally-locking transmittable torques $T_R$ [Nm]																	
	$\varnothing 10$	$\varnothing 12$	$\varnothing 14$	$\varnothing 15$	$\varnothing 16$	$\varnothing 18$	$\varnothing 19$	$\varnothing 20$	$\varnothing 22$	$\varnothing 24$	$\varnothing 25$	$\varnothing 28$	$\varnothing 30$	$\varnothing 32$	$\varnothing 35$	$\varnothing 38$	$\varnothing 40$	$\varnothing 42$
3	27	32	37	39	42	47	49	52	-	-	-	-	-	-	-	-	-	-
6	-	-	46	51	56	65	70	74	84	90	90	90	-	-	-	-	-	-
10	-	-	-	-	-	-	99	105	116	128	135	150	150	150	150	-	-	-
15	-	-	-	-	-	-	-	-	-	-	143	163	177	191	211	225	225	225



### Please Observe!

The transmittable torques refer to a temperature range of - 20 °C up to + 40°C.  
At temperatures over +40 °C, the frictionally-locking transmittable torque reduces by 10 % per 10 °C.  
The max. permitted operating temperature is +100 °C .

**Table 3: Transmittable Torques for Shrink Disk Hubs Type 95\_2\_ (dependent on bore)**

Size	Preferred bores $\varnothing d_S$ for the shrink disk hub and the respective frictionally-locking transmittable torques $T_R$ [Nm]																			
	$\varnothing 10$	$\varnothing 12$	$\varnothing 14$	$\varnothing 15$	$\varnothing 16$	$\varnothing 18$	$\varnothing 19$	$\varnothing 20$	$\varnothing 22$	$\varnothing 24$	$\varnothing 25$	$\varnothing 28$	$\varnothing 30$	$\varnothing 32$	$\varnothing 35$	$\varnothing 38$	$\varnothing 40$	$\varnothing 42$	$\varnothing 45$	
3	41	52	52	52	52	52	52	52	-	-	-	-	-	-	-	-	-	-	-	
6	-	-	90	90	90	90	90	90	90	90	90	90	-	-	-	-	-	-	-	
10	-	-	-	-	-	-	150	150	150	150	150	150	150	150	150	150	-	-	-	
15	-	-	-	-	-	-	-	-	-	-	225	225	225	225	225	225	225	225	225	

## Hub Installation

The arrangement of the individual parts can be seen in Fig. 1.

### Hub Installation Types 95\_2\_ (hubs with shrink disk) or 95\_4\_ (radial clamping hubs)

#### Installation Conditions

- The shrink disk hubs (1.2) or the radial clamping hubs (1.1) transmit the torque via frictional locking. The contact surfaces between the shrink disk (1.2.2) and the shrink disk hub (1.2) are greased manufacturer-side.
- **The hub bores and shafts must be completely grease-free during installation. Greasy or oily bores or shafts do not transmit the coupling maximum torque.**
- The shafts must not have a keyway.
- The radial clamping hub (1.1) and the shrink disk hub (1.2) must be completely relaxed. If necessary, loosen the screws (1.1.1) by several thread turns.

#### Hub Installation Type 95\_2\_ (hubs with shrink disk)

- a) Mount the shrink disk hubs (1.2) by hand (if necessary, using a suitable device) onto the shafts and bring them into the correct position.
- b) Tighten the clamping screws (1.2.1) evenly **one after the other in several sequences** to the torque stated in Table 1 using a torque wrench.
- c) Check the applied tightening torques after 5 to 10 operating hours.

#### For Disassembly:

- a) Loosen all clamping screws (1.2.1) in several sequences by several thread turns respectively.
- b) Normally the hubs on the shaft are loosened by hand. If this is not possible, please proceed as follows: Disassemble the clamping screws (1.2.1) and screw them back in again (1.2.1) in the tapped extracting holes of the shrink disks.



#### Please Observe!

Please observe the axial space requirements of the clamping rings, which are to be screwed into the tapped extracting holes (length of the hexagon head screws Item 1.2.1 in Table 1, page 3).

Tighten them evenly and one after the other until the shrink disk (1.2.2) loosens.

#### Hub Installation Type 95\_4\_ (radial clamping hubs)



#### Please Observe!

The backlash between the shaft and the hub must be kept as low as possible on single-jointed couplings. Large tolerances cause radial misalignment of the hubs and therefore lead to high reaction forces.

- a) Mount the hubs (1.1) by hand (if necessary, using a suitable device) onto the shafts and bring them into the correct position.



#### Please Observe!

The clamping screw (1.1.1) must be greased **in the area of the thread**. This is usually carried out manufacturer-side. A grease of NLGI class 2 with a basic oil viscosity of 220mm<sup>2</sup>/s at 40°C, e.g. Mobilgrease HP222, is suitable. Should the grease layer be washed off, it must be greased customer-side.

- b) Tighten the clamping screws (1.1.1) to the torque stated in Table 1 using a torque wrench.
- c) Check the applied tightening torques after 5 to 10 operating hours.

## Coupling Installation (Figs. 1, 3 and 4)

The disk packs (2) are screwed together **alternately** with the hubs and the connection plate (4) or the sleeve "S" (3) using lightly oiled cap screws (5) with washers (7).

Please observe the tightening torque according to Table 1.



#### Please Observe!

In order to install the shrink disk hubs (1.2) with the respective connection elements, the shrink disk (1.2.2) must be unscrewed from the shrink disk hub (1.2).

The pre-tension force on the disk pack (2) is produced via the cap screws (5) with washers (6).



#### Please Observe!

The disk pack (2) is to be installed in such a way that the collar bushing (**part 2a, Fig. 3**) is combined with the corresponding tolerance bore in the respective hub, connection plate (4) or in the sleeve (3). Due to the high joining forces (caused by the transition tolerance) installation of the disk packs is only possible using the screw pre-tension force.

For disk pack (2) disassembly, use suitable tools, e.g. screwdrivers on the right and left side of the collar bushing (Fig. 4).

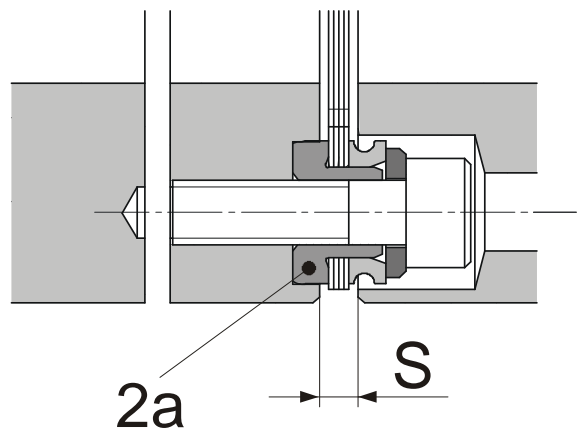


Fig. 3



Fig. 4

## Coupling Alignment

The permitted angular misalignments are shown in Table 1. Exact coupling alignment, however, greatly increases the coupling lifetime and reduces the load on the shaft bearings. On high-speed drives, we recommend aligning the coupling using a dial gauge. Normally, however, coupling alignment using a straight edge at two vertical levels next to each other is sufficient. In order to avoid axial distortion of the disk packs, please keep to dimension "S" (Fig. 3, Detail "2a", Table 1) for the aligned angular and radial shaft misalignments.

## Permitted Shaft Misalignments

ROBA®-DS single-jointed couplings (Type 950\_ \_ \_ \_) compensate for angular and axial shaft misalignments.  
 ROBA®-DS double-jointed couplings (Type 951\_ \_ \_ \_) compensate for angular, axial and radial shaft misalignments (Fig. 6) without losing their resistance to backlash. However, the permitted shaft misalignments shown in Table 1 must not simultaneously reach their maximum value. If more than one kind of misalignment takes place simultaneously, they influence each other. This means that the permitted shaft misalignment values are dependent on one another (see Fig. 5). Therefore, the sum total of the actual misalignments in percent of the maximum value must not exceed 100 % (see Example and Fig. 5).

### Example:

ROBA®-DS Size 10, Type 951.221.  
 Axial displacement occurrence  $\Delta K_a = 0,36$  equals 40 % of the permitted max. value.  
 Angular misalignment occurrence in the disk pack  $\Delta K_w = 0,3^\circ$  equals 30 % of the permitted maximum value.  
From this we can calculate:  
 A permitted radial misalignment  $\Delta K_r$  of 30 % = 0,06 mm

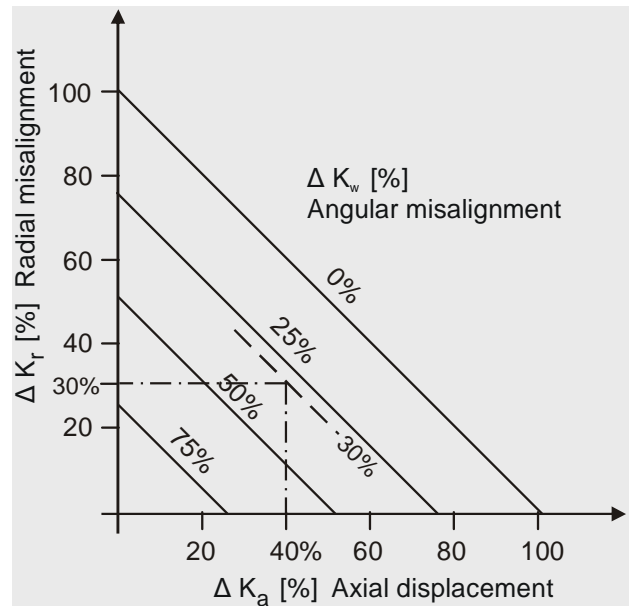


Fig. 5

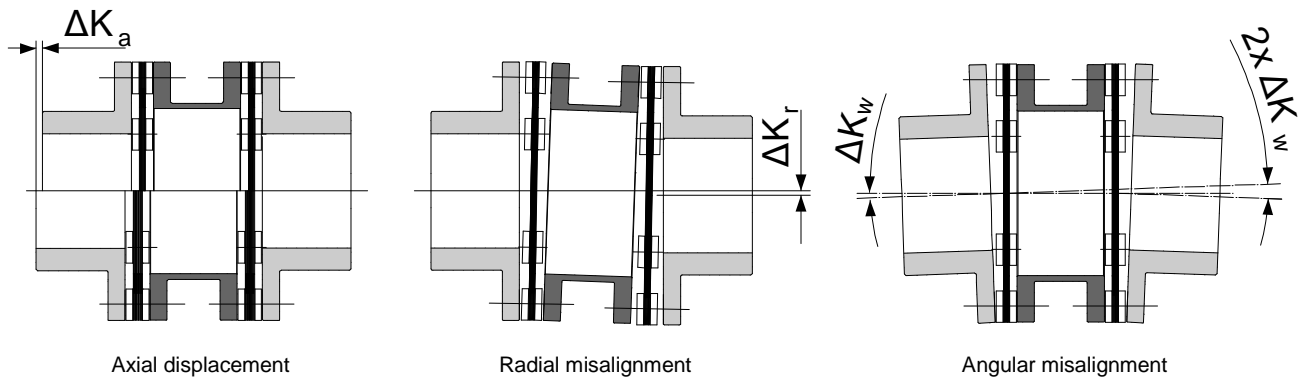


Fig. 6

## Balancing the Coupling (Figs. 7 and 8)

On most application cases, balancing the ROBA®-DS coupling is unnecessary. The decision as to whether balancing is necessary depends on the following points:

- Coupling circumferential speed
- Length of the special sleeve
- Required balance quality

The smooth running of a machine is not only due to the balance quality of the coupling but is also influenced, to at least the same extent, by parameters such as stiffness and distance to the adjacent bearing as well as sensitivity and mass of the whole assembly.

All parts of the ROBA®-DS coupling, except for the sleeve S pipe, are machined on all sides. This means that on individual parts a balance quality of G6,3/1500 (ISO DIN 1940) can be achieved.

The operational speed of the coupling must always be specified when ordering a coupling with a special sleeve.

For higher demands on the balance quality, it is possible to balance the individual parts or even the manufacturer-assembled coupling (on request). However, for this option, the hubs must have a finish bore.

## Diagram 1: Balancing the Couplings with Sleeve S (Special Length)

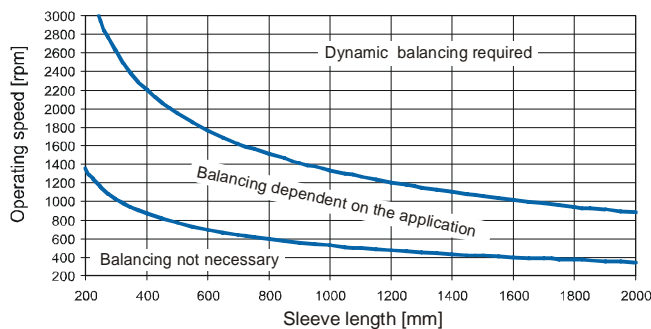


Fig. 7

## Diagram 2: Permitted Speeds for Special Sleeves (Bend-critical Speed)

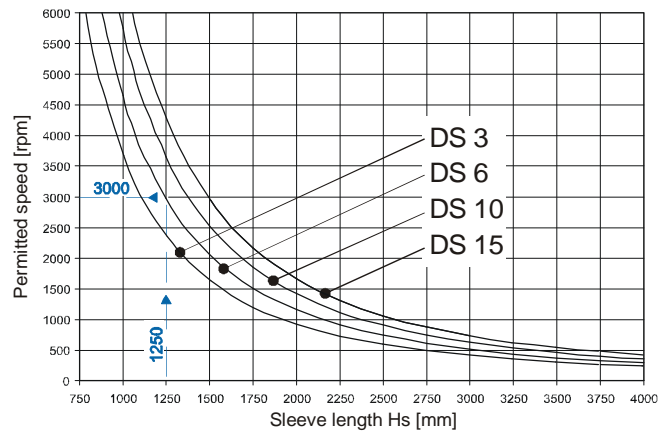


Fig. 8

### Example:

Size 6, sleeve length  $H_S = 1250$  mm  
=> permitted speed 3000 rpm.

## Maintenance

ROBA®-DS couplings are mainly maintenance-free.

Please keep to the following maintenance and inspection intervals:

- 1.) Visual check, inspection of the installation parameters (misalignment and tightening torques), running behaviour of the coupling **before initial operation**.
- 2.) Visual check, torsional backlash, inspections of misalignment and tightening torques, running behaviour of the coupling **after 1000h or after max. 3 months**.
- 3.) If no irregularities or wear are found during the second maintenance and inspection interval, all further inspection intervals can be carried out under unchanged operational parameters **after 4000 operating hours or after max. 12 months**.

In extreme ambient or operating conditions, the coupling should be inspected after shorter intervals.

## Disposal

### All steel components:

Steel scrap (Code No. 160117)

### All aluminium components:

Non-ferrous metals (Code No. 160118)

## Malfunctions / Breakdowns

Malfunctions	Possible Causes	Solutions
Changes in running noises and / or vibration occurrence	Alignment error, incorrect installation	<ol style="list-style-type: none"> <li>1) Set the system out of operation</li> <li>2) Remove the cause for alignment error</li> <li>3) Check coupling for wear</li> </ol>
	Loose connection screws, low friction corrosion under the screw head and on the disk pack	<ol style="list-style-type: none"> <li>1) Set the system out of operation</li> <li>2) Check coupling parts and replace damaged coupling parts</li> <li>3) Tighten connection screws to the specified torque</li> <li>4) Check the alignment and correct if necessary</li> </ol>
	Clamping screws or socket set screws for axial securement of hubs are loose	<ol style="list-style-type: none"> <li>1) Set the system out of operation</li> <li>2) Check the coupling alignment</li> <li>3) Tighten all clamping screws or socket set screws for axial securement of the hub to the required torque or tighten the securing set screws and paint them with securing lacquer to stop them loosening</li> <li>4) Check the coupling for wear</li> </ol>
Disk pack breakage	Disk pack breakage due to high load impacts / overload	<ol style="list-style-type: none"> <li>1) Set plant out of operation</li> <li>2) Disassemble the coupling and remove the remaining disk pack parts</li> <li>3) Check coupling parts and replace the damaged components</li> <li>4) Find the reason for the overload and correct it</li> </ol>
	Operating parameter does not correspond to the coupling performance	<ol style="list-style-type: none"> <li>1) Set plant out of operation</li> <li>2) Check the operating parameter and select an appropriate coupling (observe installation space)</li> <li>3) Install the new coupling</li> <li>4) Check the alignment</li> </ol>
	Operating error on the plant unit	<ol style="list-style-type: none"> <li>1) Set plant out of operation</li> <li>2) Disassemble the coupling and remove the remaining disk pack parts</li> <li>3) Check coupling parts and replace the damaged components</li> <li>4) Instruct and train the operating personnel</li> </ol>
Disk pack or connection screw cracks / breakage	Drive vibrations	<ol style="list-style-type: none"> <li>1) Set plant out of operation</li> <li>2) Disassemble the coupling and remove the remaining disk pack parts</li> <li>3) Check coupling parts and replace the damaged components</li> <li>4) Check the alignment and correct if necessary</li> <li>5) Find the reason for the vibrations and correct it</li> </ol>



**Please Observe!**

mayr® will take no responsibility or guarantee for replacement parts or accessories which have not been delivered by mayr®, or for any damage resulting from the use of these products.