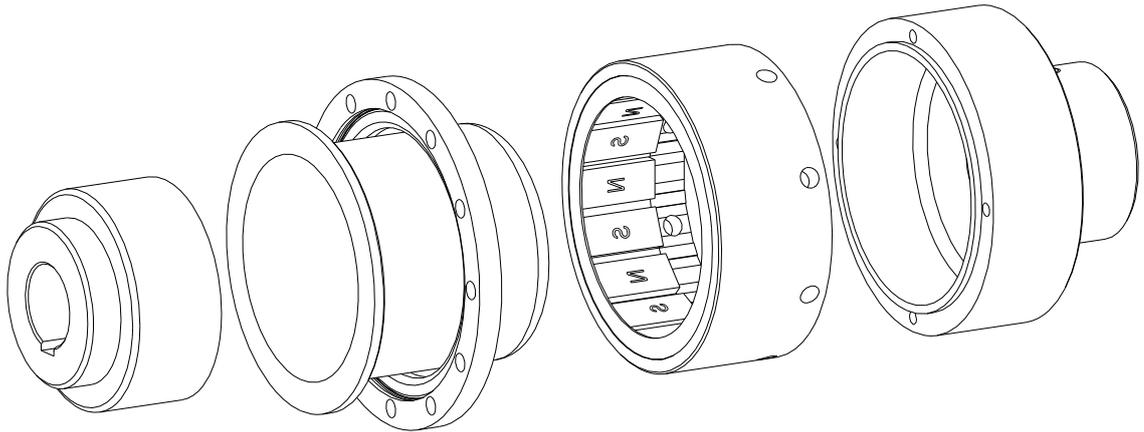


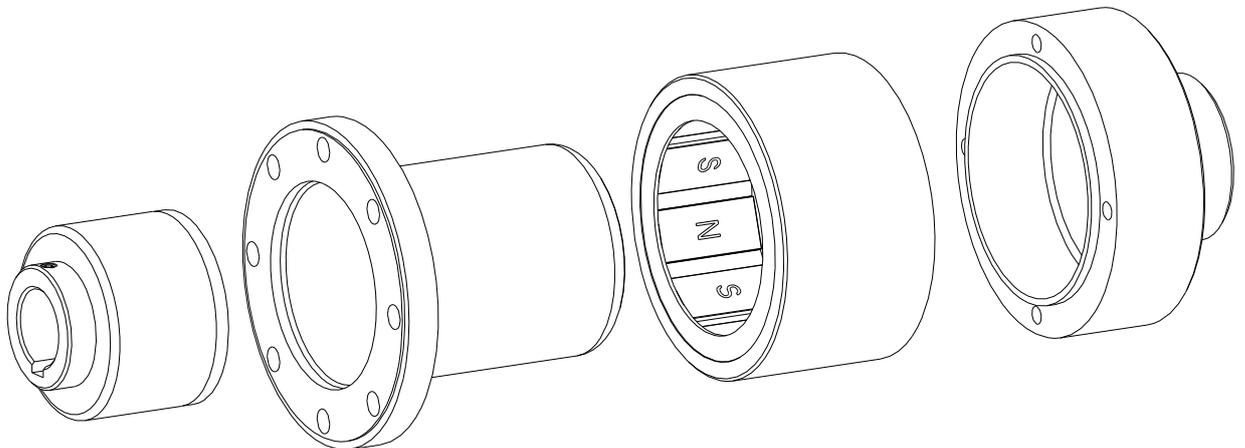


These operating and assembly instructions exclusively apply for types of MINEX[®]-S with containment shroud made of PEEK.

MINEX[®]-S Permanent-magnetic coupling with containment shroud made of PEEK



Size SA 75/10 to SE 165/24



Size SA 75/10 to SC 75/10 with one-piece containment shroud

MINEX[®]-S is a permanent-magnetic synchronous coupling which is able to transmit torques without contact through magnetic forces. Being used in pumps and agitators, it separates the product space from the atmosphere reliably.

Please observe protection note ISO 16016.	Drawn:	2018-06-20 Kb/Brd	Replacing:	KTR-N dated 2015-09-23
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1 Technical data

1.1 Sizes and dimensions

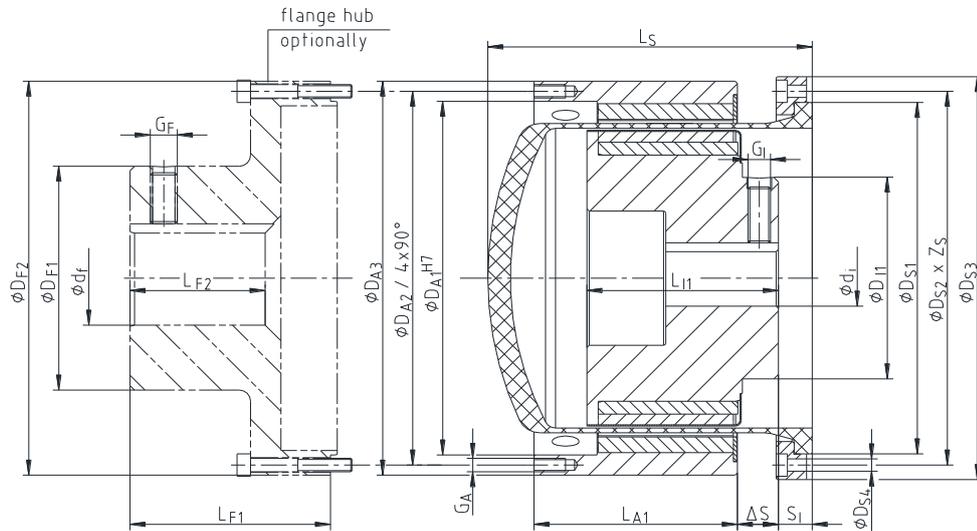


Illustration 1: MINEX[®]-S SA 75/10- SE 165/24

Table 1: Dimensions – SA 75/10 to SE 165/24

Size	T _{K max.} [Nm] with ~20 °C	Dimensions [mm]												
		Internal rotor						Containment shroud						
		Finish bore ¹⁾ d _i		D _{I1}	L _{I1}	S _I		G _I	D _{S1}	D _{S2}	D _{S3}	D _{S4}	Z _S	L _{S = 2)} L _{total}
Min.	Max.	Min.	Max.											
SA 75/10	10	12	32	45	39.5	8.5	54.5	M6	99.9	115	135	9.0	8	108
SB 75/10	24				58		34.5							
SC 75/10	40				80		10.0							
SA 110/16	30	14	55	80	45	4	46.0	M8	140	151	168	9.0	12	115
SB 110/16	70				65		26.0							
SC 110/16	100				85		6.0							
SB 135/20	110	20	70	90	65	4	48.0	M10	157	167	180	5.5	12	144
SC 135/20	155				85		28.0							
SD 135/20	210				110		4.0							
SC 165/24	220	24	80	110	85	4	32.0	M12	196	210	225	6.6	12	156
SD 165/24	300				110		8.0							
SE 165/24	390				130		-5							-5.0

Size	Dimensions [mm]													
	External rotor					Flange hub					General			
	D _{A1}	D _{A2}	D _{A3}	G _A	L _{A1}	Finish bore ¹⁾ d _f	D _{F1}	D _{F2}	L _{F1}	L _{F2}	G _F	ΔS	Total length ³⁾	
													Min.	Max.
SA 75/10	90	100	110	M6	41.3	42	60	114	64.5	35.5	M8	12.2	148.5	172.5
SB 75/10					61.3								148.5	172.5
SC 75/10					83.8								168	172.5
SA 110/16	130	138	150	M6	41.3	55	85	153	87.5	45.5	M10	18.7	165.5	193.5
SB 110/16					61.3								172.5	193.5
SC 110/16					81.3								191.5	193.5
SB 135/20	158	167	176	M6	70.3	70	100	176	89	67	M12	18.2	216	225.5
SC 135/20					90.3								216	225.5
SD 135/20					110.3								224	224
SC 165/24	186	195	204	M6	90.3	75	110	204	94	70	M16	18.5	231	234.8
SD 165/24					110.3								231	233.3
SE 165/24					130.3								254.3	254.3

¹⁾ Bores H7 with keyway to DIN 6885 sheet 1 [JS9]

²⁾ Total length without flange hub

³⁾ Total length with flange hub

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1 Technical data

1.1 Sizes and dimensions

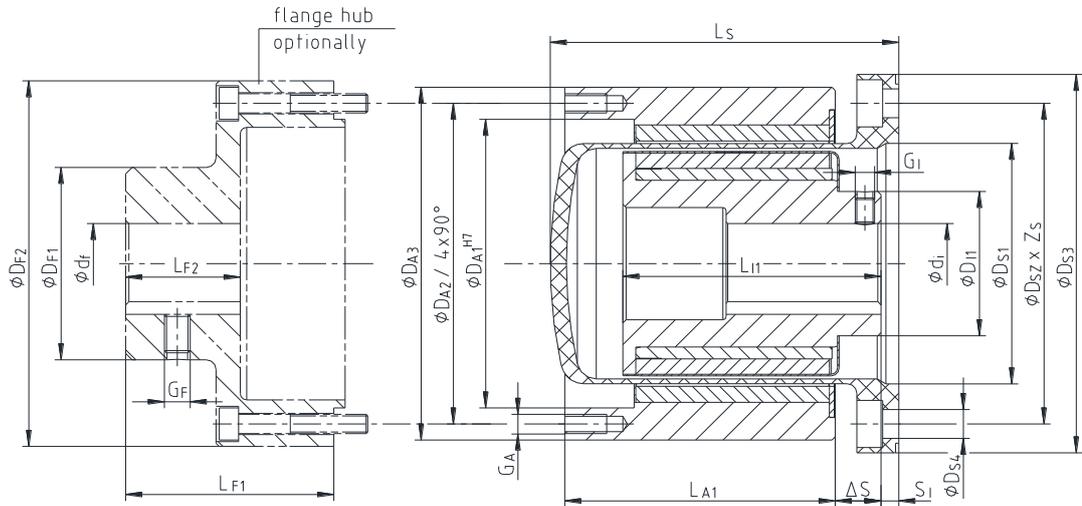


Illustration 2: MINEX[®]-S SA 75/10 - SE 165/24 with one-piece containment shroud

Table 2: Dimensions – SA 75/10 to SC 75/10 with one-piece containment shroud

Size	T _{K max.} [Nm] with ~20 °C	Dimensions [mm]													
		Internal rotor						Containment shroud							
		Finish bore ¹⁾ d _f		D _{I1}	L _{I1}	S _I		G _I	D _{S1}	D _{S2}	D _{S3}	D _{S4}	Z _S	L _S = L _{total} ²⁾	
Min.	Max.	Min.	Max.												
SA 75/10	10	12	28	45	39.5	5	54.5	M6	75	100	118	9	8	108	
SB 75/10	24				58										34.5
SC 75/10	40				80										10.0

Size	Dimensions [mm]													
	External rotor					Flange hub					General			
	D _{A1}	D _{A2}	D _{A3}	G _A	L _{A1}	Finish bore d _f ¹⁾	D _{F1}	D _{F2}	L _{F1}	L _{F2}	G _F	ΔS	Total length ³⁾	
													Min.	Max.
SA 75/10	90	100	110	M6	41.3	42	60	114	64.5	35.5	M8	12.2	148.5	172.5
SB 75/10					61.3								162.5	
SC 75/10					83.8								167.5	

¹⁾ Bores H7 with keyway to DIN 6885 sheet 1 [JS9]

²⁾ Total length without flange hub

³⁾ Total length with flange hub

1.2 Selection data

Table 3: Permissible operating pressure

Temperature [°C]	Operating pressure P _N [bar]	Max. operating pressure P _{max} [bar]
40	14	21
70	13	19.5
100	12	18
130	10	15

Perm. operating temperature: 130 °C
Max. speed: 3600 rpm

The operation with several max. ratings at the same time must be avoided to undermine operational safety.

The materials of the magnetic coupling result from the application and are bound to the order.

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2 Advice

2.1 General advice

Please read through these operating/assembly instructions carefully before you start up the coupling. Please pay special attention to the safety instructions! The operating/assembly instructions are part of your product. Please store them carefully and close to the coupling. The copyright for these operating/assembly instructions remains with KTR.

2.2 Safety and advice symbols



Warning of personal injury

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.



Warning of product damages

This symbol indicates notes which may contribute to preventing material or machine damage.



General advice

This symbol indicates notes which may contribute to preventing adverse results or conditions.



Warning of hot surfaces

This symbol indicates notes which may contribute to preventing burns with hot surfaces resulting in light to serious bodily injuries.

2.3 General hazard warnings



For people with pacemakers it is dangerous to stay within a distance of 2 m around the MINEX[®]-S. With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is secured against accidental switch-on. You may be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety indications.



With magnetic data media (cheque cards, disks etc.) within a distance of 1 m around the MINEX[®]-S. The internal and the external rotor have a strong magnetic field. Within a distance of 0.5 m around the MINEX[®]-S uncontrolled handling close to metallic parts, sudden mutual attraction of the rotors or magnetizable parts may cause injuries or damages on the parts.



- Operations on the MINEX[®]-S are generally only permitted with standstill and unpressurized condition.
- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to switch off the power pack before you perform your work on the coupling.
- Secure the power pack against accidental switch-on, e. g. by providing warning signs at the place of switch-on or removing the fuse for current supply.
- Do not reach into the operation area of the coupling as long as it is in operation.
- Please secure the coupling against accidental contact. Please provide for the necessary protection devices and covers.

The user is asked to check within the scope of his safety concept as to which impacts on the environment may be associated with a failure of the magnetic coupling and which additional safety measures protecting people must be taken.

In addition to the advice given in this safety data sheet the general instructions for operational safety and accident prevention must be observed.

Please observe protection note ISO 16016.	Drawn: 2018-06-20 Kb/Brd	Replacing: KTR-N dated 2015-09-23
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2 Advice

2.4 Intended use

You may only assemble, operate and maintain the coupling if you

- have carefully read through the operating-/assembly instructions and understood them
- had technical training
- are authorized by your company

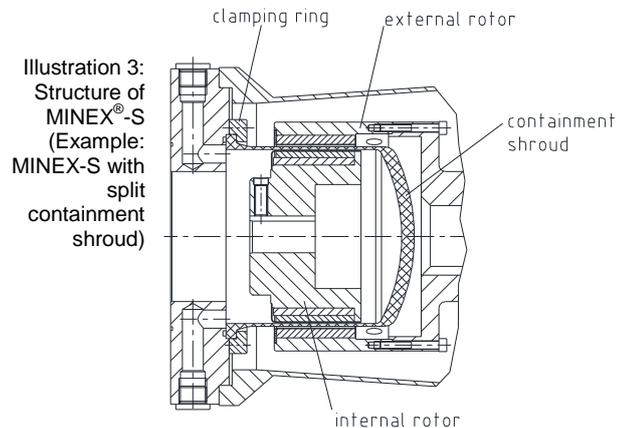
The coupling may only be used in accordance with the technical data (see chapter 1). Unauthorized modifications on the coupling design are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.

The **MINEX[®]-S** described in here corresponds to the technical status at the time of printing of these operating/assembly instructions.

2.5 Hints on couplings

For a safe operation of the magnetic coupling a circulation of the medium is definitely necessary ensuring a permanent heat dissipation.

For dirty media containing abrasive or magnetic parts a separation in the circulation is recommended.



3 Storage, transport and packaging

3.1 Storage

The coupling hubs are supplied in preserved condition and can be stored at a dry and covered place for 2 years.



The storage rooms must not include any ozone-generating devices like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances.
Humid storage rooms are not suitable.
Please make sure that condensation is not generated. The best relative air humidity is less than 65 %.
A direct contact with metallic parts must be avoided.
Direct heat exposure (sun, heating) on the MINEX[®]-S must be avoided.

With the conservation of all units having a MINEX[®]-S installed, the compatibility of the preservative selected with MINEX[®]-S materials must be checked.

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3 Storage, transport and packaging

3.2 Transport and packaging



In order to avoid any injuries and any kind of damage please always make use of proper lifting equipment.

The couplings are packed differently each depending on size, number and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.

4 Assembly

The coupling is generally supplied in individual parts. Before assembly the coupling has to be inspected for completeness.



Please make sure that the coupling components are not damaged when unpacking them. The coupling components have a strong magnetic field.

4.1 Components of MINEX[®]-S

Components of the MINEX[®]-S, size SA 75/10 to SE 165/24

Component	Quantity	Description
1	1	External rotor
2	1	Containment shroud with clamping ring
3	1	Internal rotor
4	1	Setscrew DIN EN ISO 4029 ¹⁾
5 ²⁾	1	Flange hub with setscrew DIN EN ISO 4029 ¹⁾ and cap screws DIN EN ISO 4762 or hexagon screw DIN EN ISO 4017

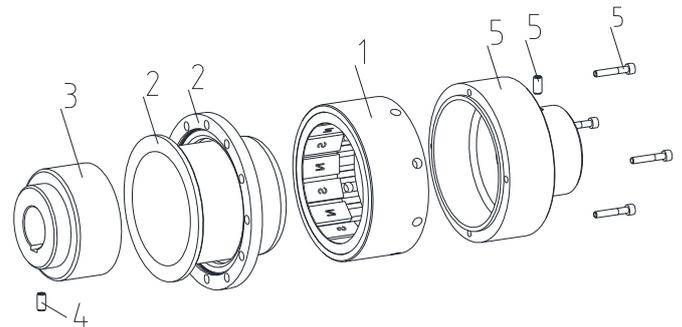


Illustration 4: MINEX[®]-S, size SA 75/10 to SE 165/24

¹⁾ with finish bored type only
²⁾ only on request

Components of MINEX[®]-S, size SA 75/10 to SC 75/10 with one-piece containment shroud

Component	Quantity	Description
1	1	External rotor
2	1	Containment shroud
3	1	Internal rotor
4	2	Setscrew DIN EN ISO 4029 ¹⁾
5 ²⁾	1	Flange hub with setscrew DIN EN ISO 4029 ¹⁾ and cap screws DIN EN ISO 4762 or hexagon screw DIN EN ISO 4017

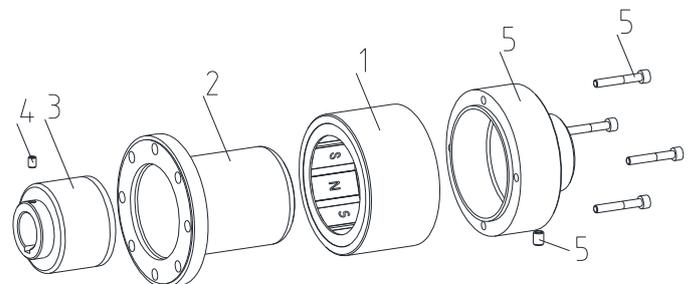


Illustration 5: MINEX[®]-S, size SA 75/10 to SC 75/10 with one-piece containment shroud

¹⁾ with finish bored type only
²⁾ only on request



4 Assembly

4.1 Components of MINEX[®]-S



If KTR also supplies component 5, the following tightening torques must be considered when screwing the hub with the external rotor. The screws used are also part of the scope of delivery of KTR.

Table 4: Tightening torques of the cap screws or hexagon screw

Size	75/10	110/16	135/20	165/24
Cap screw acc. to DIN EN ISO 4762 ¹⁾ or hexagon screw DIN EN ISO 4017 ¹⁾	M6			
Tightening torque T _A [Nm]	14			

¹⁾ min. property class 10.9

4.2 Advice for finish bore



The maximum permissible bore diameters d (see table 1 and 2 in chapter 1.1 *Sizes and dimensions*) must not be exceeded. If these figures are disregarded, the coupling may tear. Rotating particles may cause danger to life.

- Hub bores machined by the customer have to observe concentricity or axial runout, respectively (see illustration 6 and 7).
- Please make absolutely sure to observe the figures for d_{max}.
- Carefully align the hubs when the finish bores are drilled.
- Please provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

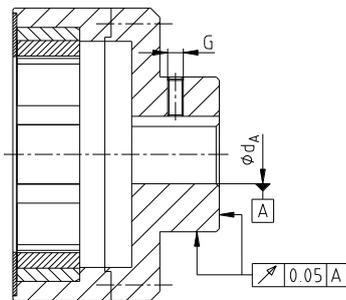


Illustration 6: Concentricity and axial runout on the flange hub

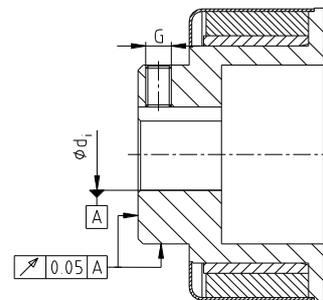


Illustration 7: Concentricity and axial runout on the internal rotor



The customer bears the sole responsibility for all machining processes performed subsequently on unbored or pilot bored as well as finish machined coupling components and spare parts. KTR does not assume any warranty claims resulting from insufficient re-machining.

Table 5: Setscrews DIN EN ISO 4029

Size	75/10	110/16	135/20	165/24	75/10	110/16	135/20	165/24
	Internal rotor				Flange hub ¹⁾			
Dimension G	M6	M8	M10	M12	M8	M10	M12	M12
Tightening torque T _A [Nm]	4.8	10	17	40	10	17	40	40

¹⁾ if the flange hub is supplied by KTR

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4 Assembly

4.3 Advice on driving and driven shaft

- When manufacturing the pump shaft and the adapter plate for the containment shroud, the concentricity and the axial runout (see illustration 8) must be observed.
- With use of the containment shroud with clamping ring:
Please use tolerance H7 for centering the containment shroud (illustration 8).
- With use of the one-piece containment shroud (size 75):
Please use tolerance f7 for centering the containment shroud (illustration 8).
- Tolerance fits and surfaces for O-rings:
finely finished R_z 6.3 μm.

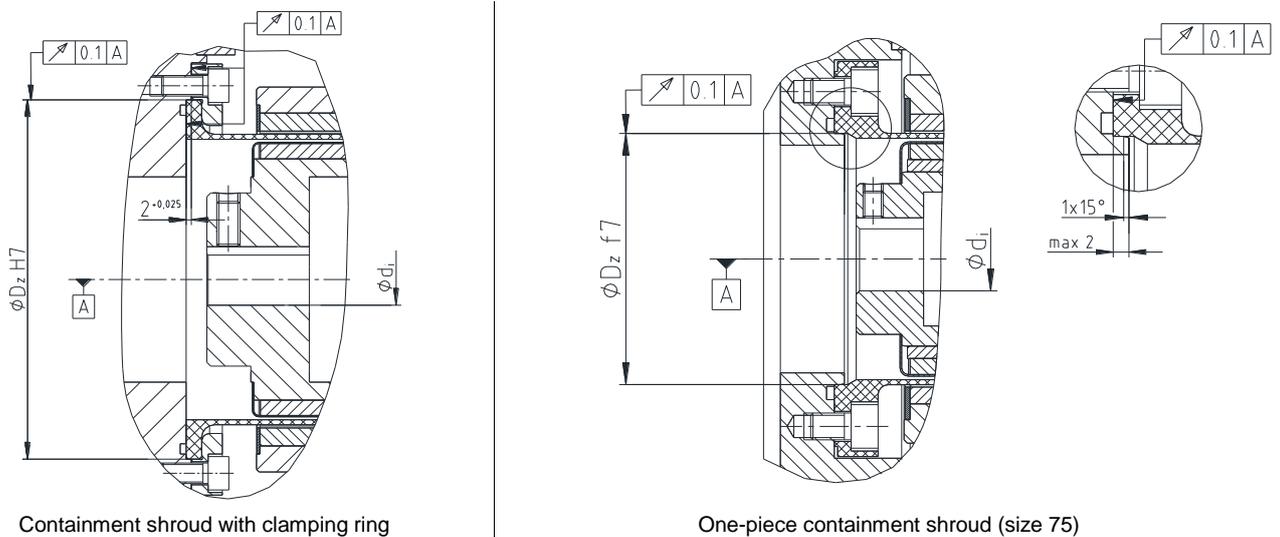


Illustration 8: Tolerances of driven-sided connection components

4.4 Assembly of internal and external rotor



For the assembly we would recommend to have the data sheet of the magnetic coupling with you.



Impacts and shocks on the coupling components are not permissible. They may cause damages on the components.



We recommend to inspect bores, shaft, keyway and feather key for dimensional accuracy before assembly.

- Before assembly the internal and external rotor must be cleaned to remove the magnetic dust. Recommended utilities are: Propyl alcohol and cellulose cloths (no cleaning rags).
- Screw the external rotor with the flange hub. Tighten the screws at the tightening torque specified in table 4.
- Mount the internal rotor and the external rotor on the shaft of driving and driven side.



Heating the internal rotor and the flange hub lightly (approx. 80 °C) allows for an easier mounting on the shaft.



Touching the heated hubs causes burns. Please wear safety gloves.

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4 Assembly

4.4 Assembly of internal and external rotor

- Please observe the distance dimensions between the internal and the external rotor (S_1 and $S_1 + \Delta S$) and the sealing surface of the containment shroud specified in table 1 or 2. Hereby you ensure that the outer and the inner magnets are flush above each other.



The user must ensure a correct alignment of the internal rotor and the containment shroud.

- Secure the rotors by tightening the setscrews acc. to DIN EN ISO 4029 (see table 5) or by using an end plate and end screw.

4.5 Assembly of the containment shroud

- Put the O-ring or the flat sealing - each depending on the design - into the adapter flange or the mounting groove of the containment shroud.



The material must be resistant to the conditions of use intended (medium, temperature).

- With use of the containment shroud with clamping ring:
Push the containment shroud over the internal rotor and center it on the adapter or pump flange. Fit the clamping ring over the containment shroud and screw with the adapter or pump flange.
- With use of the one-piece containment shroud (size 75):
Shift the containment shroud over the internal rotor and screw it with the adapter or pump flange.
- Tighten the cap screws evenly crosswise step by step to the tightening torque specified in table 6. Repeat this process until all cap screws have reached the full tightening torque.

Table 6: Recommended tightening torques for cap screws from V2A-70 – DIN EN ISO 4762

Size	Thread	z = Quantity	T _A [Nm]
75/10	M8	8	12
110/16	M8	12	25
135/20	M5	12	6
165/24	M6	12	10

- The user has to ensure venting or draining of the internal space of the containment shroud himself.
- Please make sure that driving and driven side are connected slowly to prevent the external rotor from striking against the containment shroud.



There is the danger of squeezing if the magnets of internal and external rotor are tightened suddenly.

- Please make sure that there is a radial direction with the assembly because the external rotor must not touch the containment shroud.



Do not damage the external rotor and the containment shroud during the assembly.

- Fill the complete machine and containment shroud with one medium during standstill.
- Please carefully ventilate the containment shroud and the circulation cycle.

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4 Assembly

4.6 Displacements - alignment of the coupling

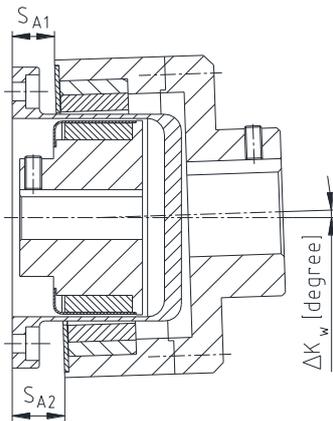
The displacement figures specified in table 7 provide for sufficient safety to compensate for external influences like, for example, thermal expansion or foundation settling.



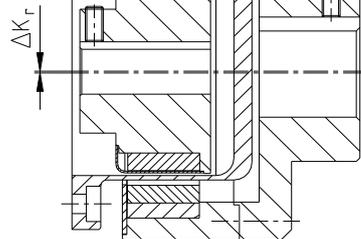
In order to ensure a long service life of the coupling, the shaft ends have to be accurately aligned. Please absolutely observe the displacement figures specified (see table 7). If the figures are exceeded, the coupling will be damaged. The more accurate the alignment of the coupling, the longer is its service life.

Please note:

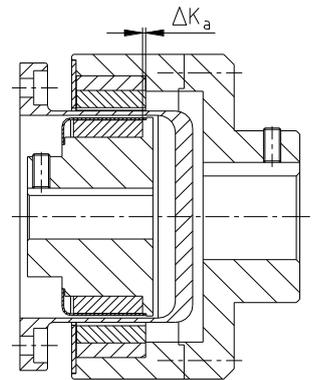
- The displacement figures specified in table 7 are maximum figures which must not arise in parallel. If radial and angular displacements arise at the same time, the permissible displacement values may only be used proportionally (see illustration 10).
- Please inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures of table 7 can be observed.



Angular displacement



Radial displacement



Axial displacement

$$\Delta K_w = S_{A2} - S_{A1} \text{ [mm]}$$

Illustration 9: Displacements

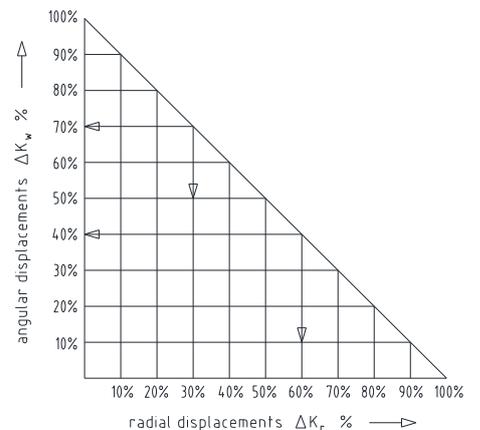
Examples of the displacement combinations specified in illustration 10:

Example 1:
 $\Delta K_r = 30 \%$
 $\Delta K_w = 70 \%$

Example 2:
 $\Delta K_r = 60 \%$
 $\Delta K_w = 40 \%$

$$\Delta K_{total} = \Delta K_r + \Delta K_w \leq 100 \%$$

Illustration 10: Combinations of displacement



**4 Assembly****4.6 Displacements - alignment of the coupling****Table 7: Displacement figures**

Size	Max. angular displacement		Max. radial displacement ΔK_r [mm]	Max. axial displacement ΔK_a [mm]
	ΔK_w [Degree]	ΔK_w [mm]		
SA 75/10	1.6	3.07	0.40	± 1
SB 75/10	0.8	1.54		
SC 75/10	0.56	1.08		
SA 110/16	1.28	3.24	0.32	
SB 110/16	0.64	1.62		
SC 110/16	0.48	1.21		
SB 135/20	0.88	2.61	0.42	
SC 135/20	0.56	1.66		
SD 135/20	0.40	1.19		
SC 165/24	0.48	1.66	0.37	
SD 165/24	0.40	1.38		
SE 165/24	0.32	1.11		

4.7 Disassembly

If you disassemble the magnetic coupling, please absolutely observe the instructions that apply for handling hazardous substances and the accident prevention regulations. In cases of doubt, please gather the necessary information before disassembly.



Please observe the warnings and safety instructions.

The disassembly of the magnetic coupling is made in the reverse order of the assembly.

5 Start-up

Before start-up of the coupling, please inspect the tightening of the setscrews in the hubs, the alignment and adjust, if necessary, and also inspect all screw connections for the tightening torques specified, dependent on the size of coupling.

Finally the coupling protection against accidental contact must be fitted.

The cover must be electrically conductive and included in the equipotential bonding. Bellhousings (magnesium share below 7.5 %) made of aluminium and damping rings (NBR) can be used as connecting element between pump and electric motor. The cover may only be taken off with standstill of the unit.

- With start-up and after a longer period of standstill it must be tested (by rotating the driving shaft manually) if coupling and power pack can easily be rotated.
- After a short initial operation the venting process must be repeated several times with standstill of the machine.



The MINEX[®]-S must never be used with dry operation over a longer period.

Please note:

In general the internal and the external rotor of the magnetic coupling must always run synchronously. The operation in a „condition torn" over a longer period of time must be avoided because the containment shroud can be heated to an inadmissible level. After switching off the engine the coupling synchronizes again and is able to transmit the full power.

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5 Start-up

Before longer periods of standstill liquids tending to solidification, efflorescence, polymerization etc. must be drained from the machine and the containment shroud. If necessary, they must be flushed with a suitable liquid.

A troublefree operation of the MINEX[®]-S can be expected if you observe the maximum ratings of operation and the hints given in these instructions.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.

The minimum distance „Sr“ between the protective device and the rotating parts must at least correspond to the figures specified below.

Openings	Cover [mm]		
	Top side	Lateral components	Distance „Sr“
Circular - max. diameter	4	8	≥ 10
Rectangular - max. lateral length	4	8	≥ 10
Straight or curved slot - max. lateral length/height	not permissible	8	≥ 20



If you note any irregularities with the coupling during operation, the drive unit must be switched off immediately. The cause of the breakdown must be specified by means of the table „Breakdowns“ and, if possible, be eliminated according to the proposals. The potential breakdowns mentioned can be hints only. To find out the cause all operating factors and machine components must be considered.

6 Breakdowns, causes and elimination

The below-mentioned failures can result in a use of the **MINEX[®]-S** coupling other than intended. In addition to the specifications given in these operating and assembly instructions please make sure to avoid such failures. The errors listed can only be clues to search for the failures. When searching for the failure the adjacent components must generally be considered.

General failures with use other than intended

- Important data for the coupling selection were not forwarded.
- The calculation of the shaft-hub-connection was not considered.
- Coupling components with damage occurred during transport are assembled.
- If the heated hubs are assembled, the permissible temperature is exceeded.
- The clearance of the components to be assembled is not coordinated with one another.
- Tightening torques have been fallen below/exceeded.
- Components are mixed up by mistake/assembled incorrectly.
- No original KTR parts (purchased parts) are used.
- Maintenance intervals are not observed.

Please observe protection note ISO 16016.	Drawn: 2018-06-20 Kb/Brd	Replacing: KTR-N dated 2015-09-23
	Verified: 2018-06-20 Kb	Replaced by:

**6 Breakdowns, causes and elimination**

Breakdowns	Causes	Elimination
Different operating noise and/or vibrations occurring	Misalignment	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Eliminate the reason for the misalignment (check the centering of the internal and the external rotor in the containment shroud and re-align, if necessary) 3) Check the wear and remove the magnetic chippings completely, if required
	Tearing of the magnetic forces	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Eliminate the reason for tearing (blockade of the pump by particles in the conveyed medium, damage on the bearing, too high starting torque of the engine, „docking“ of the internal or external rotor to the containment shroud subject to bad alignment ⇒ see above) 3) Re-synchronize the coupling components at standstill 4) Start the drive again 5) Please check the perfect operation
	Damaged external magnets due to errors in assembly (contact of the external rotor with the containment shroud)	<ol style="list-style-type: none"> 1) Check the external rotor for damages on the magnet 2) Replace the external rotor and assemble it carefully. Please make sure that there is a radial direction to exclude contact with the containment shroud.
Repeated tearing of the magnetic forces	Operating parameters do not correspond to the performance of the coupling	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Inspect operation parameters 3) If there is tearing during the starting process, the starting torque must be reduced and/or a bigger coupling size must be selected (considering the installation space) 4) Assemble new coupling size, inspect alignment
	Operating temperature is too high, thus the magnetic field is weakened	<ol style="list-style-type: none"> 1) Inspect the coupling torque 2) Please replace the internal and external rotor if the torque is insufficient 3) If required, please optimize the compulsory cooling flow of the internal rotor. If required, please optimize the material of the containment shroud (e. g. Hastelloy, titan, ceramics).
	Abrasive particles in the conveying medium blocking the pump	<ol style="list-style-type: none"> 1) Inspect the internal rotor and the containment shroud for friction and replace them, if necessary 2) Drain and clean the inside of the containment shroud 3) Use suitable filters re-constituting the purity of the medium.

7 Environment and disposal**7.1 Environment**

In the interest of the environment our products comply with directive EC 1907/2006 (REACH). Any substances specified in the REACH SVHC list in an impermissible concentration are not used.

7.2 Disposal

In respect of environmental protection we would ask you to dispose of the packaging or products on termination of their service life in accordance with the legal regulations and standards that apply, respectively.
All coupling components consist of metal. Any metal components have to be cleaned and disposed of by scrap metal.

Please observe protection note ISO 16016.	Drawn: 2018-06-20 Kb/Brd	Replacing: KTR-N dated 2015-09-23
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KTR-Group

**MINEX[®]-S with containment shroud
made of PEEK
Operating/Assembly instructions**

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8 Spares inventory, customer service addresses

A basic requirement to ensure the operational readiness of the coupling is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage at www.ktr.com.



KTR does not assume any liability or warranty for the use of spare parts and accessories which are not provided by KTR and for the damages which may incur as a result.

Please observe protection note ISO 16016.	Drawn: 2018-06-20 Kb/Brd	Replacing: KTR-N dated 2015-09-23
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