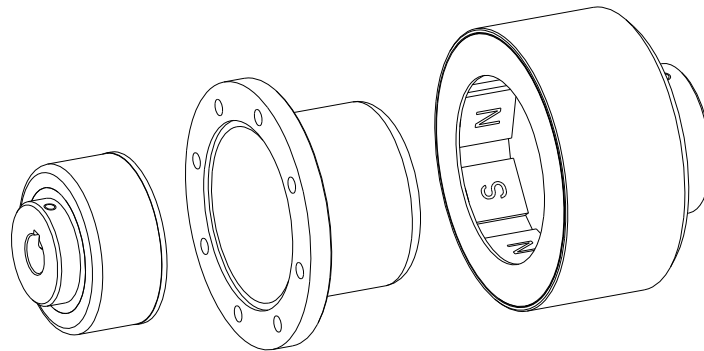




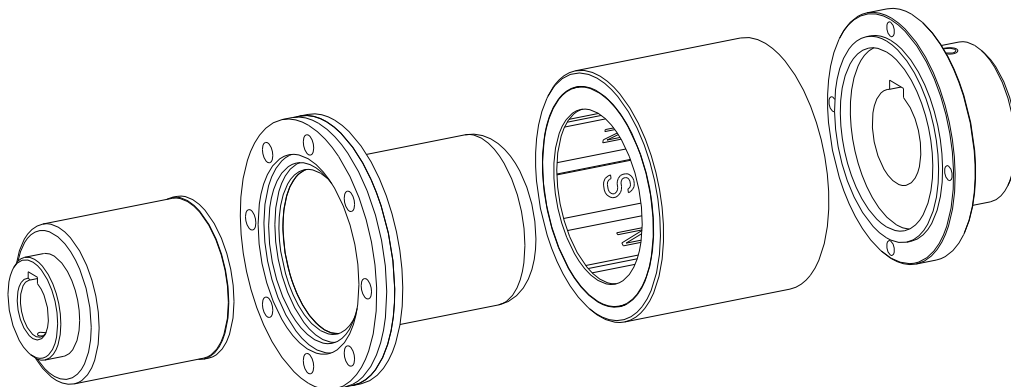
These operating and assembly instructions exclusively apply for those types of MINEX[®]-S with containment shroud made of stainless steel or Hastelloy[®].

MINEX[®]-S Permanent-magnetic coupling with containment shroud made of stainless steel or Hastelloy[®]

according to EU directive 2014/34/EU
for finish bored, pilot bored and unbored couplings



Size SA 22/4 to SB 60/8









Size SA 75/10 to SF 250/38

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: 2017-01-02 Shg/Ed	Replacing: KTR-N dated 2016-05-24
	Verified: 2017-01-02 Shg	Replaced by:



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1 Technical data

1.1 Sizes and dimensions

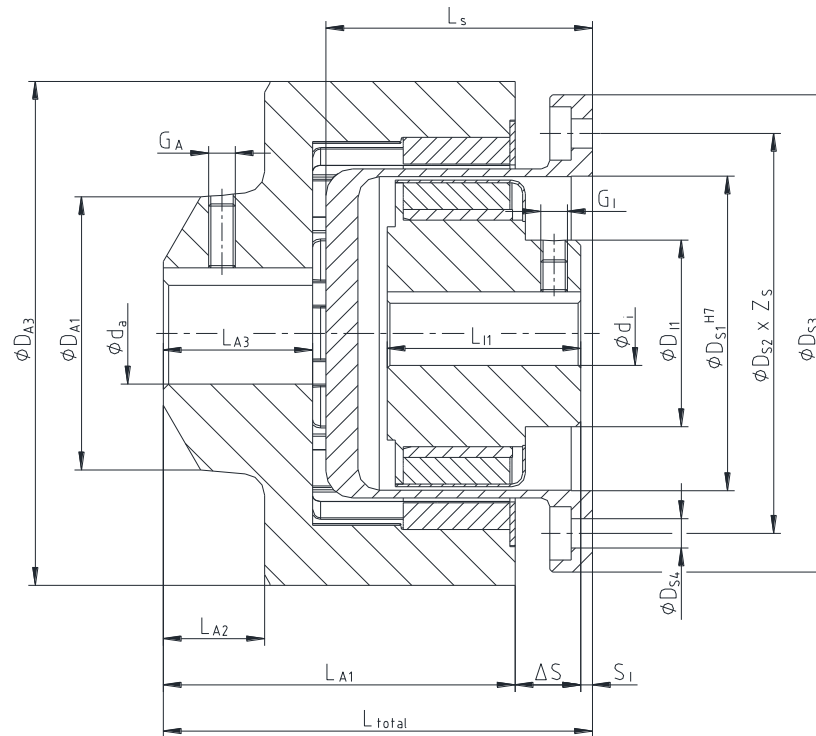


Illustration 1: MINEX[®]-S SA 22/4 to SB 60/8

Table 1: Dimensions – SA 22/4 to SB 60/8 with containment shroud made of stainless steel

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
		Min.	Max.			Min.	Max.							
SA 22/4	0.15	5	9	20	20	2.0	2.0	M3	21.5	38	46	4.5	8	29
SA 34/10	1	5	12	20	22	2.0	5.5	M3	34	46	55	4.5	4	30.5
SA 46/6	3	8	16	28	33	6.5	7.0	M4	46	64	78	4.5	8	45
SA 60/8	7	12	22	35	36.3	1.7	5.5	M5	59	75	89	5.5	8	50
SB 60/8	14			36	56	0.0	4.0							70.3

Size	Dimensions [mm]										
	External rotor							General			
	Finish bore ¹⁾ d _a		D _{A1}	D _{A3}	L _{A1}	L _{A2}	L _{A3}	G _A	ΔS	L _{total}	
Min.	Max.	Min.								Max.	
SA 22/4	5	11	18	38	35	8.5	11	M4	5.0	42	42
SA 34/10	5	14	22	53	38.8	10.5	13	M4	5.3	46	49.5
SA 46/6	5	24	40	69.5	53	16	22	M5	9.0	69	69.5
SA 60/8	9	32	50	94.5	66	19	28	M6	12.0	80	83.3
SB 60/8	9	38			93.3	15	30			M8	105.2

1) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew



1 Technical data

1.1 Sizes and dimensions

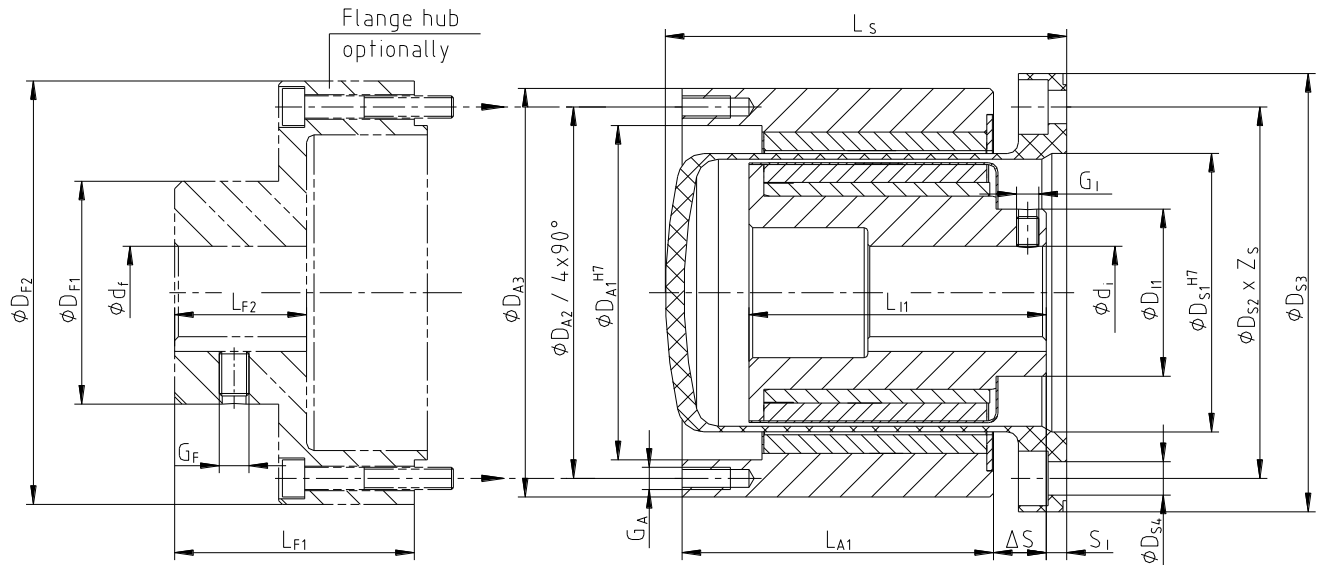


Illustration 2: MINEX®-S SA 75/10 to SF 250/38

Table 2: Dimensions – SA 75/10 to SF 250/38 with containment shroud made of stainless steel or Hastelloy®

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 = L _{total} ²⁾	
Min.	Max.	Min.	Max.												
SA 75/10	10	12	32	45	39.5	4	46.5	M6	75	100	118	9	8	102	
SB 75/10	58				26.5										
SC 75/10	80														4.0
SA 110/16	25	14	55	80	45	4	55.0	M8	110	133	153	9	12	115	
SB 110/16	60				65										35.0
SC 110/16	95														
SB 135/20	100	20	70	90	65	4	50.5	M10	135	158	178	9	16	139	
SC 135/20	145				85										30.5
SD 135/20	200														
SC 165/24	210	24	80	110	85	6	61.5	M12	163.5	192	218	11	12	170	
SD 165/24	280				110										39.0
SE 165/24	370														
SD 200/30	410	38	90	130	135	6	24.0	M16	200	252	278	11	12	180	
SE 200/30	530														
SD 250/38	670				115										46.0
SE 250/38	820	38	100	165	135	6	26.0	M16	255	285	315	13.5	12	182	
SF 250/38	1000				155										6.0

1) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew
2) Total length without flange hub



1 Technical data

1.1 Sizes and dimensions

Page 4 continued:

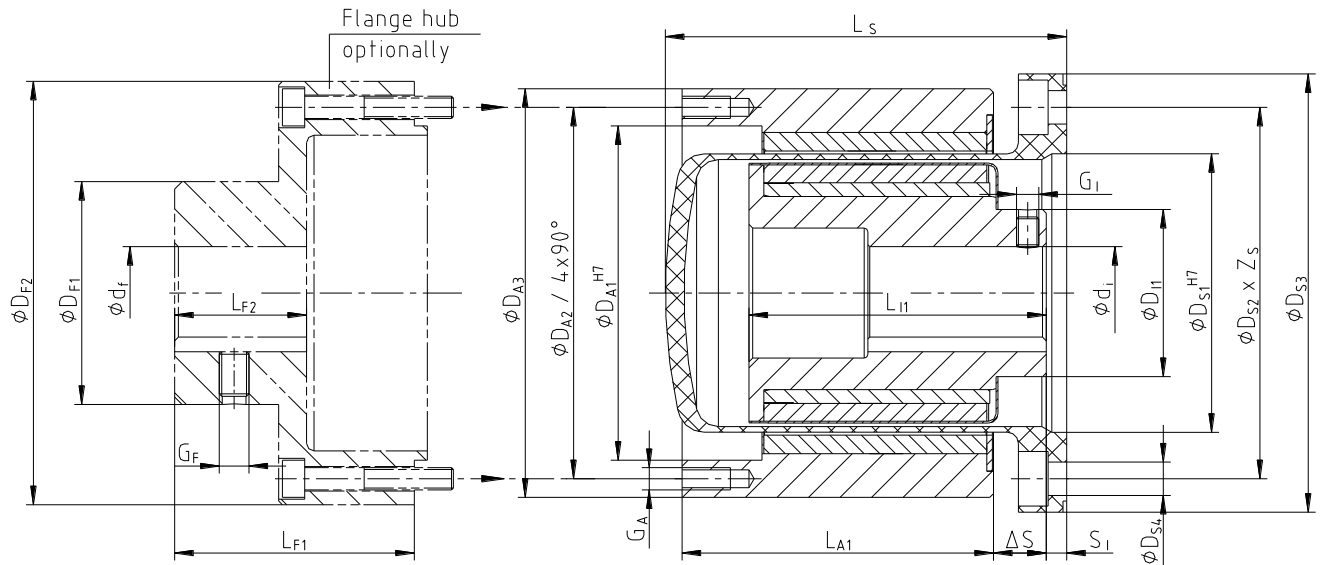


Illustration 2: MINEX®-S SA 75/10 to SF 250/38

Table 2: Dimensions – SA 75/10 to SF 250/38 with containment shroud made of stainless steel or Hastelloy®

Size	Dimensions [mm]													
	External rotor					Flange hub						General		
	D_{A1}	D_{A2}	D_{A3}	L_{A1}	G_A	Max. finish bore ¹⁾ d_f	D_{F1}	D_{F2}	L_{F1}	L_{F2}	G_F	ΔS	Total length ²⁾	
													Min.	Max.
SA 75/10	90	100	110	41.3	M6	42	60	114	64.5	35.5	M8	12.2	140	164.5
SB 75/10				61.3									142	
SC 75/10				83.8									166.5	
SA 110/16	126	135	145	41.3	M6	55	85	150	99.5	59.5	M10	19.0	177.5	214.5
SB 110/16				61.3									183.5	
SC 110/16				81.3									203.5	
SB 135/20	150	160	170	70.3	M6	70	100	170	65.5	48.5	M12	18.5	190.5	204.5
SC 135/20				90.3									200.5	
SD 135/20				110.3										
SC 165/24	180	188	198	90.3	M6	75	110	198	77	60	M16	18.5	233	247
SD 165/24				110.3									234	
SE 165/24				130.3										
SD 200/30	212	222	232	130.3	M6	80	120	232	120	98	M12	26.0	282	300
SE 200/30				110.3									282	
SD 250/38				130.3										
SE 250/38	267	282	292	130.3	M6	100	150	300	140	93	M16	26.0	302	322
SF 250/38				150.3									322	

1) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew
2) Total length with flange hub



1 Technical data

1.2 Selection data

Perm. operating pressure:	16 bar with 300 °C ¹⁾ 16 bar with 150 °C ²⁾ 25 bar with 300 °C ^{1), 3)} 25 bar with 150 °C ^{2), 3)} Higher resistances to pressure are possible on request, if required.
Perm. operating temperature:	300 °C ¹⁾ / 150 °C ²⁾
Max. speed:	3600 rpm ⁴⁾ Higher speeds are possible on request, if required.

1) Figures are valid for magnets made of Sm2Co17

2) Figures are valid for magnets made of NdFeB

3) Figures are valid for containment shrouds made of Hastelloy[®] - 1.4571 (flange)

4) Figure is valid if metallic containment shrouds according to KTR standard are used

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.

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 **MINEX[®]-S** coupling is suitable and approved for the use in hazardous locations. When using the coupling in hazardous locations, please observe the special advice and instructions regarding safety in enclosure A.

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 potentially explosive atmospheres

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



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 Advice

2.3 General hazard warnings



For people with pacemakers the handling of MINEX[®]-S is dangerous. In this case it is compulsory to meet the following measures:

- A safety distance of 2 m must be kept towards the non-assembled components of the coupling.
- For assembled couplings with magnetic robots aligned in axial position to each other and with an ambient housing of the coupling (bellhousing) a minimum safety distance of 0.5 m applies.
A crane should be used for handling assembled drive units.

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.

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 Advice

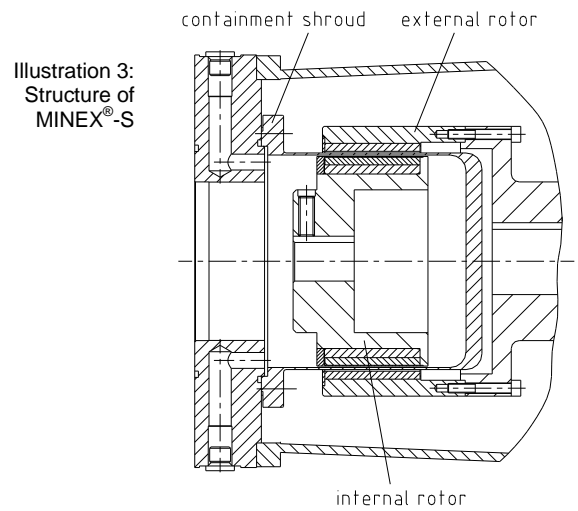
2.5 Reference to EC Machinery Directive 2006/42/EC

The couplings supplied by KTR should be considered as components, not machines or partly completed machines according to EC Machinery Directive 2006/42/EC. Consequently KTR does not have to issue a declaration of incorporation. For details about safe assembly, start-up and safe operation please refer to the present operating/assembly instructions considering the warnings.

2.6 Hints on couplings

For a safe operation of the magnetic coupling a circulation of the medium is mandatory 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.

3.2 Transport and packaging



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

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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 22/4 to SB 60/8

Component	Quantity	Description
1	1	External rotor
2	1	Containment shroud
3	1	Internal rotor
4	2	Setscrew DIN EN ISO 4029 ¹⁾

1) with finish bored type only

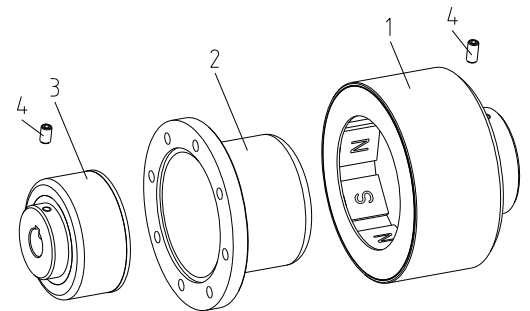


Illustration 4:
MINEX[®]-S, size
SA 22/4 to SB
60/8

Components of the MINEX[®]-S, size SA 75/10 to SF 250/38

Component	Quantity	Description
1	1	External rotor
2	1	Containment shroud
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

1) with finish bored type only

2) only on request

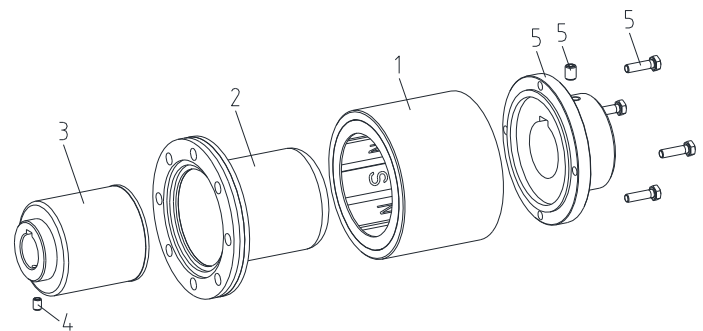


Illustration 5: MINEX[®]-S, size SA 75/10 to SF 250/38



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 3: Tightening torques of the cap screws or hexagon screws

Size	75/10	110/16	135/20	165/24	200/30	250/38
Cap screws acc. to DIN EN ISO 4762 ¹⁾ or hexagon screws DIN EN ISO 4017 ¹⁾	M6					
Tightening torque T _A [Nm]	14					

1) min. property class 10.9

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4 Assembly

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 $\varnothing d_{max}$.
- 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.

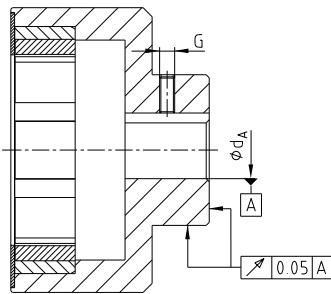


Illustration 6: Concentricity and axial runout on external rotor

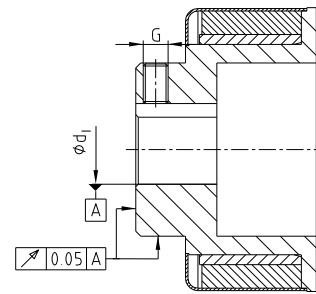


Illustration 7: Concentricity and axial runout on internal rotor



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 remachining.



KTR supplies unbored or pilot bored coupling components and spare parts only upon explicit request of the customer. These parts are additionally labelled with the symbol Ⓢ .

Table 3: Setscrews DIN EN ISO 4029

Size	22/4	34/10	46/6	60/8	75/10	110/16	135/20	165/24	200/30	250/38	
Internal rotor											
Dimension G	M3	M3	M4	M5	M6	M8	M10	M12	M16	M16	
Tightening torque T_A [Nm]	1	1	1.5	2	4.8	10	17	40	80	80	
External rotor											
Dimension G	M4	M4	M5	M6 ¹⁾	M8 ¹⁾	M8 ²⁾	M10 ²⁾	M12 ²⁾	M12 ²⁾	M12 ²⁾	M16 ²⁾
Tightening torque T_A [Nm]	1.5	1.5	2	4.8	10	10	17	40	40	40	80

1) with type SA 60/8 - M6; with type SB 60/8 - M8

2) 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.
- Please use tolerance f7 for centering the containment shroud.
- Tolerance fits and surfaces for O-rings: finely finished R_z 6.3 μm.

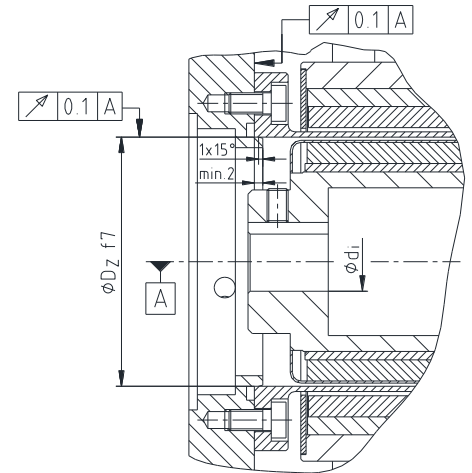


Illustration 8:
Tolerances of
driven-sided
connection
components

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).
- Mount the internal and external rotor onto the shaft of driving and driven side.



Heating the internal and external rotor lightly (approx. 80 °C) allows for an easier installation onto the shaft.



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

- Please observe the distance dimensions between internal and external rotor (S_i and $S_i + \Delta S$) and the sealing surface of the containment shroud specified in table 1 and 2. It is herewith ensured that the external and internal magnets are flush above each other.



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

- Please secure the rotors - each according to the design - by tightening the setscrews acc. to DIN EN ISO 4029 or by using an end plate and end screw.



4 Assembly

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).

- Shift the containment shroud over the internal rotor and screw it to the adapter flange.
- Tighten the cap screws step by step evenly crosswise to the tightening torque specified in table 4. The process has to be repeated until the tightening torque has been achieved with all cap screws.

Table 4: Recommended tightening torques for cap screws from V2A-70 – DIN EN ISO 4762

Size	Thread	z = Quantity	T _A [Nm]	Size	Thread	z = Quantity	T _A [Nm]
22/4	M4	8	2.6	110/16	M8	12	21
34/10	M4	8	2.6	135/20	M8	16	21
46/6	M4	8	2.6	165/24	M10	12	41
60/8	M5	8	5.1	200/30	M10	12	44
75/10	M8	8	21	250/38	M12	12	74

- 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 vent the containment shroud and the circulation cycle.

4.6 Displacements - alignment of the coupling

The displacement figures specified in table 5 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 and avoid dangers with the use in hazardous locations, the shaft ends must be accurately aligned.

Please absolutely observe the displacement figures specified (see table 5). If the figures are exceeded, the coupling will be damaged.



The more accurate the alignment of the coupling, the longer is its service life.

If used in hazardous locations for the explosion group IIC (marking II 2G c IIC T X), only half of the displacement figures (see table 5) are permissible.

Please note:

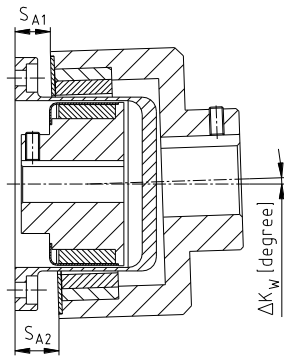
- The displacement figures specified in table 5 are maximum figures which must not arise in parallel. If radial and angular displacements arise at the same time, the permissible displacement values may only be used proportionally (see illustration 10).
- Please inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures of table 5 can be observed.

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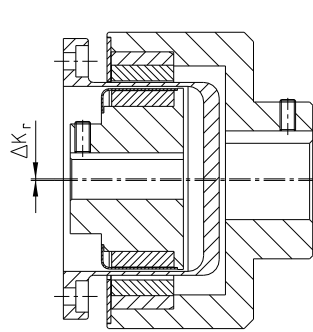


4 Assembly

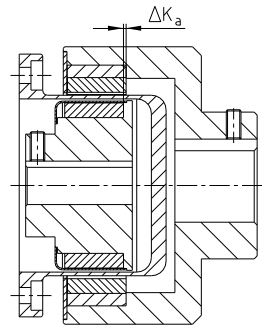
4.6 Displacements - alignment of the coupling



Angular displacement



Radial displacement



Axial displacement

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

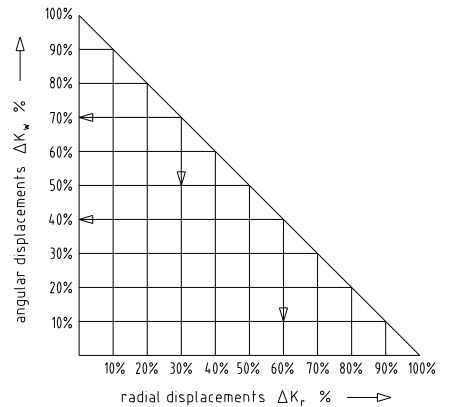
Illustration 9: Displacements

Examples of the displacement combinations specified in illustration 10:

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

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

Illustration 10:
Combinations of displacement



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

Table 5: 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 22/4	1.68	1.11	0.30	± 1
SA 34/10	1.92	1.78	0.29	
SA 46/6	0.88	1.07	0.19	
SA 60/8	1.52	2.48	0.37	
SB 60/8	0.80	1.32		
SA 75/10	1.60	3.07	0.40	
SB 75/10	0.80	1.54		
SC 75/10	0.56	1.08	0.32	
SA 110/16	1.28	3.24		
SB 110/16	0.64	1.62		
SC 110/16	0.48	1.21	0.42	
SB 135/20	0.88	2.61		
SC 135/20	0.56	1.66	0.37	
SD 135/20	0.40	1.19		
SC 165/24	0.48	1.66	0.39	
SD 165/24	0.40	1.38		
SE 165/24	0.32	1.11		
SD 200/30	0.40	1.62		
SE 200/30	0.32	1.30		
SD 250/38	0.38	1.92		
SE 250/38	0.31	1.56		
SF 250/38	0.26	1.32		



4 Assembly

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 case 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.



If used in hazardous locations the setscrews to fasten the hubs as well as all screw connections must be secured against working loose additionally, e. g. conglomerating with Loctite (average strength).

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.

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.



For covers with unlocked openings on the top face no light metals must be used if the couplings are used as equipment of equipment group II (if possible, from stainless steel).



5 Start-up

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

If the protective device is used as cover, regular openings can be arranged from the point of view explosion protection that must not exceed the following dimensions:

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.

Coating of coupling:



If coated (priming, paintings, etc.) couplings are used in hazardous locations, the requirements on conductivity and coating thickness must be considered. In case of paintings up to 200 µm electrostatic load does not have to be expected. Multiple coatings exceeding 200 µm are prohibited for explosion group IIC.

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.



If used other than intended the coupling can become a source of ignition. EU directive 2014/34/EU requires special care by the manufacturer and the user.

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** components (purchased parts) are used.
- : The coupling used/the coupling protection used is not suitable for the operation in hazardous locations and does not correspond to EU directive 2014/34/EU, respectively.
- Maintenance intervals are not observed.


6 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for hazardous locations	Elimination
Different operating noise and/or vibrations occurring	Misalignment	Increased temperature on the surface of the containment shroud and the rotors. Increased danger of ignition by hot surfaces.	<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	Heating of the coupling due to a lack of heat dissipation, danger of ignition due to hot surfaces	<ol style="list-style-type: none"> 1) Set the unit out of operation 2) Eliminate the reason for tearing (blocking 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 for 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 meet with 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
	If the operating temperature is too high (magnet material: Sm ₂ Co ₁₇ max 250 °C or NdFeB max. 150 °C), the magnetic field will be weakened	Danger of ignition due to hot surfaces	<ol style="list-style-type: none"> 1) Inspect the operation of the temperature feeler and the switch-off temperature 2) Inspect the coupling torque 3) Please replace the internal and external rotor if the torque is insufficient 4) 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.



If you operate with coupling components worn off and with subsequent contact of metal components a proper operation meeting the explosion protection requirements and acc. to EU directive 2014/34/EU is not ensured.



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.

8 Spares inventory, customer service addresses

A basic requirement to ensure the readiness for use 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.

9 Enclosure A

Advice and instructions regarding the use in  hazardous locations



Due to generation of heat when using metallic containment shrouds the following requirements for the use of the MINEX[®]-S must obligatorily be met:

- In order to exclude the generation of an inadmissible degree of heat, the temperature of the containment shroud must be monitored ensuring that the pump drive is switched off if the temperature is too high (see chapter 9.2).
- A dry operation of the magnetic coupling is not allowed, i. e. immediately after assembly and start-up of the magnetic coupling the internal space of the containment shroud must be filled with the conveyed medium.
- A compulsory cooling flow of the internal rotor by the conveyed medium or a sealing liquid must be provided for a continuous dissipation of the heat generated in the air gap.

9.1 Intended use in  hazardous locations

Conditions of operation in  hazardous locations

MINEX[®]-S couplings are suitable for the use according to EU directive 2014/34/EU.

Please observe protection note ISO 16016.	Drawn: 2017-01-02 Shg/Ed	Replacing: KTR-N dated 2016-05-24
	Verified: 2017-01-02 Shg	Replaced by:




9 Enclosure A

Advice and instructions regarding the use in  hazardous locations

9.2 Inspection intervals for couplings in  hazardous locations

Explosion group	Inspection intervals
all	If the MINEX [®] -S magnetic coupling is duly operated, maintenance is not required during the complete operating time. An inspection of the coupling, the shaft bearings and the auxiliary seals should be made by suitable specialized staff within the scope of the revision of the unit, but at the latest after 2.5 years.

9.3 Temperature monitoring in  hazardous locations

The compulsory monitoring of the heat generation in the coupling requires a suitable monitoring system with a respective temperature feeler.

The system for temperature monitoring must be suitable for the respective hazardous location.



The temperature feeler must be positioned between the containment shroud flange and the external rotor!

- The assembly should be made in the coupling housing or in the bellhousing, dependent on the design.
- The position should be as close as possible on the external rotor because that is where the highest temperature is. However, a minimum distance of 3 mm must be observed.

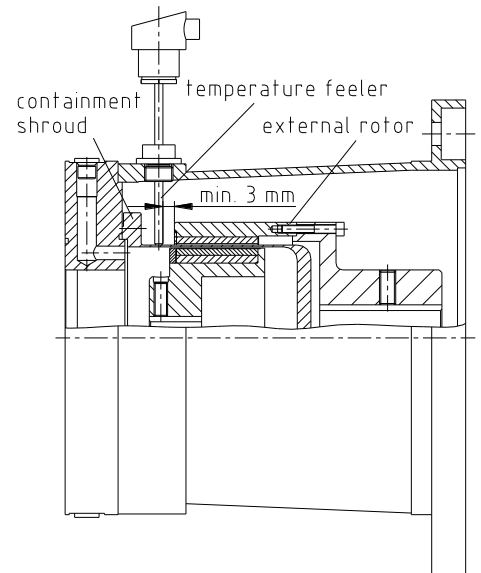


Illustration 11: Position of the temperature feeler

Dependent on the temperature class selected KTR stipulates the following switch-off temperatures for the temperature monitoring system:

Table 6:

Temperature class	Max. permissible surface temperature in °C	Switch-off temperature in °C		
		For temperature measurement with resistance thermometers		For temperature measurement with thermo elements immediately on the casing of the containment shroud
		In the blind hole in the containment shroud flange	Immediately on the casing of the containment shroud	
T1	450	250 ¹⁾	250 ¹⁾	250 ¹⁾
T2	300	250 ¹⁾	250 ¹⁾	250 ¹⁾
T3	200	185 ²⁾	190 ²⁾	195 ²⁾
T4	135	120	125	130
T5	100	85	90	95
T6	85	70	75	80

1) If the magnet material Sm2Co17 is used, the switch-off temperature based on the design is + 250 °C.

2) If the magnet material NdFeB is used, the switch-off temperature based on the design is + 150 °C.

Please observe protection note ISO 16016.	Drawn:	2017-01-02 Shg/Ed	Replacing:	KTR-N dated 2016-05-24
	Verified:	2017-01-02 Shg	Replaced by:	




9 Enclosure A

Advice and instructions regarding the use in  hazardous locations

9.4 Permissible coupling materials in  hazardous locations

The materials available for the **MINEX[®]-S** coupling are generally permitted for hazardous locations since these are only steel components (external rotor) and components made of stainless steel (internal rotor, containment shroud).



9.5  marking of coupling for hazardous locations

Couplings for the use in hazardous locations are marked on at least one component completely and on the remaining components by an  label on the outside diameter of the hub or on the front side each for the operating conditions permitted.

Complete labelling:




The labelling with explosion group IIC includes the explosion groups IIA and IIB.

If the symbol  was stamped in addition to , the coupling component was supplied unbored or pilot bored by KTR.

Please observe protection note ISO 16016.	Drawn: 2017-01-02 Shg/Ed	Replacing: KTR-N dated 2016-05-24
	Verified: 2017-01-02 Shg	Replaced by:



9 Enclosure A

Advice and instructions regarding the use in  hazardous locations

9.6 EU-Konformitätserklärung

EU Certificate of conformity

corresponding to EU directive 2014/34/EU dated 26 February 2014
and to the legal regulations

The manufacturer - KTR Systems GmbH, D-48432 Rheine - states that the

MINEX[®]-S Magnetic couplings

in an explosion-proof design described in these assembly instructions are components corresponding to article 2, 1. of directive 2014/34/EU and comply with the general safety and health requirements according to enclosure II of directive 2014/34/EU.

The coupling described in here complies with the specifications of the following standards/guidelines:

- DIN EN 13463-1
- DIN EN 13463-5


The MINEX[®]-S is in accordance with the specifications of the directive 2014/34/EU. One or several directives mentioned in the corresponding type examination certificate IBExU04ATEXB023 X were in part replaced by updated versions. KTR Systems GmbH being the manufacturer confirms that the product mentioned above is in accordance with the specifications of the new directives, too.


According to article 13 (1) b) ii) of directive 2014/34/EU the technical documentation is deposited with the institution:

IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7

09599 Freiberg

Rheine, 2017-01-02
Date

i. V. 
Reinhard Wibbeling
Engineering/R&D

i. A. 
Marco Vorholt
Product Manager