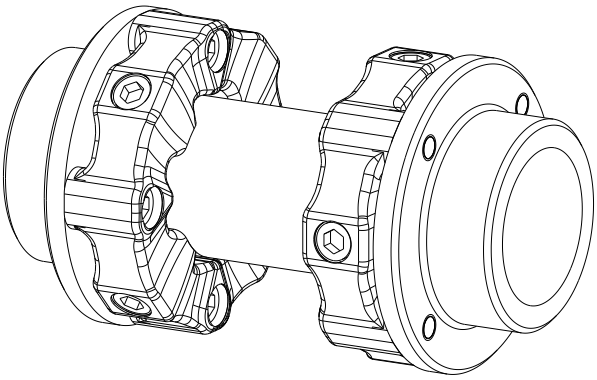
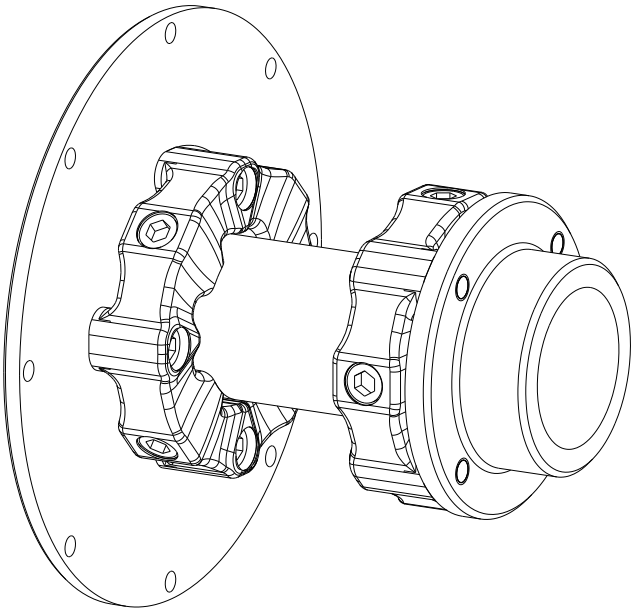
EVOLASTIC®

highly flexible coupling type
D2H and DFH and their combinations



Type D2H



Type DFH

EVOLASTIC® type D2H and DFH is a highly torsionally flexible, non-slip and backlash-free shaft and flange coupling. It dampens torsional vibrations and load shocks, reduces structure-borne noise transmission and compensates for axial, radial and angular displacements above average.
Types D2H and DFH are double-cardanic drive shafts. They bridge larger shaft distances and connect the power packs in a homokinetic and flexibly soft way.

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1 Technical data

1.1 Coupling dimensions and technical data

Type D2H

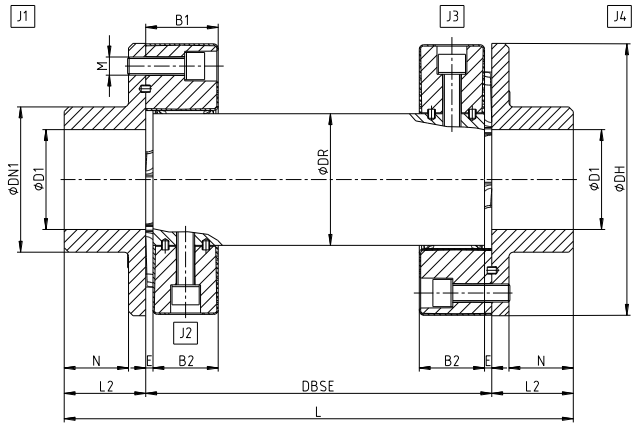


Illustration 1: EVOLASTIC® type D2H (size 12 to 280)

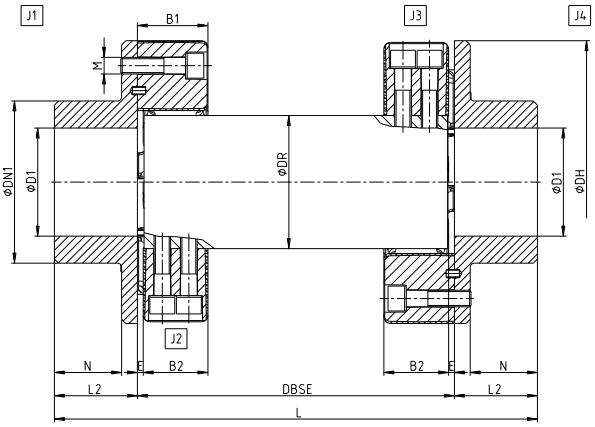


Illustration 2: EVOLASTIC® type D2H (size 360 and 560)

Table 1: Dimensions - type D2H

Size	Dimensions [1] [mm]									Cap screws DIN EN ISO 4762	
	DH	DN1	D1	DR	B1	B2	E	L2	N	M	Z x Pitch
12	122	80	55	60	32	28	4	42	32	M10	3 x 120°
24	150	100	70	70	42	36	6	50	38	M12	3 x 120°
48	170	115	85	85	46	40	6	55	41	M14	4 x 90°
60	200	140	100	100	58	50	8	66	50	M16	3 x 120°
86	200	140	100	100	58	50	8	66	50	M16	4 x 90°
125	260	160	110	125	70	63	8	80	60	M20	3 x 120°
200	260	160	110	125	70	63	8	80	60	M20	4 x 90°
280	300	160	110	145	80	72	8	94	70	M20	4 x 90°
360	340	195	130	160	85	78	8	100	80	M20	4 x 90°
560	370	200	140	170	105	95	10	125	100	M24	4 x 90°

1) Dimension L and DBSE as well as total weight depend on the mounting length.

Table 2: Technical data - type D2H

Size	Mass moment of inertia [2] with maximum bore of coupling [kgm²]	
	J1	J4
12	0.0030	0.0030
24	0.0080	0.0080
48	0.0160	0.0160
60	0.0360	0.0360
86	0.0370	0.0370
125	0.1110	0.1110
200	0.1160	0.1160
280	0.1960	0.1960
360	0.3540	0.3540
560	0.5890	0.5890

2) Mass moments of inertia J2 and J3 depend on the mounting length.

In case if a dimensional drawing was prepared for the coupling, the dimensions specified have to be primarily observed.

1 Technical data

1.1 Coupling dimensions and technical data

Type DFH

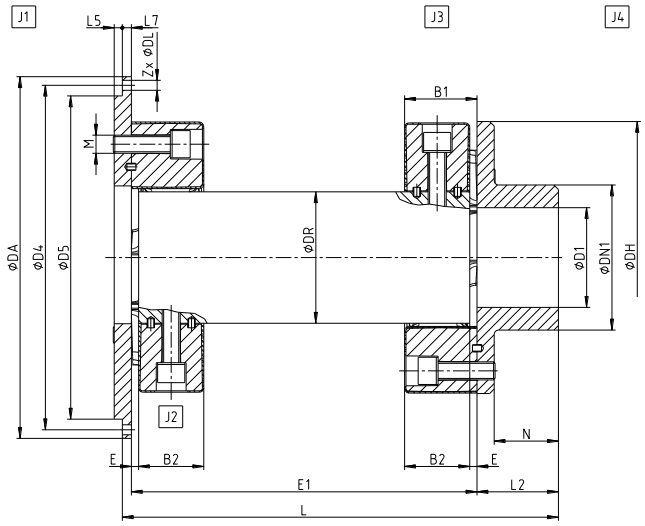


Illustration 3: EVOLASTIC® type DFH (size 12 to 280)

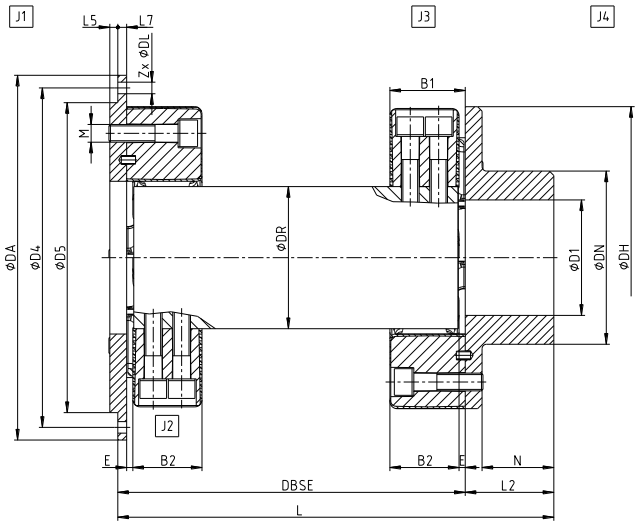


Illustration 4: EVOLASTIC® type DFH (size 360 and 560)

Table 3: Dimensions - type DFH

Size	Flange connection acc. to SAE - J620 / diameter [1]	Dimensions [2] [mm]												Cap screws DIN EN ISO 4762	
		D5	DH	DN1	D1	DR	B1	B2	E	L5	L7	L2	N	M	Z x Pitch
12	6.5“	180	122	80	55	60	32	28	4	4	6	42	32	M10	3 x 120°
	7.5“	190													
24	6.5“	180	150	100	70	70	42	36	6	6	6	50	38	M12	3 x 120°
	7.5“	190													
48	7.5“	190	170	115	85	85	46	40	6	8	6	55	41	M14	4 x 90°
	8“	200													
	10“	260								4	10				
60	10“	270	200	140	100	100	58	50	8	6	10	66	50	M16	3 x 120°
	11.5“	310													
86	10“	270	200	140	100	100	58	50	8	6	10	66	50	M16	4 x 90°
	11.5“	310													
125	10“	270	260	160	110	125	70	63	8	9	10	80	60	M20	3 x 120°
	11.5“	310													
200	10“	270	260	160	110	125	70	63	8	9	10	80	60	M20	4 x 90°
	11.5“	310													
	14“	405													
280	11.5“	310	300	160	110	145	80	72	8	9	10	94	70	M20	4 x 90°
	14“	405													
360	14“	405	340	195	130	160	85	78	8	9	10	100	80	M20	4 x 90°
560	14“	405	370	200	140	170	105	95	10	15	25	125	100	M24	4 x 90°

1) For dimensions of flange connection see table 5.
2) Dimension L and DBSE as well as total weight depend on the mounting length.

In case if a dimensional drawing was prepared for the coupling, the dimensions specified have to be primarily observed.

1 Technical data

1.2 General dimensions and torques

Table 4: Technical data - type DFH

Size	Flange connection acc. to SAE - J620 / diameter [1]	Mass moment of inertia [2] with maximum bore of coupling [kgm²]	
		J1	J4
12	6.5“	0.013	0.003
	7.5“	0.020	
24	6.5“	0.016	0.008
	7.5“	0.023	
48	7.5“	0.026	0.016
	8“	0.034	
	10“	0.091	
60	10“	0.103	0.036
	11.5“	0.165	
86	10“	0.105	0.037
	11.5“	0.166	
125	10“	0.129	0.111
	11.5“	0.199	
200	10“	0.135	0.116
	11.5“	0.205	
	14“	0.572	
280	11.5“	0.226	0.196
	14“	0.593	
360	14“	0.628	0.354
560	14“	0.794	0.589

1) For dimensions of flange connection see table 9.
2) Mass moments of inertia J2 and J3 depend on the mounting length.

Table 5: Flange dimensions according to SAE J 620

Nominal size	Flange dimensions [mm]					
	6.5“	7.5“	8“	10“	11.5“	14“
Dimension DA	215.9	241.3	263.52	314.32	352.42	466.62
Dimension D4	200.02	222.25	244.47	295.27	333.37	438.15
Z x Pitch	6 x 60°	8 x 45°	6 x 60°	8 x 45°	8 x 45°	8 x 45°
Dimension DL	9	9	11	11	11	14

Table 6: Torques

Size	Elastomer type	Torque [Nm]				Perm. operating speed [rpm]	
		T_{KN}	$T_{K\,max}$	$T_{K\,max1}$	T_{KW}	n	$n_{max.}$
12	SN	100	200	300	40	4500	5000
	MN	120	240	360	48	5400	6000
24	SN	200	400	600	80	3780	4200
	MN	240	480	720	96	4500	5000
48	SN	420	840	1260	168	3780	4200
	MN	480	960	1440	192	4500	5000
60	SN	500	1000	1500	200	3240	3600
	MN	600	1200	1800	240	3600	4000
86	SN	760	1520	2280	304	3600	4000
	MN	860	1720	2580	344	4050	4500
125	SN	1100	2200	3300	440	2880	3200
	MN	1250	2500	3750	500	3240	3600
200	SN	1700	3400	5100	680	3060	3400
	MN	2000	4000	5250	800	3240	3600
280	WN	2400	4800	6100	960	2700	3000
	MN	2800	5600	6100	1120	3060	3400
360	WN	3200	6400	9600	1280	2700	3000
	SN	3400	6800	10200	1360	3060	3400
	MN	3600	7200	10800	1440	3060	3400
560	WN	5000	10000	14000	2000	2250	2500
	SN	5200	10400	14000	2080	2520	2800
	MN	5600	11200	14000	2240	2700	3000

1 Technical data

1.2 General dimensions and torques

Maximum torque of coupling $T_{K\,max}$ = rated torque of coupling T_{KN} x 2.0.
The maximum torque $T_{K\,max.}$ signifies short-term torque peaks (e.g. when passing through the resonance). $T_{K\,max}$ may arise at the maximum 50,000 times as vibratory torque or 100,000 times as pulsating torque.

Triple torque of coupling $T_{K\,max1}$ = rated torque of coupling T_{KN} x ~3.0.
The triple rated torque $T_{K\,max1}$ is the torque that may arise only rarely, but only 1,000 times at the maximum. Exceeding the triple torque of $T_{K\,max1}$ may cause impairment resp. damage of the coupling components.

2 Advice

2.1 General advice

Please read through these operating/assembly instructions carefully before you start up the coupling.
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

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. Make absolutely sure to read through and observe the following safety indications.

- All operations on and with the coupling have to be performed taking into account "safety first".
- 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 operating area of the coupling as long as it is in operation.
- Secure the coupling against accidental contact. Provide for the necessary protection devices and covers.

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
- are technically qualified and specifically trained (e. g. safety, environment, logistics)
- 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 **EVOLASTIC®** described in here corresponds to the state of the art at the time of printing of these operating/assembly instructions.

2.5 Coupling selection

For a permanent and failure-free operation of the coupling it must be selected according to the selection instructions (according to DIN 740 part 2) for the particular application (see catalogue drive technology "EVOLASTIC®").
If the operating conditions (performance, speed, modifications on engine and machine) change, the coupling selection must be reviewed.
Make sure that the technical data regarding torque refer to the elastomer part only. The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

For drives subjected to torsional vibrations (drives with cyclic stress due to torsional vibrations) it is necessary to perform a torsional vibration calculation to ensure a reliable selection. Typical drives subject to torsional vibrations are e. g. drives with diesel engines, piston pumps, piston compressors etc. If requested, KTR will perform the coupling selection and the torsional vibration calculation.

2.6 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 refer to the present operating/assembly instructions considering the warnings.

3 Storage, transport and packaging

3.1 Storage

The coupling hubs are supplied in preserved condition and can be stored in a dry and roofed place for 6 - 9 months.
With favourable storage conditions the properties of the elastomer part remain unchanged for up to 5 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.
Make sure that condensation is not generated. The best relative air humidity is less than 65 %.

Please bear in mind that the elastomer part may be stored horizontally only.

3.2 Transport and packaging

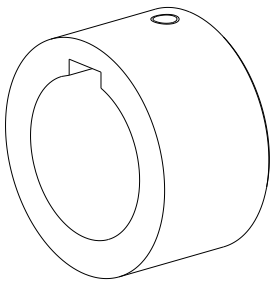
In order to avoid any injuries and any kind of damage always make use of proper transport and lifting equipment.

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.

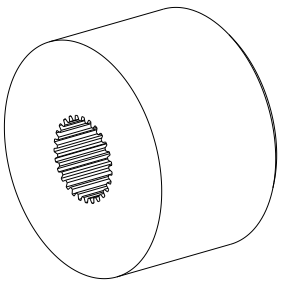
4 Assembly

The coupling is supplied in the following subassemblies and single parts. Before assembly the coupling has to be inspected for completeness.

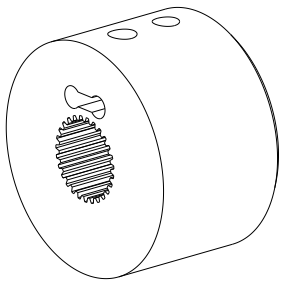
4.1 Types of hubs



Type 1.0
Hub with feather keyway and setscrew



Type 3.0
Hub with spline bore



Type 3.1
Clamping hub N with spline bore

Illustration 5: Types of hubs

4 Assembly

4.2 Components of the couplings

Components of type D2H

Component	Quantity	Description
1	2	Elastomer part E
2	1	Intermediate shaft
3	2	Hub axial
5	see table 7	Cap screw DIN EN ISO 4762 - 12.9
6	see table 7	Ratchet washer
7	see table 7	Cap screw DIN EN ISO 4762 - 12.9
8	see table 7	Ratchet washer
9 [1)]	see table 7	Clamping sleeve DIN 7346
10 [1)]	see table 7	Clamping sleeve DIN 7346

1) Component 9 and 10 is omitted with size 12

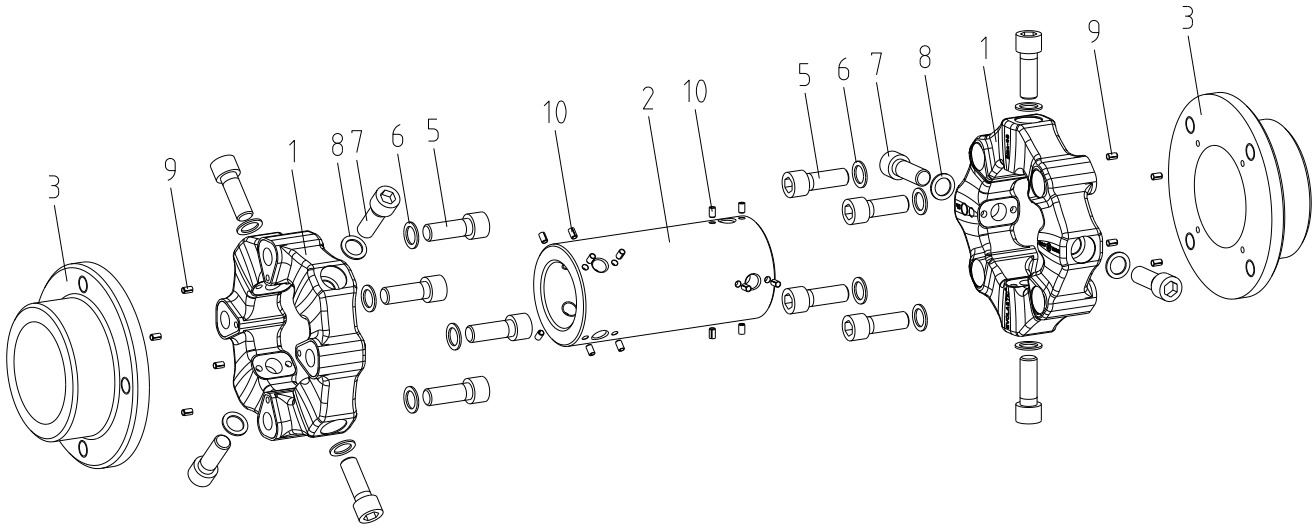


Illustration 6: EVOLASTIC® type D2H (size 12 to 280)

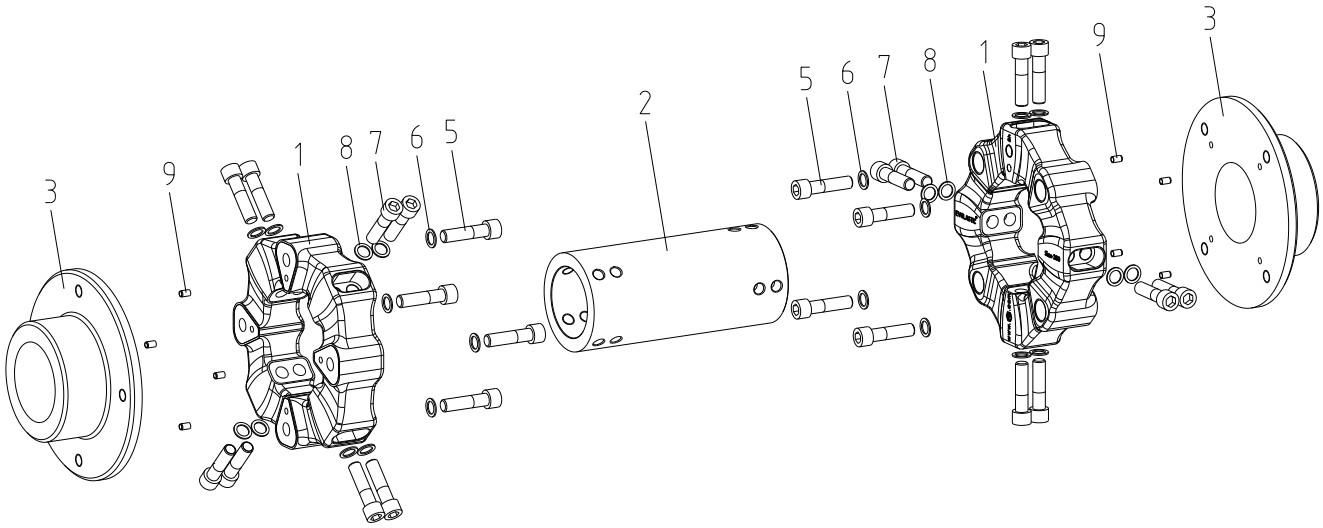


Illustration 7: EVOLASTIC® type D2H (size 360 and 560)

4 Assembly

4.2 Components of the couplings

Components of type DFH

Component	Quantity	Description
1	1	Elastomer part E
2	1	Intermediate shaft
3	1	Hub axial
4	1	Flange
5	see table 7	Cap screw DIN EN ISO 4762 - 12.9
6	see table 7	Ratchet washer
7	see table 7	Cap screw DIN EN ISO 4762 - 12.9
8	see table 7	Ratchet washer
9 [1)]	see table 7	Clamping sleeve DIN 7346
10 [1)]	see table 7	Clamping sleeve DIN 7346

1) Component 9 and 10 is omitted with size 12

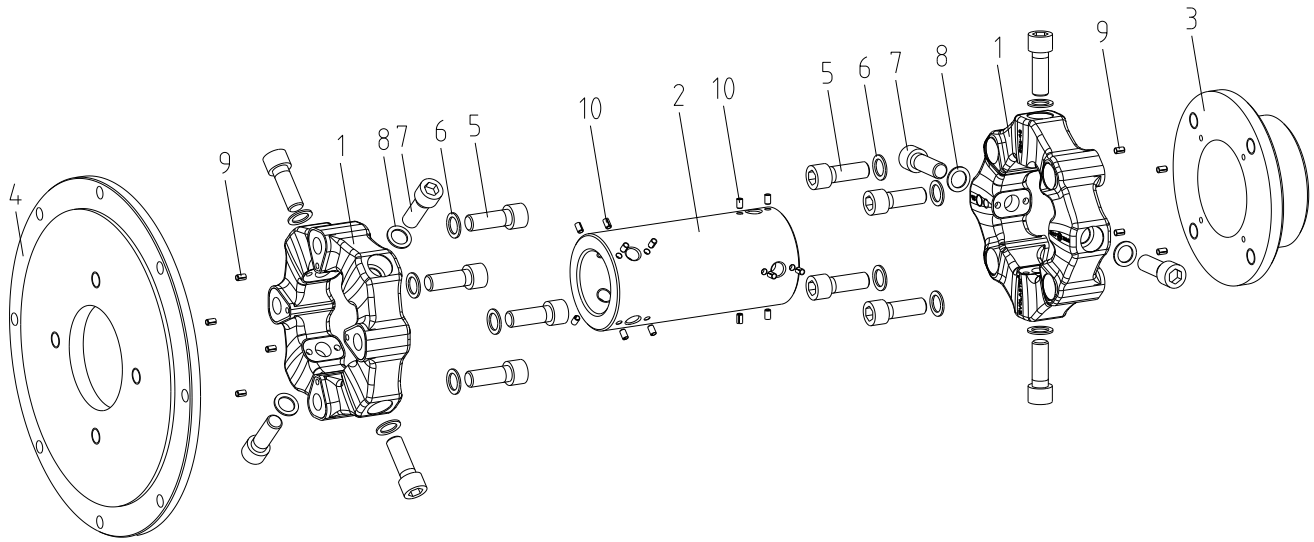


Illustration 8: EVOLASTIC® type DFH (size 12 to 280)

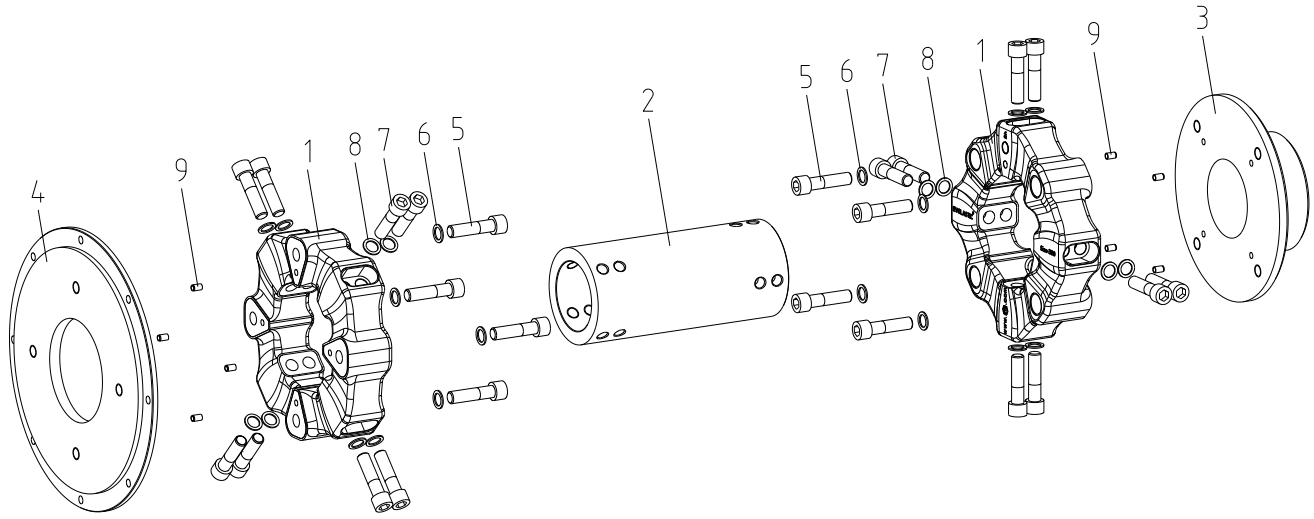


Illustration 9: EVOLASTIC® type DFH (size 360 and 560)

4 Assembly

4.2 Components of the couplings

Table 7: Number of cap screws, ratchet washers and clamping sleeves

Size	12	24	48	60	86	125	200	280	360	560
Number of cap screws (component 5)	6	6	8	6	8	6	8	8	8	8
Number of ratchet washers (component 6)	6	6	8	6	8	6	8	8	8	8
Number of cap screws (component 7)	6	6	8	6	8	6	8	8	16	16
Number of ratchet washers (component 8)	6	6	8	6	8	6	8	8	16	16
Number of clamping sleeves (component 9)	6	6	8	6	8	6	8	8	8	8
Number of clamping sleeves (component 10)	-	12	16	12	16	12	16	16	-	-

4.3 Advice for finish bore

STOP

The maximum permissible bore diameters D (see chapter 1 - technical data) 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 resp. axial runout (see illustration 10).
- Make absolutely sure to observe the figures for $ØD_{max.}$.
- Carefully align the hubs when the finish bores are drilled.
- If possible, provide for a setscrew according to DIN EN ISO 4029 with a cup point or an end plate to fasten the hubs axially.

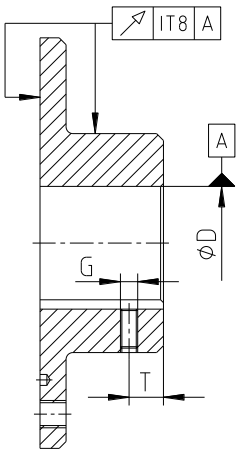


Illustration 10: Concentricity and axial runout

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.

Table 8: Setscrew DIN EN ISO 4029

Size	12	24	48	60	86	125	200	280	360	560
Dimension G	M8	M8	M8	M10	M10	M10	M10	M12	M12	M16
Dimension T	15	15	20	20	20	20	20	30	30	40
Tightening torque T_A [Nm]	10	10	10	17	17	17	17	40	40	80

4 Assembly

4.4 General advice for assembly

The EVOLASTIC® coupling may only be assembled in the order described in here.

In case if a dimensional drawing was prepared for the coupling, the dimensions specified have to be primarily observed.

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

Heating the hubs lightly (approx. 80 °C) allows for easier mounting on the shaft.

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

We recommend to secure all screw connections against working loose additionally to securing screws by the ratchet washer, e. g. applying Loctite screw adhesive (average strength), while the elastomer parts must not come into contact with any type of adhesive.

4.5 Assembly of clamping sleeves (component 9 and 10)

- **Only valid from size 24:**
  Drive the clamping sleeves (component 9) in the hub axial (component 3) or flange (component 4) (see illustration 11 and 12).
- **Only valid for size 24 to 280:**
  Drive the clamping sleeves (component 10) in the intermediate shaft (component 2) (see illustration 13).

For the assembly of the clamping sleeves observe dimensions DB, LB1 and LB2 according to catalogue "EVOLASTIC® type E".

Any kind of twisting must be eliminated with assembly of the elastomer part (component 1).

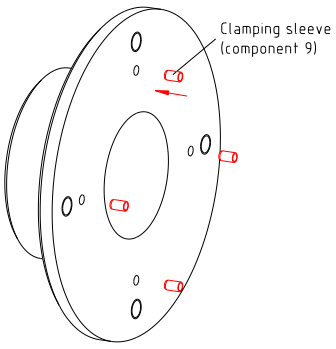


Illustration 11: Assembly of clamping sleeves (component 9) (Type D2H)

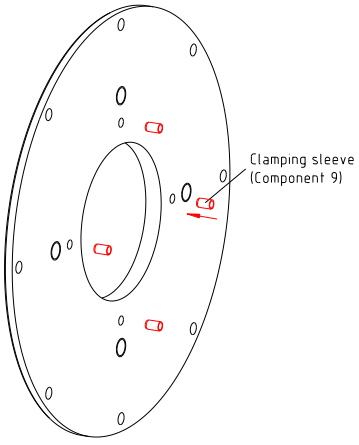


Illustration 12: Assembly of clamping sleeves (component 9) (Type DFH)

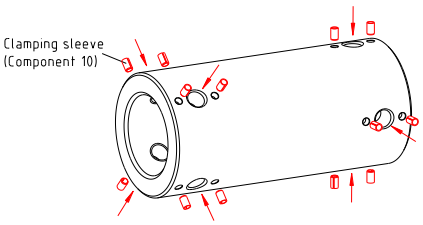


Illustration 13: Assembly of clamping sleeves (component 10)

4 Assembly

4.6 Assembly of the hubs (component 3)

- Mount the hubs (component 3) on the shaft of the driving and driven side.
- Fasten the hubs by tightening the setscrew DIN EN ISO 4029 with a cup point (tightening torque T_A see table 8) or an end plate.

4.7 Assembly of the flange (component 4)

- Push the flange (component 4) into the centering of the flywheel.
- Align the through holes of the connection flange to the threads of the flywheel.
- Hand-tighten the components via suitable screws (not part of the scope of delivery) first.
- Tighten the screws at the tightening torques T_A specified in table 9 by means of a suitable torque key.

We recommend to secure all screw connections against working loose additionally, e. g. applying Loctite screw adhesive (average strength), while the elastomer parts must <u>not</u> come into contact with any type of adhesive.

Table 9: Screw tightening torques for screwing the connection flange to the engine flywheel

Size of flywheel acc. to SAE - J620 [1)]	6.5“	7.5“	8“	10“	11.5“	14“
Screw size	M8	M8	M10	M10	M10	M12
Tightening torque [Nm]	25	25	49	49	49	120
Minimum screw strength	8.8	8.8	8.8	8.8	8.8	10.9
Inch screw	5/16 - 18	5/16 - 18	3/8 - 16	3/8 - 16	3/8 - 16	1/2 - 13
Tightening torque [Nm]	24	24	42	42	42	150
Minimum screw strength	5	5	5	5	5	8

1) For dimensions of flange connection see table 5.

4.8 Assembly of elastomer part (component 1)

We recommend to secure all screw connections against working loose additionally, e. g. applying Loctite screw adhesive (average strength), while the elastomer parts must <u>not</u> come into contact with any type of adhesive.

- Mount the elastomer part (component 1) to the hub axial (component 3) or the flange (component 4) and align the bores to the clamping sleeves (component 9) (see illustration 14).
- Hand-tighten the elastomer part and the hub via the cap screws (component 5) and the ratchet washers (component 6) first.

Make sure that the ratchet washer (component 6) is inserted with the convex side to the screw head of the cap screw (component 5).

- Tighten the cap screws (component 5) to the tightening torques T_{A1} specified in table 10 by a suitable torque key.

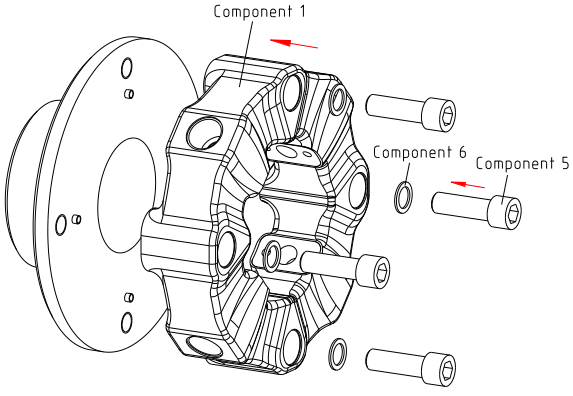


Illustration 14: Assembly of the elastomer part to the hub axial

4 Assembly

4.9 Assembly of the intermediate shaft (component 2)

- Insert the intermediate shaft (component 2) in one of the two elastomer parts. Align the threads of the intermediate shaft (component 2) to the bores of the elastomer part (see illustration 15).
- Hand-tighten the elastomer part and the hub resp. flange via the cap screws (component 7) and the ratchet washers (component 8) first.

☞ **Make sure that the ratchet washer (component 8) is inserted with the convex side to the screw head of the cap screw (component 7).**

- Shift the power pack of the driven side resp. the opposite side in axial direction until the mounting dimension DBSE or E1 is achieved. Align the threads of the intermediate shaft (component 2) to the bores of the second elastomer part (see illustration 15).

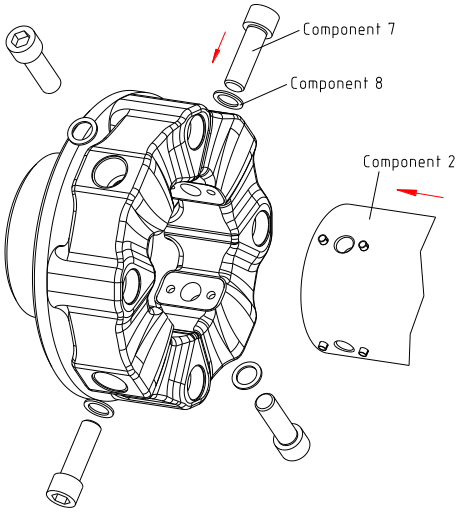


Illustration 15: Assembly of the elastomer parts to the intermediate shaft

- Hand-tighten the elastomer part and the hub resp. flange via the cap screws (component 7) and the ratchet washers (component 8) first.

☞ **Make sure that the ratchet washer (component 8) is inserted with the convex side to the screw head of the cap screw (component 7).**

- Tighten the cap screws (component 7) by a suitable torque key to the tightening torques T_A specified in table 10.

☞ **The clamping sleeves (component 9) respectively double radial screw connection (cap screws, component 7) prevent twisting of the elastomer parts with the assembly.**

Table 10: Cap screws DIN EN ISO 4762 - 12.9 (component 5 and 7)

Size	12	24	48	60	86	125	200	280	360	560
Dimension M	M10	M12	M14	M16	M16	M20	M20	M20	M20	M24
Tightening torque T_A [Nm]	71	123	195	302	302	592	592	592	592	1017

4 Assembly

4.10 Displacements - alignment of the couplings

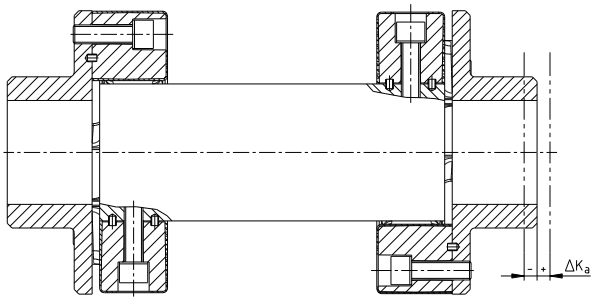
The **EVOLASTIC®** flange couplings compensate for position deviations of the machine components to be connected up to the data specified in table 11.
With alignment, the radial and angular displacement should be kept as small as possible, because the service life is increased in this way provided that the operating conditions are maintained besides that.

The **EVOLASTIC®** flange coupling has to be aligned from the coupling hub on the shaft side to one of the machined surfaces of the flywheel or machine.

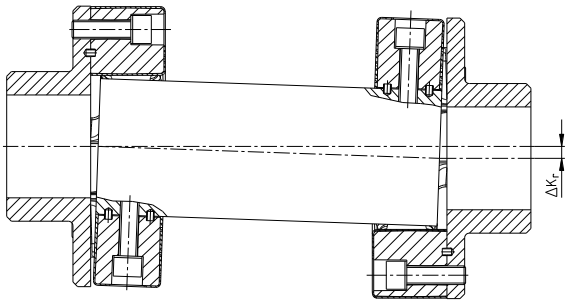
In order to ensure a long service life of the coupling, the shaft ends have to be accurately aligned. Please absolutely observe the displacement figures specified (see table 11). If the figures are exceeded, the coupling will be damaged.
The more accurate the alignment of the coupling, the longer is its service life.

Please note:

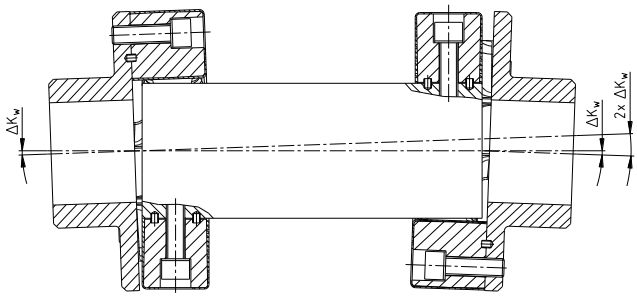
- The displacement figures specified in table 11 are maximum figures which must not arise in parallel. If radial and angular displacements arise simultaneously, the permissible displacement values may only be used proportionally (see illustration 17).
- The radial and angular displacement figures specified refer to a reference speed of 1500 rpm. The diagramme of displacement alignment (see illustration 18) provides for a speed-dependent increase or reduction of displacement figures by factor f_{rpm}. The displacement figures between the speeds specified have to be interpolated accordingly.
- The figures of maximum displacements refer to the mounting process, in addition they are permissible for a short time respectively rarely at standstill or with start-up operation as well as with unusual loading conditions.
- The displacement figures are general standard figures that apply up to an ambient temperature of +80 °C, ensuring a sufficient service life of the **EVOLASTIC®** coupling.
- Inspect with a dial gauge, ruler or feeler gauge whether the permissible displacement figures specified in table 11 can be observed.



Axial displacement



Radial displacement



Angular displacement

Illustration 16: Displacements
(Example: type D2H, size 12 to 280)

4 Assembly

4.10 Displacements - alignment of the couplings

Examples of the displacement combinations specified in illustration 17:

Example 1:
ΔK_r = 30 %
ΔK_w = 70 %

Example 2:
ΔK_r = 60 %
ΔK_w = 40 %

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

Illustration 17: Combinations of displacement

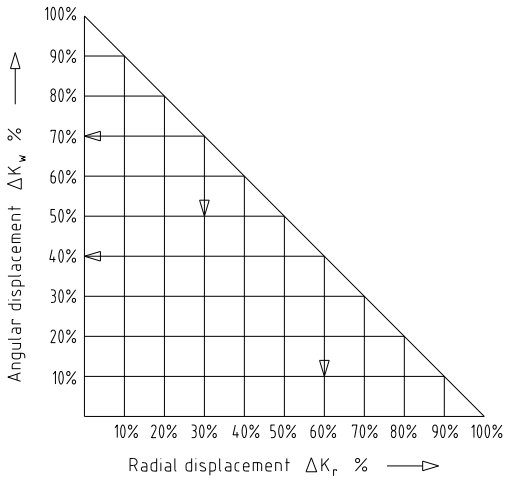


Table 11: Displacement figures

Size		12	24	48	60	86	125	200	280	360	560
Perm. axial displacement 1) ΔK_a [mm]		±2.5	±3.0	±2.5	±3.0	±3.0	±3.5	±3.0	±3.5	±4.0	±4.0
Perm. radial displacement 1) ΔK_r [mm]	1500 rpm	2.0	2.0	2.0	2.5	2.0	2.5	2.5	2.5	3.0	3.0
	max. 2)	3.6	3.6	3.6	4.5	3.6	4.5	4.5	4.5	5.4	5.4
Perm. angular displacement 1) ΔK_w [°]	1500 rpm	3.0	3.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0
	max. 2)	6.0	6.0	4.0	6.0	4.0	6.0	4.0	4.0	4.0	4.0

1) each elastomer part
2) for short-term start-up operation

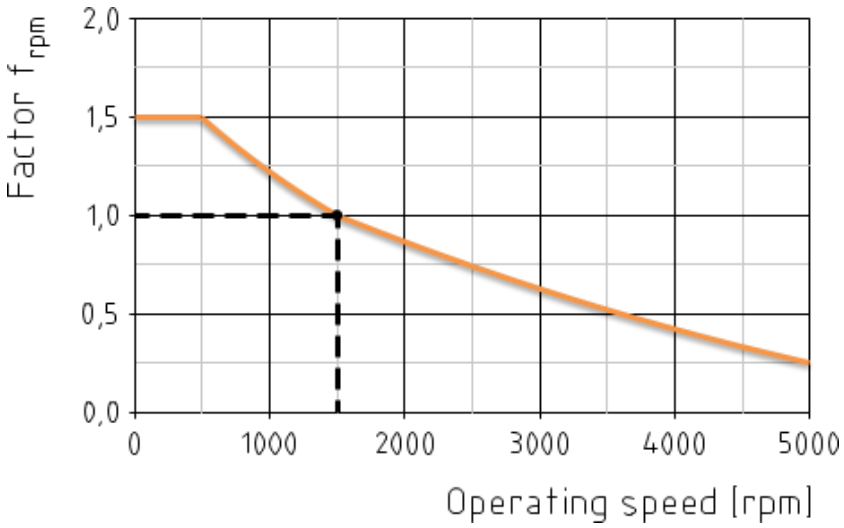


Illustration 18: Diagramme of displacement alignment

5 Start-up

Before start-up of the coupling, inspect the alignment and the distance dimension E and adjust, if necessary, and also inspect all screw connections for the tightening torques specified.

Finally the coupling protection against accidental contact must be fitted. It is required in accordance with DIN EN ISO 12100 (Safety of Machinery) and directive 2014/34/EU and must protect against

- access with a little finger
- falling down of solid foreign objects.

The cover may provide for openings intended for necessary heat dissipation. These openings have to comply with DIN EN ISO 13857.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.

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 specified 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 lead to improper use of the **EVOLASTIC®** coupling. In addition to the specifications given in these operating/assembly instructions 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 are not forwarded.
- The calculation of the shaft-hub-connection is not considered.
- Coupling components with damage occurred during transport are assembled.
- If the heated hub is assembled, the permissible temperature is exceeded.
- The clearance of the components to be assembled is not coordinated with one another.
- Tightening torques are fallen below/exceeded.
- Components are mixed up by mistake/assembled incorrectly.
- No original **KTR** components (purchased parts) are used.
- Old/already worn out elastomer parts or those stored for too long are used.
- Maintenance intervals are not observed.

6 Breakdowns, causes and elimination

Breakdowns	Causes	Elimination
Different operating noise and/or vibrations occuring	Errors in alignment, too high displacement, internal contact of coupling components	1) Set the unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, fracture of the engine mount, heat expansion of unit components, modification of the installation dimension E of the coupling) 3) For visual inspection/inspection of wear see chapter 8 *Maintenance*
	Axial fastening of hubs working loose and screw connection unfastened	1) Set the unit out of operation 2) Inspect alignment of coupling 3) For visual inspection/inspection of wear see chapter 8 *Maintenance* 4) Secure the hubs axially and against working loose
Fracture of elastomer part	Fracture of elastomer part/ high dynamic energy/ overload	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Find out the reason for overload
	Operating parameters do not meet with the performance of the coupling	1) Set the unit out of operation 2) Review the operating parameters and select a bigger coupling (consider mounting space) 3) Assemble new coupling size 4) Inspect alignment
	Operating error of the unit	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Instruct and train the service staff
High rotational angles during operation, formation of wrinkles up to external cracks in the elastomer part, fracture of elastomer, internal depolymerisation	Vibrations of drive, resonance in the elastomer	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for vibrations (selection of loads)
	Ambient/contact temperatures which are too high for the elastomer part, max. permissible -30 °C/+80 °C	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Inspect and adjust ambient/contact temperature
	E. g. contact with aggressive liquids/oils, influence by ozone, too high ambient temperature etc. causing a physical change of the elastomer part	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer part 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer part, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Make sure that other physical modifications of the elastomer part are excluded

7 Disposal

In respect of environmental protection we would ask you to dispose of the packaging resp. products on termination of their service life in accordance with the legal regulations resp. standards that apply.

- **Metal**
  Any metal components have to be cleaned and disposed of by scrap metal.
- **Nylon materials**
  Nylon materials have to be collected and disposed of by a waste disposal company.

8 Maintenance and service

We recommend to perform a visual inspection on the coupling **at least once a year**. Pay special attention to the condition of the elastomer part of the coupling.

- Remove loose dirt from the coupling.
- Inspect the coupling for spalling or missing components, if necessary. Inspect the elastomer part in particular for cracks.
- Defective components must be replaced immediately resp. missing components must be replaced immediately.
- Inspect and correct the tightening torques of all screw connections, if necessary.
- Since the flexible machine bearings of the driving and driven side settle during the course of load, inspect the alignment of the coupling and re-align the coupling, if necessary.

Please perform visual inspection as follows:

- Inspect adhesion of the elastomer to the metal insert.
- Inspect the elastomer part for wrinkles or cracks in the areas marked with ①, ②, ③, ④ and ⑤ in illustration 19. Formation of wrinkles is trouble-free, but dependent on the application may generate cracks in the long run.
  If the cracks in the areas marked achieve or exceed the limit specified in table 12, the elastomer part must be replaced.

Elastomer parts that are damaged or worn off have to be replaced, with the maintenance interval of the engine at the latest.

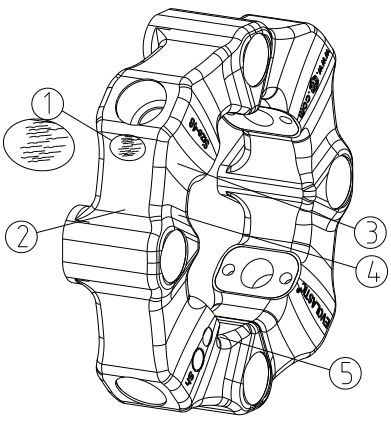


Illustration 19: Visual inspection

Table 12: Crack depth

Size	12	24	48	60	86	125	200	280	360	560
Max. perm. crack depth [mm]	3.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	8.0	10.0

9 Spares inventory, customer service addresses

We recommend to store major spare parts on site to ensure the readiness for use of the machine in case if a coupling fails.

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.**

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