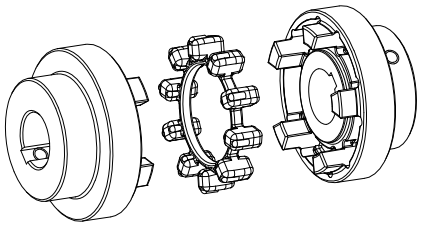
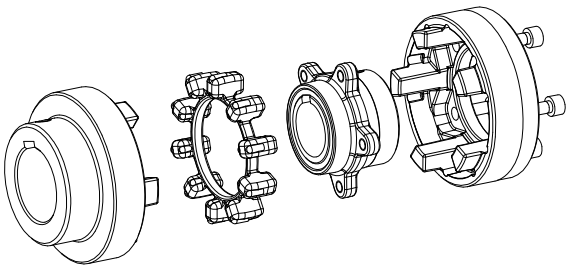
POLY-NORM®

Flexible jaw-type couplings
AR, ADR, AVR, AZR,
AR/AZR, AZVR,
AR with taper clamping sleeve
and their combinations

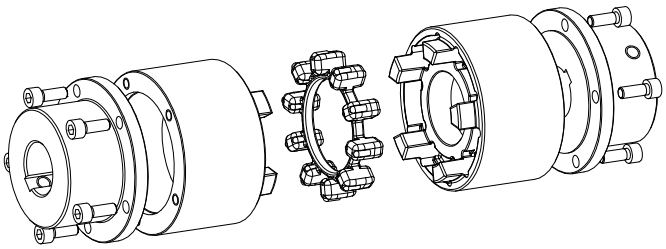
according to directive 94/9/EC
(ATEX 95) for finish bored, pilot bored
and unbored couplings



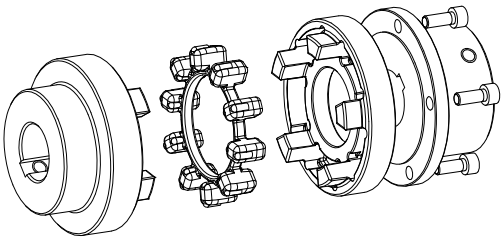
Type AR



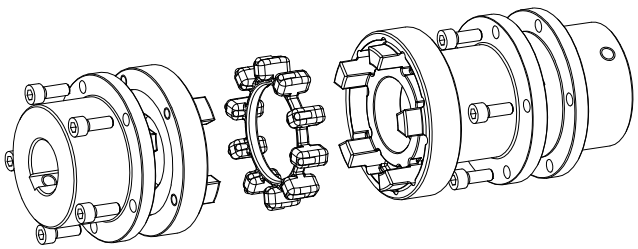
Type ADR, ADR-K and AVR



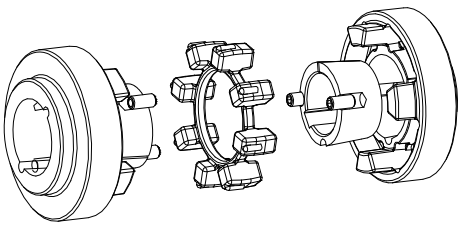
Type AZR and AZR short



Type AR/AZR



Type AZVR



Type AR with taper clamping sleeve

POLY-NORM® is a torsionally flexible jaw coupling. It is able to compensate for shaft misalignment, for example caused by manufacturing inaccuracies, thermal expansion, etc.

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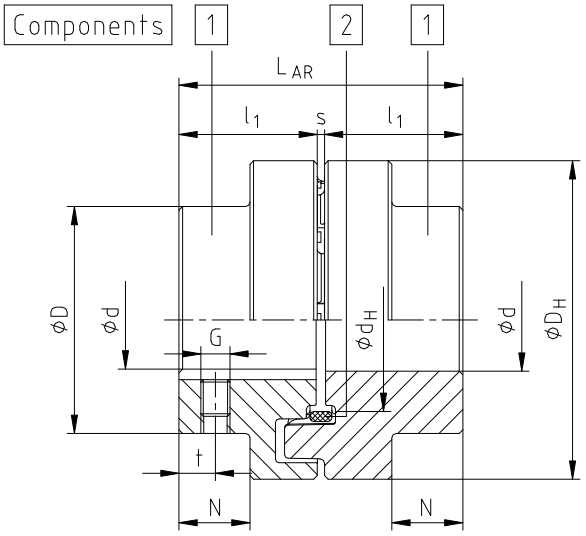
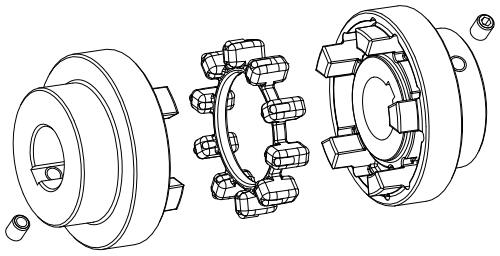
1 Technical data



Size 28 to 125



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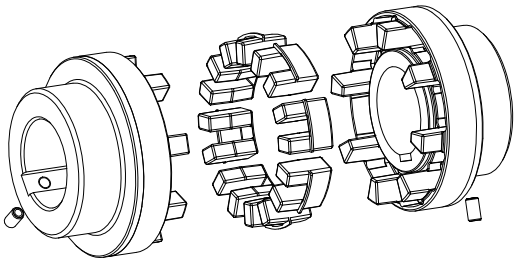


Illustration 1: POLY-NORM®, type AR

Table 1: Dimensions and torques – type AR

POLY-NORM® AR Cast iron (EN-GJL-250)													
Size	Elastomer ring [1] (part 2) Torque [Nm]		Dimensions [mm]										Weight [4] [kg]
			Finish bore [2]	General							Thread for setscrews [3]		
	T_{KN}	$T_{Kmax.}$	$d_{max.}$	L_{AR}	l_1	s	D_H	D	d_H	N	G	t	
28	40	80	30	59	28	3	69	46	36.5	12.0	M5	7	0.77
32	60	120	35	68	32	4	78	53	41.5	14.0	M8	7	1.14
38	90	180	40	80	38	4	87	62	50.0	19.5	M8	10	1.59
42	150	300	45	88	42	4	96	69	55.5	20.0	M8	10	2.17
48	220	440	50	101	48	5	106	78	64	24.0	M8	15	3.03
55	300	600	60	115	55	5	118	90	73	29.0	M8	14	4.27
60	410	820	65	125	60	5	129	97	81	33.0	M8	15	5.32
65	550	1100	70	135	65	5	140	105	86	36.0	M10	20	6.86
75	850	1700	80	155	75	5	158	123	100	42.5	M10	20	10.25
85	1350	2700	90	175	85	5	182	139	116	48.5	M10	25	15.05
90	2000	4000	95	185	90	5	200	148	128	49.0	M12	25	19.50
100	2900	5800	110	206	100	6	224	165	143	55.0	M12	25	26.98
110	3900	7800	50-120	226	110	6	250	185	158	60.0	M16	30	38.12
125	5500	11000	55-140	256	125	6	280	210	178	70.0	M16	35	54.21
140	7200	14400	65-155	286	140	6	315	235	216	76.5	M20	35	77.28
160	10000	20000	75-175	326	160	6	350	265	246	94.5	M20	45	106.24
180	13400	26800	75-200	366	180	6	400	300	290	111.5	M20	50	155.20
200	19000	38000	200	408	200	8	450	335	-	126	M24	50	218.50
220	30000	60000	220	448	220	8	500	370	-	140	M24	50	296.10
240	43000	86000	240	488	240	8	550	405	-	154	M24	50	390.00
260	55000	110000	260	530	260	10	650	440	-	158	M24	60	575.00
280	67000	134000	280	570	280	10	700	475	-	172	M24	60	716.00

1) Material Perbunan (NBR) 78 Shore A with size 28 to 180; material T-PUR 84 Shore A with size 200 to 280; with size 140 to 280 use of DZ individual elastomers
2) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew on the keyway
3) Tightening torques of setscrews see table 2
4) Weights apply for max. bore diameters with feather key according to DIN 6885 sheet 1

Table 2: Setscrews DIN EN ISO 4029

Size	28	32	38	42	48	55	60	65	75	85	90
Dimension G [mm]	M5	M8	M8	M8	M8	M8	M8	M10	M10	M10	M12
Tightening torque T_A [Nm]	2	10	10	10	10	10	10	17	17	17	40

Size	100	110	125	140	160	180	200	220	240	260	280
Dimension G [mm]	M12	M16	M16	M20	M20	M20	M24	M24	M24	M24	M24
Tightening torque T_A [Nm]	40	100	100	140	140	140	240	240	240	240	240

1 Technical data

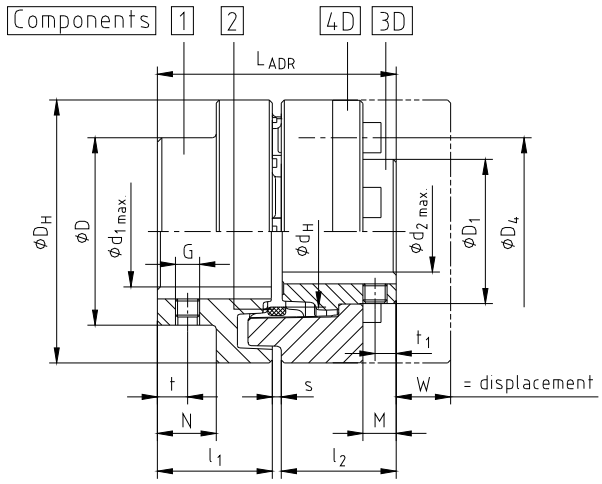


Illustration 2: POLY-NORM®, type ADR (three-part)

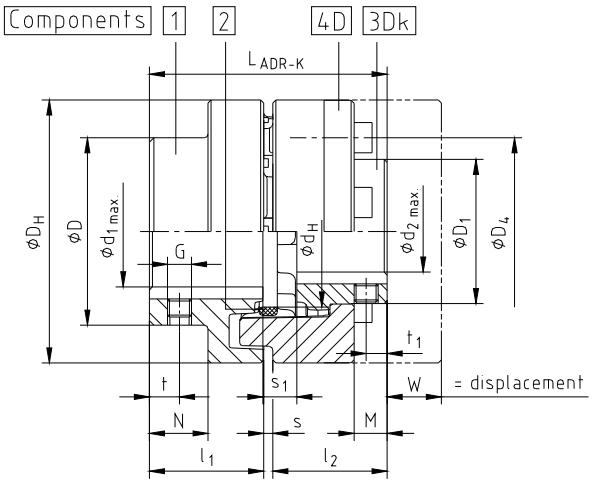


Illustration 3: POLY-NORM®, type ADR-K (three-part)

Table 3: Dimensions – type ADR and ADR-K

POLY-NORM® ADR and ADR-K (type AVR corresponding to components 3D and 4D mirrored)
cast iron (EN-GJL-250), component 3D/3Dk flange hub nodular iron (EN-GJS-400-15)

Size	Dimensions [mm]															
	Max. finish bore [1]		General											Thread for setscrews [2]		
	d_1	d_2	L_{ADR}/ L_{ADR-K}	l_1/l_2	s	s_1	D_H	D	D_1	d_H	N	M	W	G	t	t_1
38	40	34	80	38	4	12.0	87	62	48	50	19.5	11	12	M8	10	7
42	45	38	88	42	4	14.5	96	69	54	55.5	20.0	12	16	M8	10	7
48	50	44	101	48	5	16.0	106	78	62	64	24.0	13.7	16	M8	15	7
55	60	50	115	55	5	17.0	118	90	72	73	29.0	18.7	15	M8	14	14
60	65	56	125	60	5	18.0	129	97	80	81	33.0	22.2	14	M8	15	15
65	70	60	135	65	5	20.0	140	105	86	86	36.0	26.7	11	M10	20	20
75	80	68	155	75	5	23.5	158	123	98	100	42.5	27.8	16	M10	20	20
85	90	78	175	85	5	27.0	182	139	112	116	48.5	33.7	18	M10	25	25
90	95	85	185	90	5	29.5	200	148	122	128	49.0	31.5	26	M12	25	25
100	110	95	206	100	6	33.0	224	165	136	143	55.0	37.5	28	M12	25	25
110	50-120	105	226	110	6	36.0	250	185	150	158	60.0	39.5	30	M16	30	30
125	55-140	115	256	125	6	39.0	280	210	168	178	70.0	48.0	35	M16	35	35
140	65-155	55-135	286	140	6	-	315	235	195	216	76.5	47.0	59	M20	35	35
160	75-175	65-155	326	160	6	-	350	265	225	246	94.5	65.0	43	M20	45	45
180	75-200	65-175	366	180	6	-	400	300	255	290	111.5	79.0	33	M20	50	50
200	200	200	408	200	8	-	450	335	290	-	126	95	7	M24	50	50
220	220	220	448	220	8	-	500	370	320	-	140	103	8	M24	50	50
240	240	240	488	240	8	-	550	405	350	-	154	119	1	M24	50	50
260	260	260	530	260	10	-	650	440	380	-	158	109	34	M24	60	60
280	280	280	570	280	10	-	700	475	410	-	172	109	29	M24	60	60

Table 4: Torques and weights - type ADR and ADR-K

Size		38	42	48	55	60	65	75	85	90	100
Elastomer ring [3] (part 2) Torque [Nm]	T_{KN}	90	150	220	300	410	550	850	1350	2000	2900
	$T_{Kmax.}$	180	300	440	600	820	1100	1700	2700	4000	5800
Weight [4] [kg]	ADR	1.75	2.34	3.23	4.41	5.43	7.10	10.50	15.29	20.06	27.83
	ADR-K	1.70	2.26	3.12	4.24	5.24	6.67	10.01	14.44	19.02	26.28

Size		110	125	140	160	180	200	220	240	260	280
Elastomer ring [3] (part 2) Torque [Nm]	T_{KN}	3900	5500	7200	10000	13400	17600	22000	28000	50000	65000
	$T_{Kmax.}$	7800	11000	14400	20000	26800	35200	44000	56000	100000	130000
Weight [4] [kg]	ADR	38.95	55.67	80.30	108.00	155.00	215	294	380	593	728
	ADR-K	37.31	53.26	77.90	104.70	150.30	-	-	-	-	-

1) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew on the keyway
2) Tightening torques of setscrews see table 2
3) Material Perbunan (NBR) 78 Shore A with size 28 to 180; material T-PUR 84 Shore A with size 200 to 280; with size 140 to 280 use of DZ individual elastomers
4) Weights apply for max. bore diameters with feather key according to DIN 6885 sheet 1

1 Technical data

Type ADR and ADR-K:

Table 5: Arrangement of the cap screws DIN EN ISO 4762 - 12.9

Size	38	42	48	55	60	65	75	85	90	100
Screw dimension M	M6	M8	M8	M8	M8	M10	M10	M12	M16	M16
Screw length l	16	16	20	20	20	20	25	25	30	30
Number z [5)]	5	5	6	6	6	6	6	6	6	6
Dimension D_4	62	69	78	88	98	104	120	138	149	163
Tightening torque T_A [Nm]	10	25	25	25	25	49	49	86	210	210

Size	110	125	140	160	180	200	220	240	260	280
Screw dimension M	M16	M20	M20	M20	M20	M20	M24	M27	M30	M30
Screw length l	40	40	50	55	60	60	70	70	90	90
Number z [5)]	8	8	8	9	10	10	10	10	10	10
Dimension D_4	183	202	237	267	304	342	378	416	480	520
Tightening torque T_A [Nm]	210	410	410	410	410	580	1000	1500	2000	2000

5) per flange hub

1 Technical data

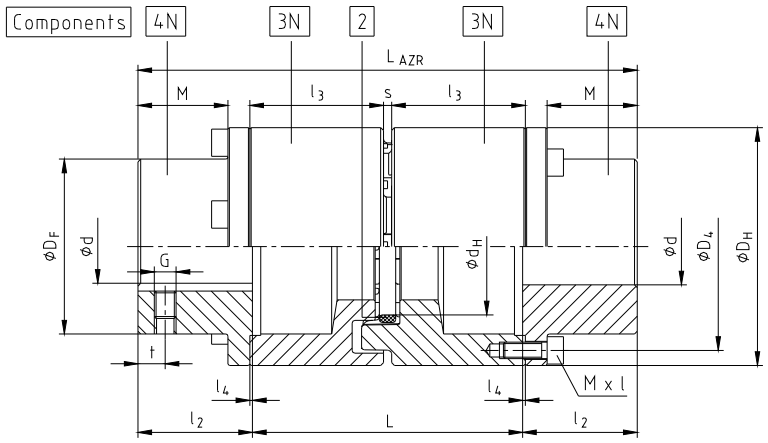


Illustration 4:
POLY-NORM®, type AZR

Table 6: Dimensions and torques – type AZR

POLY-NORM® AZR cast iron (EN-GJL-250), component 4N steel (S355 J2G3)																
Size	Drop-out center length L [mm]	Elastomer ring [1] (part 2) Torque [Nm]		Dimensions [mm]												Weight [4] [kg]
				Finish bore [2]	General									Thread for setscrews [3]		
		T_{KN}	$T_{Kmax.}$	$d_{max.}$	L_{AZR}	l_2	l_3	s	l_4	D_H	D_F	d_H	M	G	t	
28	100	40	80	30	170	35	49.5	3	1	69	46	36.5	26	M5	7	2.33
	140				210		69.5									2.91
32	100	60	120	35	170	35	49	4	1	78	53	41.5	26	M8	7	2.86
	140				210		69									3.50
38	100	90	180	40	184	42	49	4	1	87	62	50	33	M8	10	3.78
	140				224		69									4.57
42	100	150	300	45	190	45	49	4	1	96	69	55.5	35	M8	10	4.56
	140				230		69									5.41
48	100	220	440	50	204	52	49	5	1.5	106	78	64	41.5	M8	15	6.03
	140				244		69									6.98
55	100	300	600	60	210	55	49	5	1.5	118	88	73	43.5	M8	14	7.81
	140				250		69									9.21
	180				290		89									10.57
60	100	410	820	65	220	60	49	5	1.5	129	97	81	47.5	M8	15	9.49
	140				260		69									11.05
	180				300		89									12.61
65	100	550	1100	70	230	65	49	5	1.5	140	105	86	51.5	M10	20	11.85
	140				270		69									13.61
	180				310		89									15.37
75	140	850	1700	80	290	75	69	5	1.5	158	123	100	60.5	M10	20	19.71
	180				330		89									22.15
	250				400		124									26.18
85	140	1350	2700	90	310	85	69	5	1.5	182	139	116	69.5	M10	25	27.57
	180				350		89									30.65
	250				420		124									36.22
90	140	2000	4000	100	320	90	69	5	1.5	200	148	128	73.5	M12	25	32.00
	180				360		89									35.35
	250				430		124									41.22
100	140	2900	5800	110	340	100	69	6	2	224	165	143	83	M12	25	42.31
	180				380		89									46.44
	250				450		124									53.67

Table 7: Assignment of the cap screws DIN EN ISO 4762 - 12.9

Size	28	32	38	42	48	55	60	65	75	85	90	100
Screw dimension M	M6	M6	M6	M6	M6	M8	M8	M8	M10	M10	M12	M12
Screw length l	18	18	20	20	20	25	25	25	30	30	35	35
Dimension D_4	58	67	76	85	95	103	114	124	141	160	180	200
Number z [5]	4	4	5	5	6	6	6	6	6	6	6	6
Tightening torque T_A [Nm]	14	14	14	14	14	35	35	35	69	69	120	120

1) Material Perbunan (NBR) 78 Shore A
2) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew on the keyway
3) Tightening torques of setscrews see table 2
4) Weights apply for max. bore diameters with feather key according to DIN 6885 sheet 1
5) Each flange connection

1 Technical data

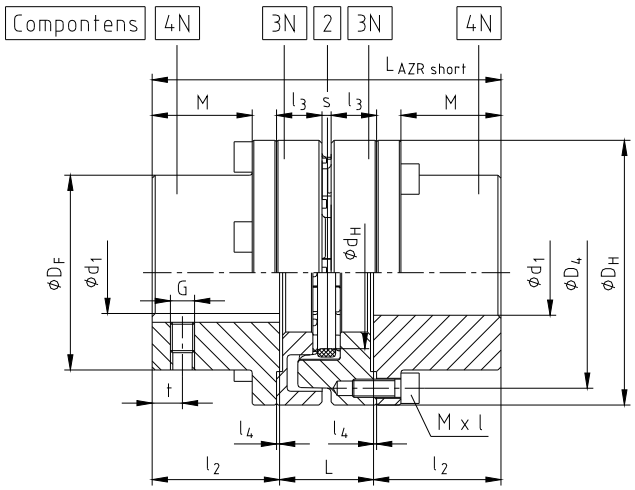


Illustration 5: POLY-NORM®, type AZR short

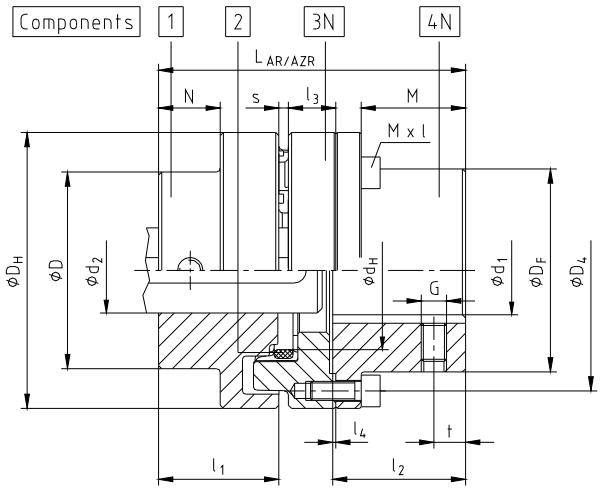


Illustration 6: POLY-NORM®, type AR/AZR

Table 8: Dimensions – type AZR short and AR/AZR

POLY-NORM® AZR short and AR/AZR cast iron (EN-GJL-250), component 4N steel (S355 J2G3)															
Size	Dimensions [mm]														
	General													Thread for setscrews [1]	
	$L_{AZR\ short}$	$L_{AR/AZR}$	l_1	l_2	l_3	s	l_4	L	D_H	D/D_F	d_H	N	M	G	t
28	101	80	28	35	15	3	1	31	69	46	36.5	12	26	M5	7
32	102	85	32	35	15	4	1	32	78	53	41.5	14	26	M8	7
38	116	98	38	42	15	4	1	32	87	62	50	19.5	33	M8	10
42	128	108	42	45	18	4	1	38	96	69	55.5	20	35	M8	10
48	144	122.5	48	52	19	5	1.5	40	106	78	64	24	41.5	M8	15
55	154	134.5	55	55	21	5	1.5	44	118	90/88	73	29	43.5	M8	14
60	166	145.5	60	60	22	5	1.5	46	129	97	81	33	47.5	M8	15
65	180	157.5	65	65	24	5	1.5	50	140	105	86	36	51.5	M10	20
75	206	108.5	75	75	27	5	1.5	56	158	123	100	42.5	60.5	M10	20
85	234	204.5	85	85	31	5	1.5	64	182	139	116	48.5	69.5	M10	25
90	252	218.5	90	90	35	5	1.5	72	200	148	128	49	73.5	M12	25
100	280	243	100	100	39	6	2	80	224	165	143	55	83	M12	25

Table 9: Torques and finish bores - type AZR short and AR/AZR

Size		28	32	38	42	48	55	60	65	75	85	90	100
Elastomer ring [2] (part 2) Torque [Nm]	T_{KN}	40	60	90	150	220	300	410	550	850	1350	2000	2900
	$T_{Kmax.}$	80	120	180	300	440	600	820	1100	1700	2700	4000	5800
Max. finish bore [3] [mm]	d_1	30	35	40	45	50	60	65	70	80	90	100	110
	d_2	30	35	40	45	50	60	65	70	80	90	95	110
Weight [4] [kg]	AZR short	1.24	1.57	2.20	2.98	4.07	5.18	6.76	8.11	11.34	20.06	24.43	34.16
	AR/AZR	1.01	1.35	1.89	2.57	3.55	4.72	6.04	7.48	10.79	17.54	21.94	30.56

Table 10: Assignment of the cap screws DIN EN ISO 4762 - 12.9

Size	28	32	38	42	48	55	60	65	75	85	90	100
Screw dimension M	M6	M6	M6	M6	M6	M8	M8	M8	M10	M10	M12	M12
Screw length l	16	16	16	20	20	25	25	25	30	30	35	35
Dimension D_4	58	67	76	85	95	103	114	124	141	160	180	200
Number z [5]	4	4	5	5	6	6	6	6	6	6	6	6
Tightening torque T_A [Nm]	14	14	14	14	14	35	35	35	69	69	120	120

1) Tightening torques of setscrews see table 2
2) Material Perbunan (NBR) 78 Shore A
3) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew on the keyway
4) Weights apply for max. bore diameters with feather key according to DIN 6885 sheet 1
5) Each flange connection

1 Technical data

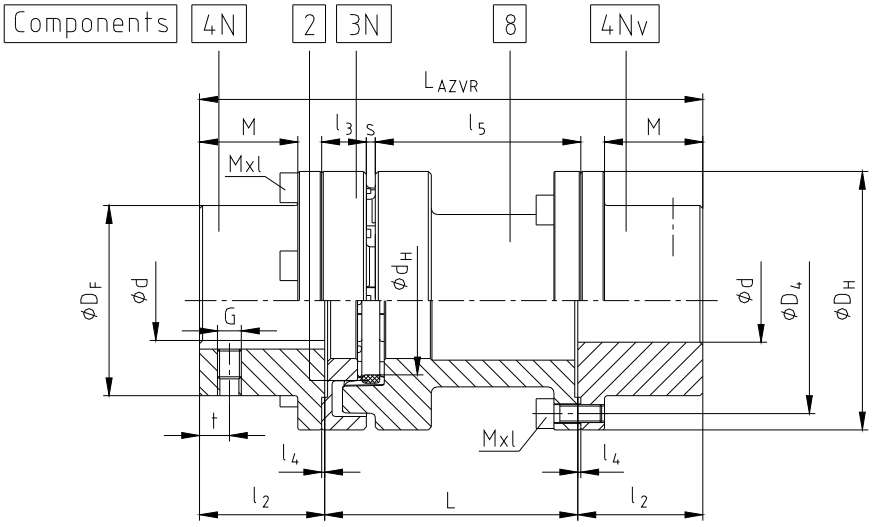


Illustration 7: POLY-NORM®, type AZVR

Table 11: Dimensions – type AZVR

POLY-NORM® AZVR cast iron (EN-GJL-250), component 4N and 4Nv steel (S355 J2G3)													
Size	Dimensions [mm]												Weight [2] [kg]
	General											Thread for setscrews [1]	
	L_{AZVR}	l_2	l_3	s	l_4	l_5	L	D_H	D_F	d_H	M	G	t	
38	224	42	69	4	1	69	140	87	62	50	33	M8	10	4.33
42	230	45	69	4	1	69	140	96	69	55.5	35	M8	10	5.25
48	244	52	69	5	1.5	69	140	106	78	64	41.5	M8	15	6.83
55	250	55	49	5	1.5	89	140	118	88	73	43.5	M8	14	8.59
	290		89				180							9.97
60	260	60	49	5	1.5	89	140	129	97	81	47.5	M8	15	10.66
	300		89				180							12.22
65	270	65	49	5	1.5	89	140	140	105	86	51.5	M10	20	12.74
	310		89				180							14.50
75	330	75	89	5	1.5	89	180	158	123	100	60.5	M10	20	21.34
	450		209				300							28.58
85	350	85	89	5	1.5	89	180	182	139	116	69.5	M10	25	29.91
	470		209				300							39.25

Table 12: Torques and finish bores - type AZVR

Size		38	42	48	55	60	65	75	85
Elastomer ring [3] (part 2) Torque [Nm]	T_{KN}	90	150	220	300	410	550	850	1350
	$T_{Kmax.}$	180	300	440	600	820	1100	1700	2700
Finish bore [4] [mm]	$d_{max.}$	40	45	50	60	65	70	80	90

Table 13: Assignment of the cap screws DIN EN ISO 4762 - 12.9

Size	38	42	48	55	60	65	75	85
Screw dimension M	M6	M6	M6	M8	M8	M8	M10	M10
Screw length l	20	20	20	25	25	25	30	30
Dimension D_4	76	85	95	103	114	124	141	160
Number z [5]	5	5	6	6	6	6	6	6
Tightening torque T_A [Nm]	14	14	14	35	35	35	69	69

1) Tightening torques of setscrews see table 2
2) Weights apply for max. bore diameters with feather key according to DIN 6885 sheet 1
3) Material Perbunan (NBR) 78 Shore A
4) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew on the keyway
5) Each flange connection

1 Technical data

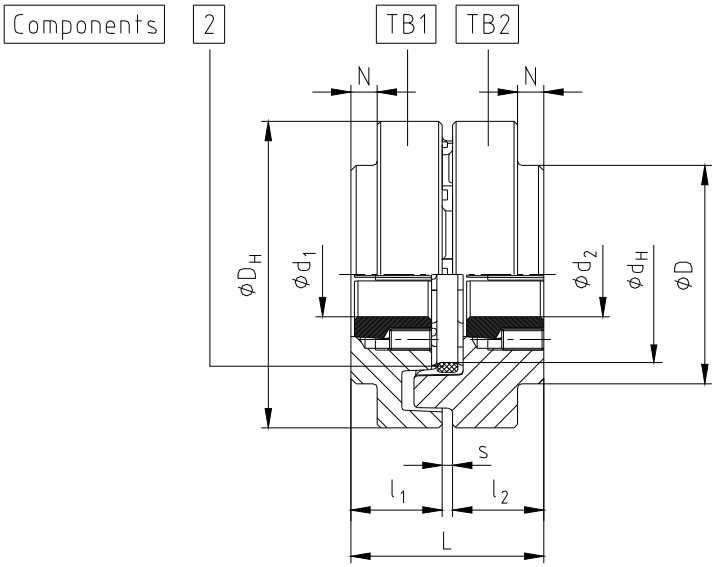


Illustration 8: POLY-NORM® type with taper clamping sleeve

Table 14: Dimensions - type with taper clamping sleeve

POLY-NORM® with taper clamping sleeve hub TB1 and TB2 cast iron (EN-GJL-250)													
Size	Elastomer ring [1] (part 2) Torque [Nm]		Speed $n_{max.}$ [1/min]	Dimensions [mm]								Taper clamping sleeve	Weight [3] [kg]
				Finish bore [2] d_1/d_2		General							
	T_{KN}	$T_{Kmax.}$		min.	max.	l_1/l_2	s	L	D	D_H	N		
32	60	120	7300	10	28	25.5	4	55	53	78	7.5	1108	1.05
42	150	300	6000	11	32	31.0	4	66	69	96	9.0	1210	1.98
48	220	440	5400	14	42	30.0	5	65	78	106	6.0	1610	2.35
						42.5		90			18.5	1615	2.96
60	410	820	4400	14	50	38.5	5	80	97	129	10.5	2012	4.16
65	550	1100	4100	16	60	62.5	5	130	105	140	-	2517	9.13
75	850	1700	3600	16	60	52.5	5	110	123	158	20.0	2517	8.54
85	1350	2700	3150	16	60	46.5	5	98	139	132	10.0	2517	11.60
				35	75	82.0		169		182		3030	14.81
90	2000	4000	2900	25	75	52.0	5	109	148	200	11.0	3020	14.88
100	2900	5800	2600	35	90	98.0	6	202	165	224	53.0	3535	27.41
125	5500	11000	2050	40	100	111.5	6	229	210	280	56.5	4040	48.70

1) Material Perbunan (NBR) 78 Shore A
2) Bores H7 with keyway to DIN 6885 sheet 1 [JS9] and thread for setscrew on the keyway
3) Weights apply for max. bore diameters with feather key according to DIN 6885 sheet 1

POLY-NORM® couplings with attachments that can generate heat, sparks and static charging (e. g. combinations with brake drums, brake disks, overload systems like torque limiters, fans etc.) are <u>not</u> permitted for the use in hazardous areas.
A separate analysis must be performed.

2 Advice

2.1 Coupling selection

C A U T I O N !
For a long-lasting 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 POLY-NORM® catalogue).
If the operating conditions (performance, speed, modifications on engine and machine) change, the coupling selection must be reviewed again.
Please 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 subject 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.

2.2 General advice

Please read through these assembly instructions carefully before you start up the coupling.
Please pay special attention to the safety instructions!

The **POLY-NORM®** 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 assembly instructions are part of your product. Please keep them carefully and close to the coupling.

2.3 Safety and advice symbols

STOP	**D A N G E R !**	**Danger of injury to persons.**
	C A U T I O N !	**Damages on the machine possible.**
☞	**A T T E N T I O N !**	**Pointing to important items.**
	W A R N I N G !	**Hints concerning explosion protection.**

2 Advice

2.4 General hazard warnings

D A N G E R !
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.

- 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.

2.5 Intended use

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

- have carefully read through the 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 table 1 to 14 in 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 **POLY-NORM®** described in here corresponds to the technical status at the time of printing of these assembly instructions.

3 Storage

The coupling hubs are supplied in preserved condition and can be stored at a dry and covered place for 6 - 9 months.
The features of the elastomer rings/DZ individual elastomers remain unchanged for up to 5 years with favourable stock conditions.

C A U T I O N !
The storage rooms may 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 %.

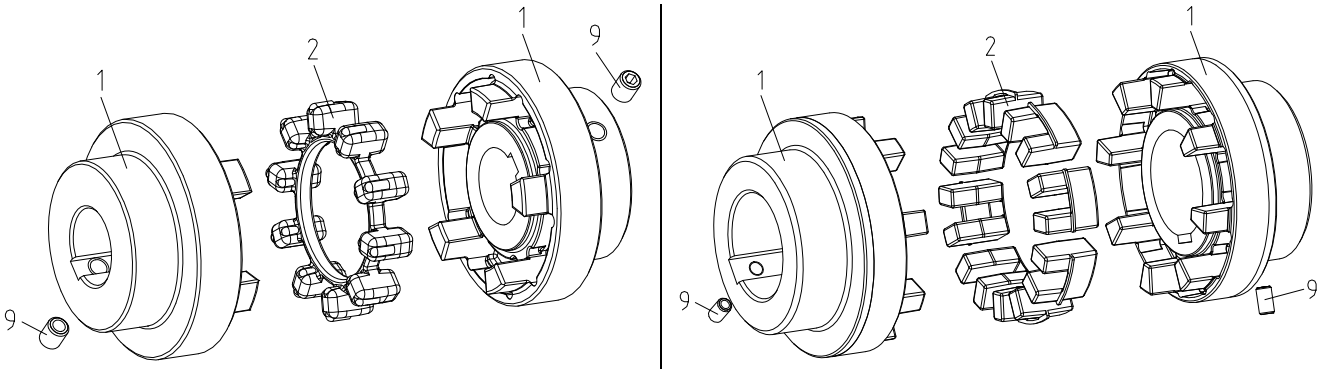
4 Assembly

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

4.1 Components of the couplings

Components of POLY-NORM®, type AR

Component	Quantity	Description	Material	Balancing condition
1	2	Hub	EN-GJL-250	According to customer specification
2	1	Elastomer ring/DZ individual elastomers	NBR (Perbunan) from size 200 T-PUR	
9	2	Setscrews DIN EN ISO 4029	Steel	

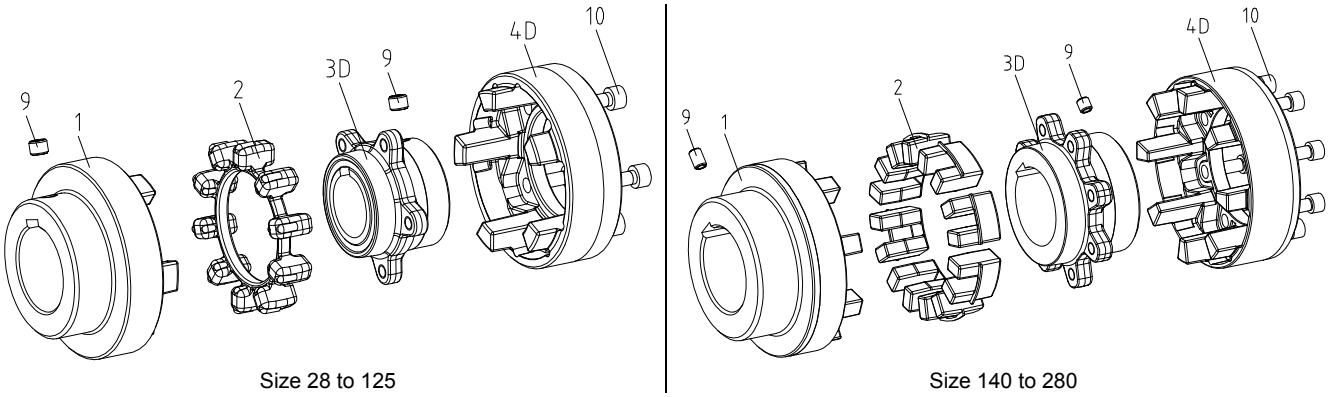


Size 28 to 125 Size 140 to 280

Illustration 9: POLY-NORM®, type AR

Components of POLY-NORM®, type ADR (three-part) type AVR corresponding to components of 3D and 4D mirrored

Component	Quantity	Description	Material	Balancing condition
1	1	Hub	EN-GJL-250	According to customer specification
2	1	Elastomer ring/DZ individual elastomers	NBR (Perbunan) from size 200 T-PUR	
3D	1	Flange hub	EN-GJS-400-15 from size 200 steel (S355J2G3)	According to customer specification
4D	1	Cam ring	EN-GJL-250	
9	2	Setscrews DIN EN ISO 4029	Steel	
10	see table 5	Cap screws DIN EN ISO 4762	Steel	



Size 28 to 125 Size 140 to 280

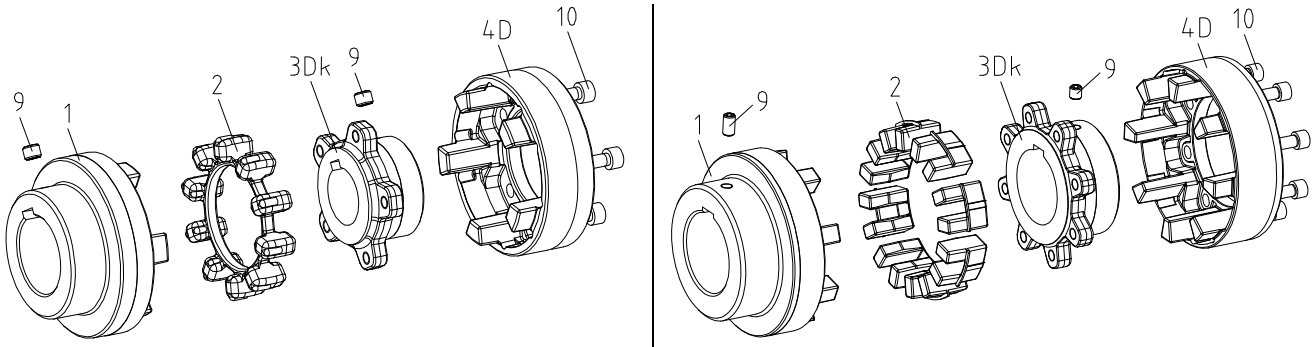
Illustration 10: POLY-NORM®, type ADR (three-part)

4 Assembly

4.1 Components of the couplings

Components of POLY-NORM®, type ADR-K (three-part)

Component	Quantity	Description	Material	Balancing condition
1	1	Hub	EN-GJL-250	According to customer specification
2	1	Elastomer ring/DZ individual elastomers	NBR (Perbunan) from size 200 T-PUR	
3Dk	1	Flange hub K	EN-GJS-400-15 from size 200 steel (S355J2G3)	According to customer specification
4D	1	Cam ring	EN-GJL-250	
9	2	Setscrews DIN EN ISO 4029	Steel	
10	see table 5	Cap screws DIN EN ISO 4762	Steel	



Size 28 to 125 Size 140 to 280

Illustration 11: POLY-NORM®, type ADR-K (three-part)

Components of POLY-NORM®, type AZR and AZR short

Component	Quantity	Description	Material	Balancing condition
2	1	Elastomer ring	NBR (Perbunan)	
3N	2	Driving flange	EN-GJL-250	According to customer specification
4N	2	Coupling flange	EN-GJL-250 / S355 J2G3	
9	2	Setscrews DIN EN ISO 4029	Steel	
10	see table 7 and 10	Cap screws DIN EN ISO 4762	Steel	

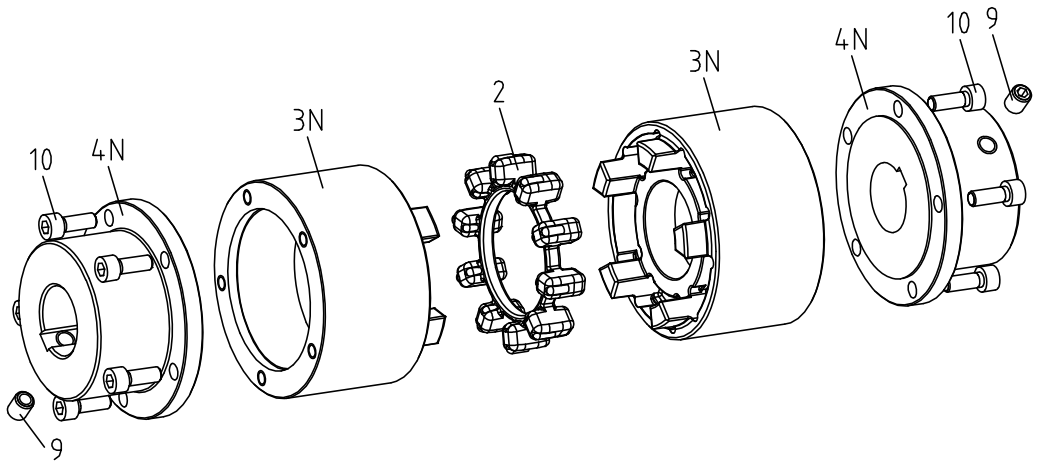


Illustration 12: POLY-NORM®, type AZR and AZR short

4 Assembly

4.1 Components of the couplings

Components of POLY-NORM®, type AR/AZR

Compo-nent	Quantity	Description	Material	Balancing condition
1	1	Hub	EN-GJL-250	According to customer specification
2	1	Elastomer ring	NBR (Perbunan)	
3N	1	Driving flange	EN-GJL-250	According to customer specification
4N	1	Coupling flange	EN-GJL-250 / S355 J2G3	
9	2	Setscrews DIN EN ISO 4029	Steel	
10	see table 10	Cap screws DIN EN ISO 4762	Steel	

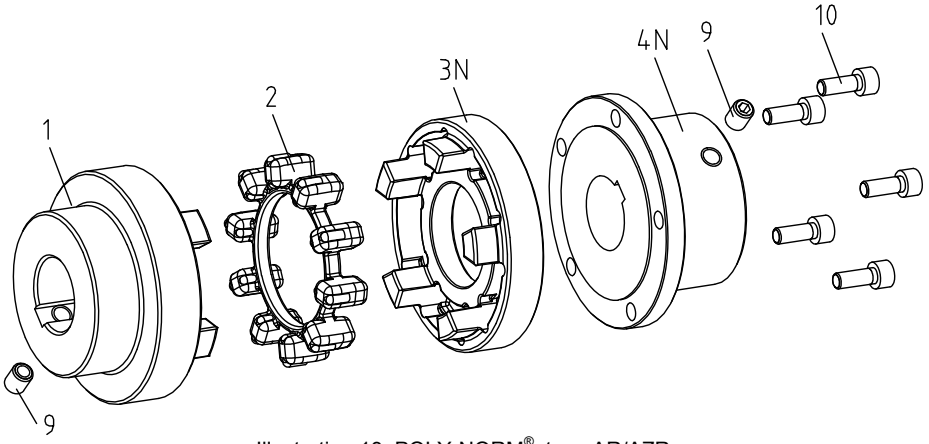


Illustration 13: POLY-NORM®, type AR/AZR

Components of POLY-NORM®, type AZVR

Compo-nent	Quantity	Description	Material	Balancing condition
2	1	Elastomer ring	NBR (Perbunan)	
3N	1	Driving flange	EN-GJL-250	According to customer specification
4N	1	Coupling flange	EN-GJL-250 / S355 J2G3	
4Nv	1	Coupling flange AZVR		
8	1	Driving flange AZVR	EN-GJL-250	
9	2	Setscrews DIN EN ISO 4029	Steel	
10	see table 13	Cap screws DIN EN ISO 4762	Steel	

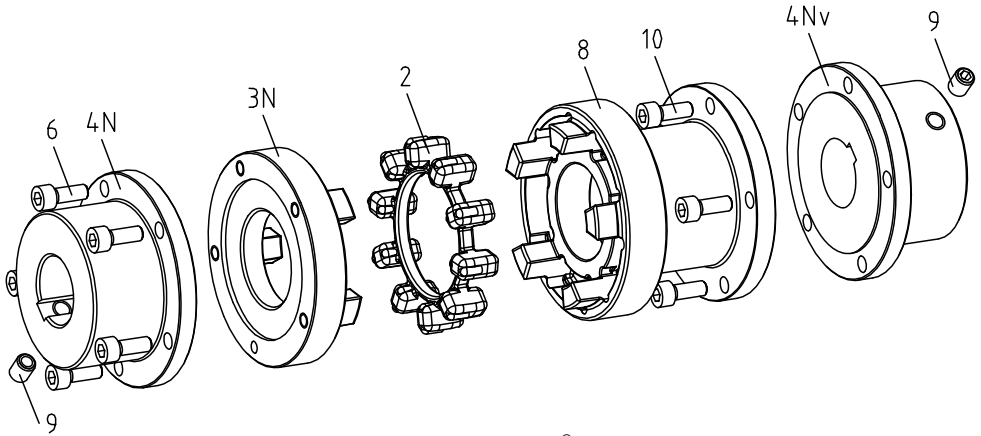


Illustration 14: POLY-NORM®, type AZVR

4 Assembly

4.1 Components of the couplings

Components of POLY-NORM®, type with taper clamping sleeve

Compo-nent	Quantity	Description	Material	Balancing condition
2	1	Elastomer ring	NBR (Perbunan)	
9	2 [1)]	Setscrew	Steel	
TB1	2	Hub for taper clamping sleeve	EN-GJL-250	According to customer specification
11	2	Taper clamping sleeve	EN-GJL-250	

1) For each taper clamping sleeve from size 100, 3-off setscrews are needed.

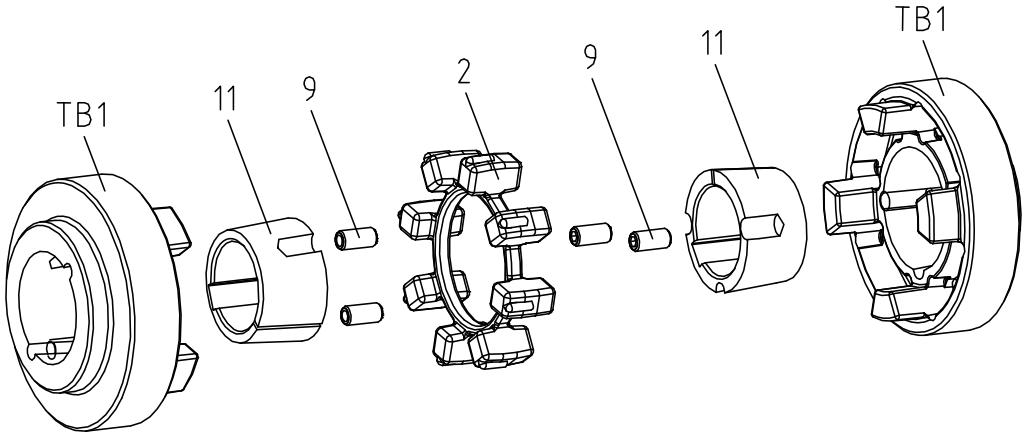


Illustration 15: POLY-NORM® type with taper clamping sleeve

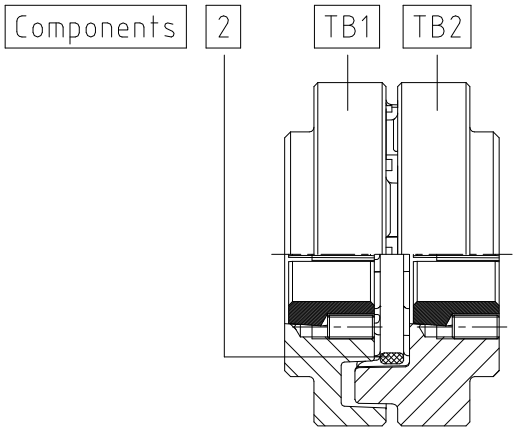


Illustration 16: Type with taper clamping sleeve hub design TB1 and TB2

Coupling design:

TB1 Screwing on cam side
TB2 Screwing on collar side

Different combinations of types TB1 and TB2 are possible.

4 Assembly

4.2 Assembly of the coupling (general)

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

Heating the hubs, coupling flanges or flange hubs lightly (approx. 80 °C) allows for an easier mounting on the shaft.

WARNING!
Please pay attention to the ignition risk in hazardous locations!

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

CAUTION!
With the assembly please make sure that the dimension s or L, respectively (see table 1 to 14 of the different types) is observed so that the hubs are not in contact with each other during the operation.
Disregarding this advice may cause damage to the coupling.

4.3 Assembly of type AR

- Mount the hubs on the shaft of driving and driven side (see illustration 17).
- Insert the elastomer ring or DZ individual elastomers, respectively, into the cam section of the drive- or driven-sided hub (see illustration 18.1 and 18.2).

ATTENTION!
Insert the DZ individual elastomers with the web into the cam section of the hub first (see illustration 18.2).

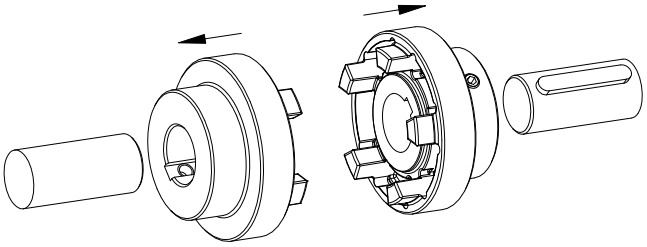


Illustration 17: Assembly of hub

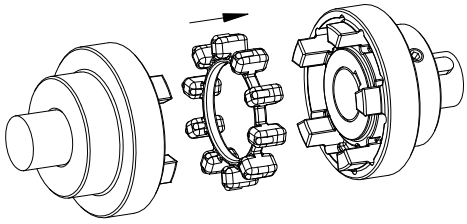


Illustration 18.1: Assembly of elastomer ring

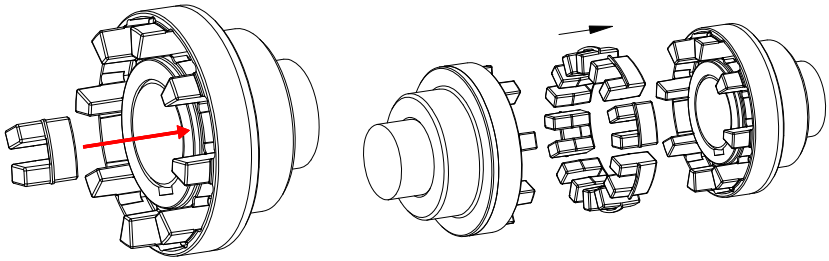


Illustration 18.2: Assembly of DZ individual elastomers

- Shift the power packs in axial direction until the dimension s is achieved (see illustration 19).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for adjusting the distance dimension s (see illustration 19).
- Fasten the hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 2).

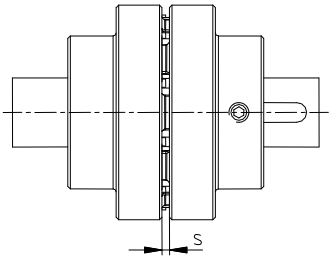


Illustration 19: Assembly of coupling

4 Assembly

4.4 Assembly of type ADR, ADR-K and AVR

- Please stick the flange hub and the cam ring together (see illustration 20).
- Hand-tighten the components for the time being.
- Mount the hub and flange hub with cam ring on the shaft of driving and driven side (see illustration 21).
- Tighten the screws by means of a suitable torque key to the tightening torques T_A mentioned in table 5.
- Insert the elastomer ring or DZ individual elastomers, respectively, into the cam section of the drive- or driven-sided hub or cam ring (see illustration 22.1 and 22.2).

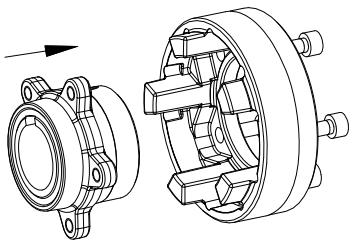


Illustration 20: Assembly of flange hub with cam ring

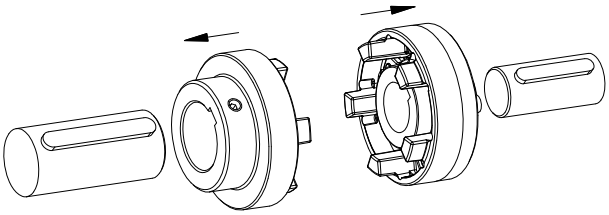


Illustration 21: Assembly of hub and flange hub with cam ring

A T T E N T I O N !
Insert the DZ individual elastomers with the web into the cam section of the hub or cam ring first (see illustration 22.2).

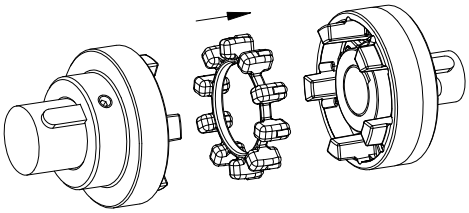


Illustration 22.1: Assembly of elastomer ring

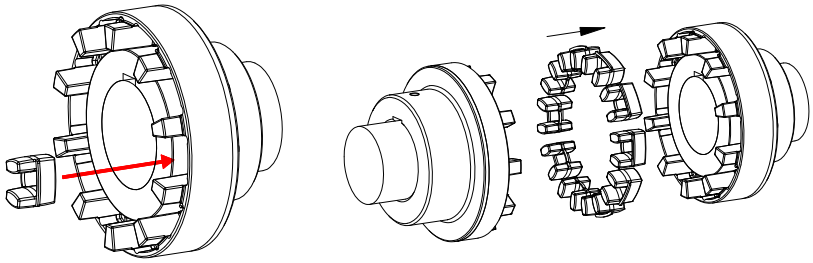


Illustration 22.2: Assembly of DZ individual elastomers

C A U T I O N !
To facilitate the assembly of the elastomer ring when the power packs are already firmly assembled, we would recommend to separate the elastomer ring up to size 65 in one position between the dampers (see illustration 23).
From size 75 on we would recommend to separate the elastomer ring between every second damper to facilitate the assembly (see illustration 24).

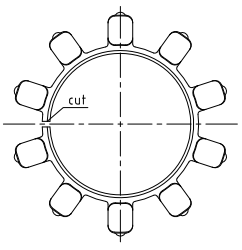


Illustration 23: Mounting aid of elastomer ring up to size 65

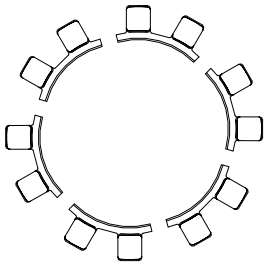


Illustration 24: Mounting aid of elastomer ring from size 75

- Shift the power packs in axial direction until the dimension s is achieved (see illustration 25).
- If the power packs are already firmly assembled, shifting the hubs axially on the shafts allows for setting the dimension s (see illustration 25).
- Fasten the hub or flange hubs by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torque see table 2).

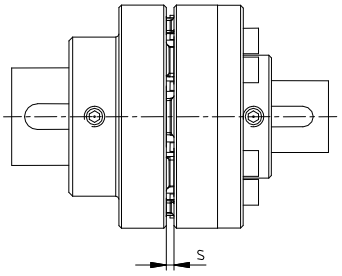


Illustration 25: Assembly of coupling

C A U T I O N !
Having started up the coupling, the tightening torque of the screws and wear of elastomer ring has to be inspected at regular maintenance intervals.

4 Assembly

4.5 Assembly of type AZR, AZR short and AZVR

- Mount the coupling flanges on the shaft of driving and driven side (see illustration 26). The internal sides of the coupling flanges must be flush with the front sides of the shafts.
- Shift the power packs in axial direction until the dimension L is achieved.
- Fasten the coupling flanges by tightening the set-screws DIN EN ISO 4029 with a cup point (tightening torque see table 2).

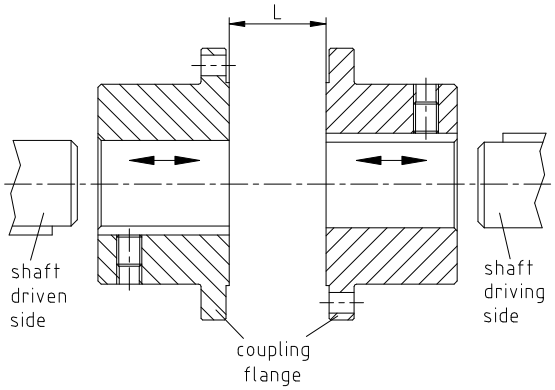


Illustration 26: Assembly of coupling flanges

- Please plug the driving flanges and the elastomer ring together (see illustration 27).

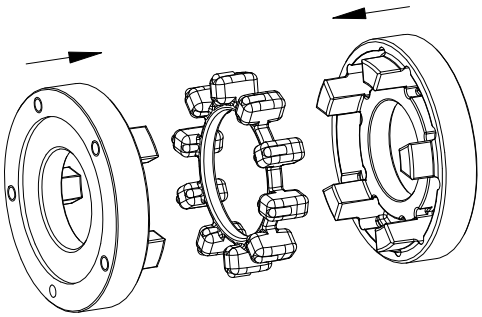


Illustration 27: Assembly of driving flange with elastomer ring

- Place the components plugged together between the coupling flanges (see illustration 28).
- Hand-tighten the components for the time being.
- Tighten the screws by means of a suitable torque key to the tightening torques T_A mentioned in table 7, 10 and 13.
- Please check the dimension s or L (see table 6, 8 and 11).
- If the power packs are already firmly assembled, shifting the coupling flanges axially on the shafts allows for setting the dimension s or L (see illustration 28).

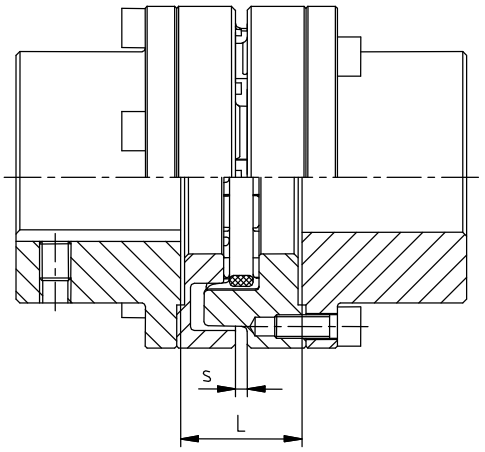


Illustration 28: Assembly of coupling

C A U T I O N !
Having started up the coupling, the tightening torque of the screws and wear of elastomer ring has to be inspected at regular maintenance intervals.

4 Assembly

4.6 Assembly of type AR/AZR

- Mount the coupling flange on the shaft of driving or driven side (see illustration 29).
  The internal side of the coupling flange must be flush with the faces of the shafts.

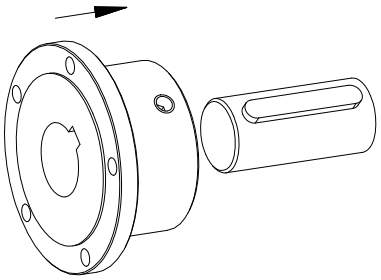


Illustration 29: Assembly of coupling flange

- Please plug the hub, the elastomer ring and the driving flange together (see illustration 30).

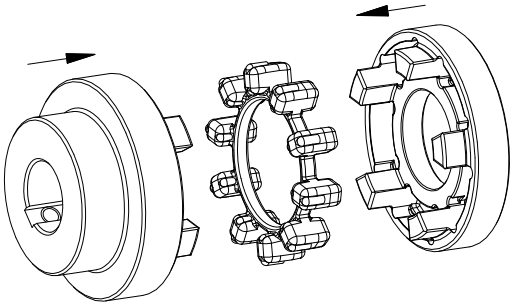


Illustration 30: Assembly of hub, elastomer ring and driving flange

- Assemble the parts plugged together onto the other shaft end (see illustration 31).
- Fasten the hub and coupling flange by tightening the setscrews DIN EN ISO 4029 with a cup point (tightening torques see table 2).

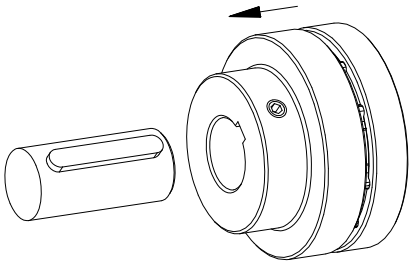


Illustration 31: Assembly of component assembly

- Place the machine such that the driving flange and coupling flange can be screwed to each other. Hand-tighten the components for the time being and tighten the screws by means of a suitable torque key to the tightening torque T_A mentioned in table 10.
- Please review the dimension s (see illustration 32).

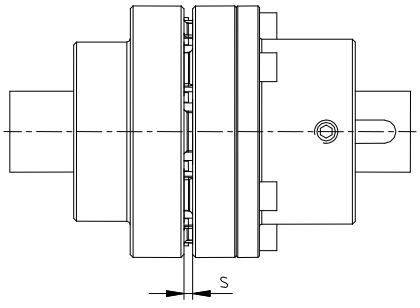


Illustration 32: Assembly of coupling

C A U T I O N !
Having started up the coupling, the tightening torque of the screws and wear of elastomer ring has to be inspected at regular maintenance intervals.

4 Assembly

4.7 Assembly of taper clamping sleeve

Assembly of taper clamping sleeve:

Clean the contact surfaces of the taper clamping sleeves and of shaft and hub and afterwards apply thin fluid oil lightly (e. g. Ballistol Universal oil or Klüber Quietsch-Ex).
The taper clamping sleeves have axially parallel, cylindrical and smooth blind holes. Only half of these holes are located in the material of the sleeve. The other half located in the hub has threads.
Fit the coupling element and the taper clamping sleeve into each other, make sure that the bores cover each other and tighten the setscrews lightly. Fit the coupling element along with the taper clamping sleeve on the shaft and tighten the setscrews at the tightening torque indicated in table 15.
During the process of screwing the hub is mounted onto the taper sleeve and thus the sleeve is pressed onto the shaft. By light blows of the hammer the taper clamping sleeve must be pushed further into the taper bore by means of a suitable sleeve. Afterwards please re-tighten the setscrews at the tightening torque indicated in table 15. This process must be performed at least once.
After the drive has operated under load for a short while please inspect if the setscrews have unscrewed.
An axial fixing of the Taper Lock hub (coupling hub with taper clamping sleeve) is obtained by a proper assembly only.

C A U T I O N !
If used in hazardous locations the setscrews to fix the taper clamping sleeves have to be secured against working loose additionally, e. g. conglutinating with Loctite (average strength).
The use of taper clamping sleeves without a feather key is not permitted in hazardous locations.

C A U T I O N !
Oils and greases with molybdenum disulphide or high-pressure additives, additives of Teflon and silicone as well as sliding grease paste reducing the coefficient of friction significantly must not be used.

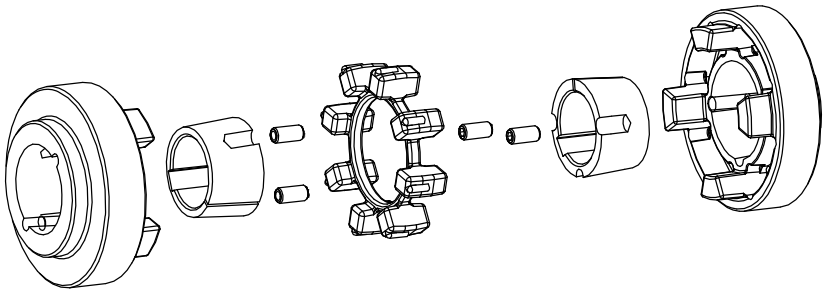


Illustration 33: POLY-NORM® type with taper clamping sleeve

Disassembly of taper clamping sleeve:

The taper clamping sleeve is released by removing the setscrews. Afterwards one of the setscrews used as forcing screw is screwed in the thread of the sleeve and tightened.
The coupling hub detached in this way can be manually removed from the shaft with the taper clamping sleeve.

Table 15:

Taper clamping sleeve	Screw dimensions				Quantity
	G [inch]	L [inch]	SW [mm]	T_A [Nm]	
1108	1/4	1/2	3	5.7	2
1210	3/8	5/8	5	20	2
1610	3/8	5/8	5	20	2
1615	3/8	5/8	5	20	2
2012	7/16	7/8	6	31	2
2517	1/2	7/8	6	49	2
3020	5/8	1 1/4	8	92	2
3030	5/8	1 1/4	8	92	3
3535	1/2	1 1/2	10	115	3
4040	5/8	1 3/4	12	170	3

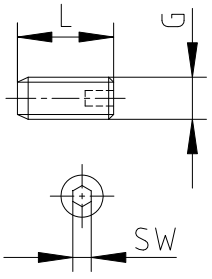


Illustration 34: Withworth setscrew (BSW)

4 Assembly

4.8 Advice for finish bore

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 Ⓤ.

C A U T I O N !
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 16: Recommended fit pairs acc. to DIN 748/1

Bore [mm]		Shaft tolerance	Bore tolerance
above	up to		
	50	k6	H7
50		m6	(KTR standard)

If a feather key is intended to be used in the hub, it should correspond to the tolerance ISO JS9 (KTR standard) with normal operating conditions or ISO P9 with complicated operating conditions (frequently alternating torsional direction, shock loads, etc.). The keyway should preferably be located between the cams. With axial fastening by setscrews the tapping should be located on the keyway.

The transmittable torque of the shaft-hub-connection must be reviewed by the customer and is subject to his responsibility.

4.9 Displacements - alignment of the coupling

The **POLY-NORM®** compensates for displacements generated by the shafts to be combined as shown in table 17. Excessive misalignment may be caused by inaccurate alignment, production tolerances, thermal expansion, shaft deflection, twisting of machine frames, etc.

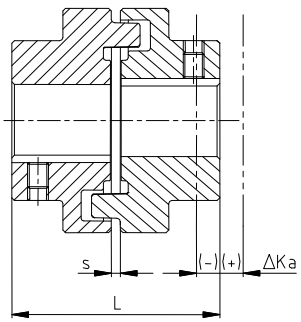
C A U T I O N !
In order to ensure a long service life of the coupling and avoid dangers with the use in hazardous locations, the shaft ends must be accurately aligned.
Please absolutely observe the displacement figures indicated (see table 17). If the figures are exceeded, the coupling will be damaged.
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 2GD c IIC T X), only half of the displacement figures (see table 17) are permissible.

Please note:

- The displacement figures mentioned in table 17 are maximum figures which must not arise in parallel. If the radial and the angular displacement occur at the same time, the sum of the displacement figures must not exceed ΔK_r or ΔK_W.
- Please inspect with a dial gauge, ruler or feeler whether the permissible displacement figures of table 17 are observed.

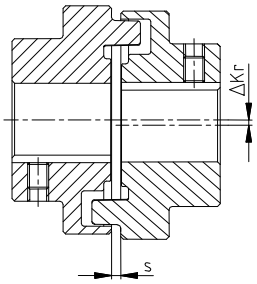
4 Assembly

4.9 Displacements - alignment of the coupling

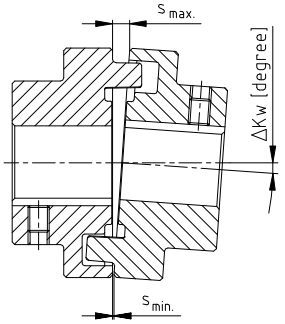


Axial displacements

$L_{adm.} = L + \Delta K_a$ [mm]



Radial displacements



Angular displacements

$\Delta K_w = s_{max.} - s_{min.}$ [mm]

Illustration 35: Displacements

Examples for the displacement combinations specified in illustration 36:

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 36: Combinations of displacement

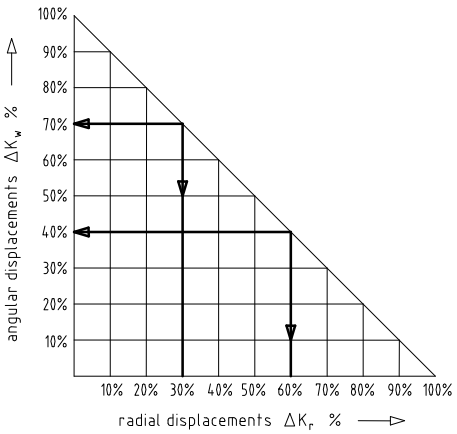


Table 17: Displacement figures

Size		28	32	38	42	48	55	60	65	75	85	90
Max. axial displacement ΔK_a [mm]		±1	±1	±1	±1	±1.5	±1.5	±1.5	±1.5	±1.5	±1.5	±1.5
Max. radial displacement ΔK_r [mm] with	1500 rpm	0.2	0.25	0.25	0.25	0.3	0.3	0.3	0.35	0.4	0.4	0.5
	3000 rpm	0.15	0.18	0.18	0.18	0.22	0.22	0.22	0.26	0.3	0.3	0.33
Max. angular displacement ΔK_w [degree]	1500 rpm (1 degree)	1.2	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.7	3.0	3.4
	3000 rpm (0.5 degree)	0.6	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.5	1.7

Size		100	110	125	140	160	180	200	220	240	260	280
Max. axial displacement ΔK_a [mm]		±3	±3	±3	±3	±3	±3	±4	±4	±4	±4	±4
Max. radial displacement ΔK_r [mm] with		1500 rpm							1350 rpm	1220 rpm	1030 rpm	960 rpm
		0.5	0.6	0.6	0.6	0.65	0.65	0.65	0.70	0.70	0.85	0.85
	3000 rpm	0.37	-	-	-	-	-	-	-	-	-	-
Max. angular displacement ΔK_w [degree]	1500 rpm (1 degree)	1500 rpm							1350 rpm	1220 rpm	1030 rpm	960 rpm
		3.9	4.3	4.8	5.5	6.1	6.0	7.8	8.7	9.6	11.3	12.2
	3000 rpm (0.5 degree)	1.9	-	-	-	-	-	-	-	-	-	-

4 Assembly

4.10 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.

☞ **A T T E N T I O N !**
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.

5 Enclosure A

Advice and instructions regarding the use in Ex hazardous locations

Type AR:	hub/elastomer ring/hub or hub/DZ individual elastomers/hub
Type ADR:	hub/elastomer ring/flange hub/cam ring or hub/DZ individual elastomers/flange hub/cam ring
Type ADR-K:	hub/elastomer ring/flange hub K/cam ring or hub/DZ individual elastomers/flange hub K/cam ring
Type AZR and AZR short:	coupling flange/driving flange/elastomer ring/driving flange/coupling flange
Type AR/AZR:	hub/elastomer ring/driving flange/coupling flange
Type AZVR:	coupling flange/driving flange/elastomer ring/driving flange AZVR/ coupling flange AZVR
Type with taper clamping sleeve:	hub/taper clamping sleeve/elastomer ring/taper clamping sleeve/hub **(Use of taper clamping sleeve <u>only</u> permissible in combination with a feather key!)**

5.1 Intended use in Ex hazardous locations

Conditions of operation in Ex hazardous locations

POLY-NORM® couplings are suitable for the use according to EC directive 94/9/EC.

1. **Industry (with the exception of mining)**
   - Equipment group II of category 2 and 3 (*coupling is <u>not</u> approved for equipment group 1*)
   - Media class G (*gases, fogs, steams*), zone 1 and 2 (*coupling is <u>not</u> approved for zone 0*)
   - Media class D (*dusts*), zone 21 and 22 (*coupling is <u>not</u> approved for zone 20*)
   - Explosion group IIC (*explosion class IIA and IIB are included in IIC*)

<u>Temperature class:</u>

Temperature class	Ambient or operating temperature T_a	Max. surface temperature
T5, T4, T3, T2, T1	- 30 °C to + 80 °C [1)]	+ 100 °C [2)]
T6	- 30 °C to + 65 °C	+ 85 °C

<u>Explanation:</u>
The maximum surface temperatures result from each the maximum permissible ambient or operating temperature T_a plus the maximum temperature increase ΔT of 20 K which has to be taken into account.

1) The ambient or operating temperature T_a is limited to + 80 °C due to the permissible permanent operating temperature of the elastomers used.
2) The maximum surface temperature of + 100 °C applies for the use in locations which are potentially subject to dust explosion, too.

5 Enclosure A

Advice and instructions regarding the use in Ex hazardous locations

5.1 Intended use in Ex hazardous locations

2. Mining

Equipment group I of category M2 (coupling is not approved for equipment group M1).
Permissible ambient temperature - 30 °C to + 80 °C.

5.2 Inspection intervals for couplings in Ex hazardous locations

Explosion group	Inspection intervals
3G 3D	For couplings which are classified in category 3G or 3D the operating and assembly instructions that are usual for standard operation apply. During the standard operation which has to be subject to the ignition risk analysis the couplings are free from any ignition source. Merely the temperature increase produced by self-heating and depending on the coupling type has to be considered: for POLY-NORM®: $\Delta T = 20$ K
II 2G c IIB T4, T5, T6	An inspection of the circumferential backlash and a visual inspection of the elastomer ring/DZ individual elastomers must be performed after 3,000 operating hours for the first time, at the latest after 6 months after start-up of the coupling. If you note insignificant or no wear on the elastomer ring/DZ individual elastomers upon this initial inspection, further inspections can each be performed after 6,000 operating hours or at the latest after 18 months, provided that the operating parameters remain the same. If you note significant wear during the initial inspection, so that it would be recommendable to replace the elastomer ring/DZ individual elastomers, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.
II 2G c IIC T4, T5, T6	An inspection of the circumferential backlash and a visual inspection of the elastomer ring/DZ individual elastomers must be performed after 2,000 operating hours for the first time, at the latest after 3 months after start-up of the coupling. If you note insignificant or no wear on the elastomer ring/DZ individual elastomers upon this initial inspection, further inspections can each be performed after 4,000 operating hours or at the latest after 12 months, provided that the operating parameters remain the same. If you note significant wear during the initial inspection, so that it would be recommendable to replace the elastomer ring/DZ individual elastomers, please find out the cause according to the table „Breakdowns“, if possible. The maintenance intervals must be adjusted to the modified operating parameters without fail.

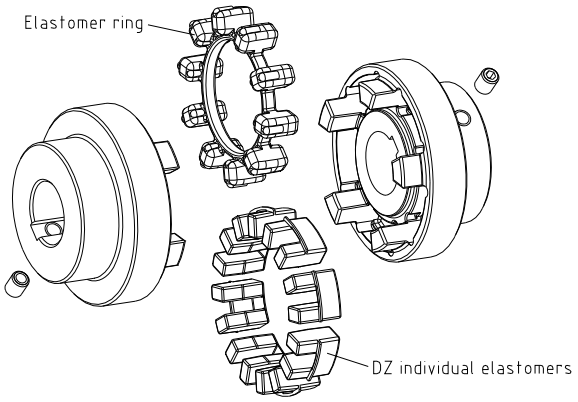


Illustration 37: POLY-NORM®, type AR

Inspection of torsional backlash

Here the backlash between the coupling cams and the elastomer teeth must be inspected by means of reversing backlash.
The friction/wear may be 25 % of the original tooth thickness of the elastomer before the elastomer rings/DZ individual elastomers must be replaced.
When reaching the limit of wear and tear $\Delta s_{max.}$, the elastomer rings/DZ individual elastomers must be replaced immediately, irrespective of the inspection intervals.

5 Enclosure A

Advice and instructions regarding the use in Ex hazardous locations

5.3 Standard values of wear

Reaching the limits for replacing depends on the operating conditions and the existing operating parameters.

With torsional backlash ≥ $\Delta s_{max.}$ [mm] the elastomer rings/DZ individual elements must be replaced. With wear ≥ 25 % of the original thickness of the elastomer teeth it is necessary to replace the elastomer rings/DZ individual elements.

C A U T I O N !
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 indicated (see table 17). If the figures are exceeded, the coupling will be damaged.

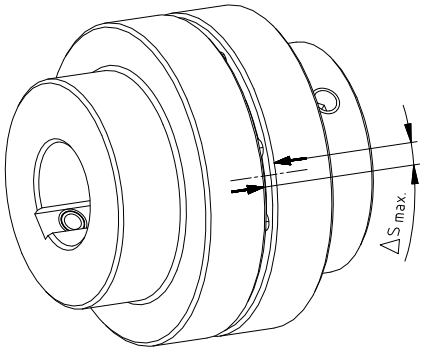


Illustration 38: Inspection of the limit of wear

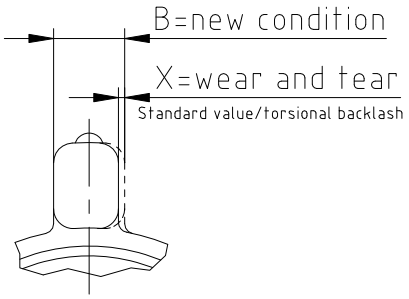


Illustration 39: Wear of elastomer ring

Table 18:

POLY-NORM® size	Limits of wear			POLY-NORM® size	Limits of wear		
	Thickness of elastomer tooth [mm]	Friction $X_{max.}$ [mm]	Torsional backlash $\Delta S_{max.}$ [mm]		Thickness of elastomer tooth [mm]	Friction $X_{max.}$ [mm]	Torsional backlash $\Delta S_{max.}$ [mm]
28	7.2	1.80	3.0	100	23.0	5.75	9.1
32	8.8	2.20	3.6	110	22.5	5.5	8.0
38	9.0	2.20	3.6	125	24.5	6.0	9.0
42	9.6	2.40	4.0	140	23.8	6.0	9.0
48	10.3	2.55	4.2	160	25.4	6.4	9.6
55	11.9	2.95	4.7	180	26.2	6.6	9.9
60	12.6	3.15	5.1	200	28.0	7.0	13.0
65	13.4	3.35	5.4	220	29.5	7.4	13.4
75	15.6	3.90	6.1	240	32.5	8.1	14.1
85	19.1	4.75	7.4	260	38.0	9.5	15.5
90	20.0	5.00	7.0	280	40.0	10.0	16.0

5.4 Permissible coupling materials in Ex hazardous locations

In the explosion groups **IIA**, **IIB** and **IIC** the following materials may be combined:
EN-GJL-250 (GG 25)
EN-GJS-400-15 (GGG 40)
Steel

Semifinished products of aluminium with a magnesium share of up to 7.5°% and a yield point of $R_{p0.2} \geq 250$ N/mm² are permitted for the use in hazardous locations.
Aluminium diecast is generally excluded for hazardous locations.

5 Enclosure A

Advice and instructions regarding the use in Ex hazardous locations

5.5 Ex marking of coupling for hazardous locations

Couplings for the use in hazardous locations are marked on at least one component completely and on the balance of components by an Ex label on the outside diameter of the hub or on the front side each for the operating conditions permitted. The elastomer ring or DZ individual elastomer is excluded.

Short labelling: (Standard)	Ex II 2GD c IIC T X/I M2 c X
Complete labelling:	Ex II 2G c IIC T6 resp. T5 - 30 °C ≤T_a ≤ + 65 °C resp. + 80 °C II 2D c T 100 °C - 30 °C ≤ T_a ≤ + 80 °C / I M2 c - 30 °C ≤T_a≤ + 80 °C
The former marking remains valid:	Ex II 2G c IIC T4/T5/T6 - 30 °C ≤ T_a ≤ + 80/60/45 °C II 2D c T 110 °C/I M2 c - 30 °C ≤ T_a ≤ + 80 °C

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

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

5.6 Start-up

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

Ex 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. conglutinating 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 after having stopped the unit.

During operation of the coupling, please pay attention to

- different operating noise
- vibrations occurring.

If the couplings are used in locations subject to dust explosion and in mining the user must make sure that there is no accumulation of dust in a dangerous volume between the cover and the coupling. The coupling must not operate in an accumulation of dust.

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*).
If the couplings are used in mining (equipment group I M2), the cover must not be made of light metal. In addition, it must be resistant to higher mechanical loads than if it is used as equipment of equipment group II.

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

5 Enclosure A

Advice and instructions regarding the use in hazardous locations

5.6 Start-up

If the protection device is used as cover, regular openings complying with the explosion protection demands can be made 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

C A U T I O N !
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 found out 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.

Coupling coating:

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

5.7 Breakdowns, causes and elimination

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

If used other than intended the coupling can become a source of ignition.
EC directive 94/9/EC requires special care from 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 each other.
- Tightening torques have been fallen below/exceeded.
- Components are exchanged by mistake/assembled incorrectly.
- A wrong or no elastomer ring/DZ individual elastomers are inserted in the coupling.
- No original **KTR** parts (purchased parts) are used.
- Old/already worn off elastomer rings resp. DZ individual elastomers or those which are stored for too long are used.
- The coupling used/the coupling protection used is not suitable for the operation in hazardous areas and does not correspond to EC directive 94/9/EC, respectively.
- Maintenance intervals are not observed.

5 Enclosure A

Advice and instructions regarding the use in ⟨Ex⟩ hazardous locations

5.7 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for hazardous locations	Elimination
Different operating noise and/or vibrations occurring	Misalignment		1) Set the unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the mounting dimension s of the coupling) 3) Inspection of wear see item inspection
	Wear of elastomer ring, short-term torque transmission due to metal contact	Ignition risk due to sparking	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer ring 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer ring, assemble coupling components 5) Inspect alignment, adjust if necessary
	Screws for axial fastening of hubs working loose		1) Set the unit out of operation 2) Inspect alignment of coupling 3) Tighten the screws to secure the hubs and secure against working loose 4) Inspection of wear see item inspection
Breaking of cam	Wear of elastomer ring, torque transmission due to metal contact		1) Set the unit out of operation 2) Replace complete coupling 3) Inspect alignment
	Breaking of the cams due to high impact energy/overload		1) Set the unit out of operation 2) Replace complete coupling 3) Inspect alignment 4) Find out the reason for overload
	Operating parameters do not correspond to 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) Replace complete coupling 3) Inspect alignment 4) Instruct and train the service staff

5 Enclosure A

Advice and instructions regarding the use in hazardous locations

5.7 Breakdowns, causes and elimination

Breakdowns	Causes	Hazard notes for hazardous locations	Elimination
Early wear of elastomer ring	Misalignment		1) Set the unit out of operation 2) Eliminate the reason for the misalignment (e. g. loose foundation bolts, breaking of the engine mount, heat expansion of unit components, modification of the mounting dimension s of the coupling) 3) Inspection of wear see item inspection
	e. g. contact with aggressive liquids/oils, influence by ozone, too high/low ambient temperature etc. causing a physical modification of the elastomer ring	Ignition risk due to sparking with metallic contact of the cams	1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer ring 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer ring, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Make sure that other physical modifications of the elastomer ring are excluded
	excessively high ambient/contact temperatures for the elastomer ring; max. permissible - 30 °C/+ 80 °C		1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer ring 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer ring, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Inspect and adjust ambient/contact temperature
Early wear of elastomer ring (Hardening/embrittlement of the elastomer cam)	Vibrations of drive		1) Set the unit out of operation 2) Disassemble the coupling and remove remainders of the elastomer ring 3) Inspect coupling components and replace coupling components that are damaged 4) Insert elastomer ring, assemble coupling components 5) Inspect alignment, adjust if necessary 6) Find out the reason for vibrations

If you operate with a worn elastomer ring/DZ individual elastomers (see chapter 5.2) and the subsequent contact of metal parts, a proper operation meeting the explosion protection requirements and acc. to directive 94/9/EC is not ensured.

5 Enclosure A

Advice and instructions regarding the use in Ex hazardous locations

5.8 EC Certificate of conformity

EC Certificate of conformity

corresponding to EC directive 94/9/EC dated 23 March 1994
and to the legal regulations

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

POLY-NORM® couplings

in an explosion-proof design described in these assembly instructions correspond to article 1 (3) b) of directive 94/9/EC and comply with the general safety and health requirements according to enclosure II of directive 94/9/EC.

The POLY-NORM® torsionally flexible coupling is in accordance with the specifications of the directive 94/9/EC. One or several directives mentioned in the corresponding EC type examination certificate IBExU02ATEXB006_05 X were in part replaced by updated versions.
KTR Kupplungstechnik GmbH being the manufacturer confirms that the product mentioned above is in accordance with the specifications of the new directives, too.

According to article 8 (1) of directive 94/9/EC the technical documentation is deposited with the institution:

IBExU
Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7

09599 Freiberg

Rheine,	20.02.2013	i. V.	i. V.
Place	Date	Reinhard Wibbeling Head of Engineering	Michael Brüning Product Manager