

# Backlash-free Safety Couplings

**GERWAH®**  
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The modular system satisfies all your wishes!



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QRO (442) 1 95 72 60  
MTY (81) 83 54 10 18  
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# GERWAH The Company

GERWAH GmbH was founded in 1980. The idea of new, innovative products has made GERWAH a recognized partner in the machine tool industry. We are a dynamic, spirited and fast growing company with clear goals and open mind that is reflected in the architecture of our new headquarters.



*Our new headquarters in Grosswallstadt, Germany*

## Our Goals

- To add value for our customers by providing innovative product solutions
- To develop solutions in cooperation with our customers
- Satisfied customers

## Our Advantages

- Know-how, innovative designs and cutting edge manufacturing plants
- Customer oriented employees
- Technical assistance and service, both locally and internationally
- Qualified sales force
- Economic stability
- Worldwide presence with subsidiaries and dealers



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*We are certified according to DIN EN ISO 9001 (Cert.-No. 0063-D)*



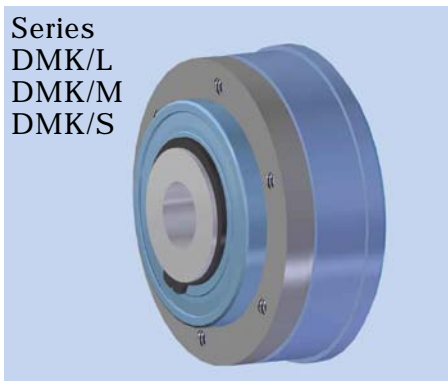
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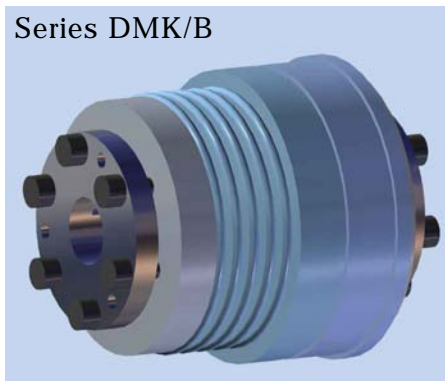
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# Guarantee for your success!

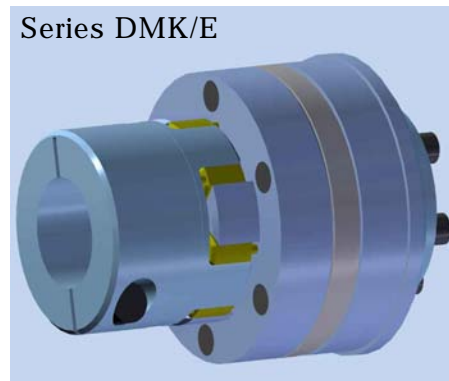
- Machine and system protection
  - High-speed disengagement within 2-4 msec.
  - Minimal residual friction
- Process control
  - Accurate adjustment of disengaging torque
  - Signalling of overloads
- Process accuracy
  - Backlash-free torque transmission
  - Excellent disengagement repeatability after long downtimes
  - Easy handling
- High dynamics
  - Low mass moment of inertia
- Specific customer solutions
  - High flexibility through modular design



Technical data: pages 6-7

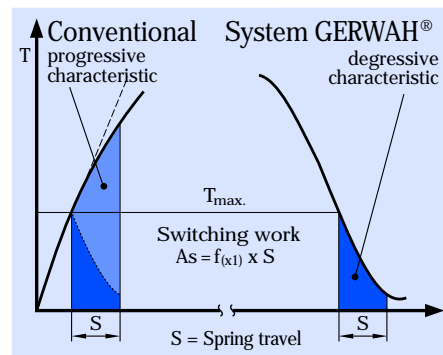
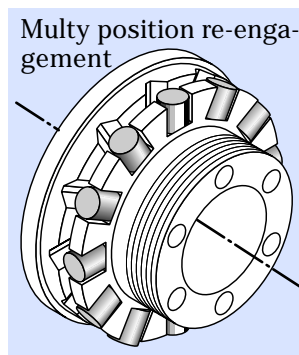
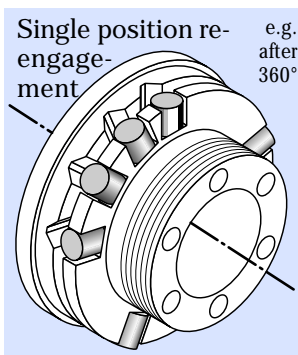
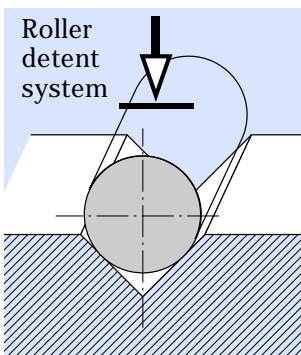


Technical data: pages 8-9



Technical data: pages 10-11

## The detent mechanism: rollers as interlocking elements



The details in this catalogue describe the products and do not represent guaranteed qualities. The user is responsible for checking and defining the technical characteristics of his particular application. We reserve the right to make changes at any time without notice. We cannot be held responsible for any omissions or printing errors. Deliveries are based on individual detailed contractual agreements. Backlash-free safety couplings are dangerous parts and must therefore be protected by the user against unintentional handling during operation.

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# Create your own safety coupling!

## The modular system

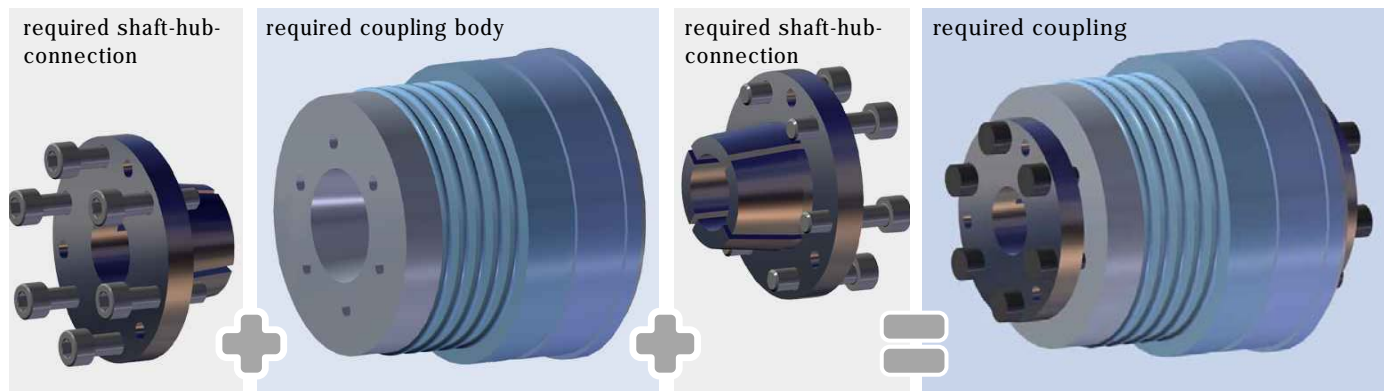
Our new system allows the user to build the requested coupling combining basic coupling elements.

The coupling is composed of three parts: the coupling body and the two hubs. The following pages illustrate technical details of each element. The result is a customer specific coupling tuned to the requirements of your application.

Any questions?  
Don't hesitate  
to contact us!



Example:



Multiple combinations available!



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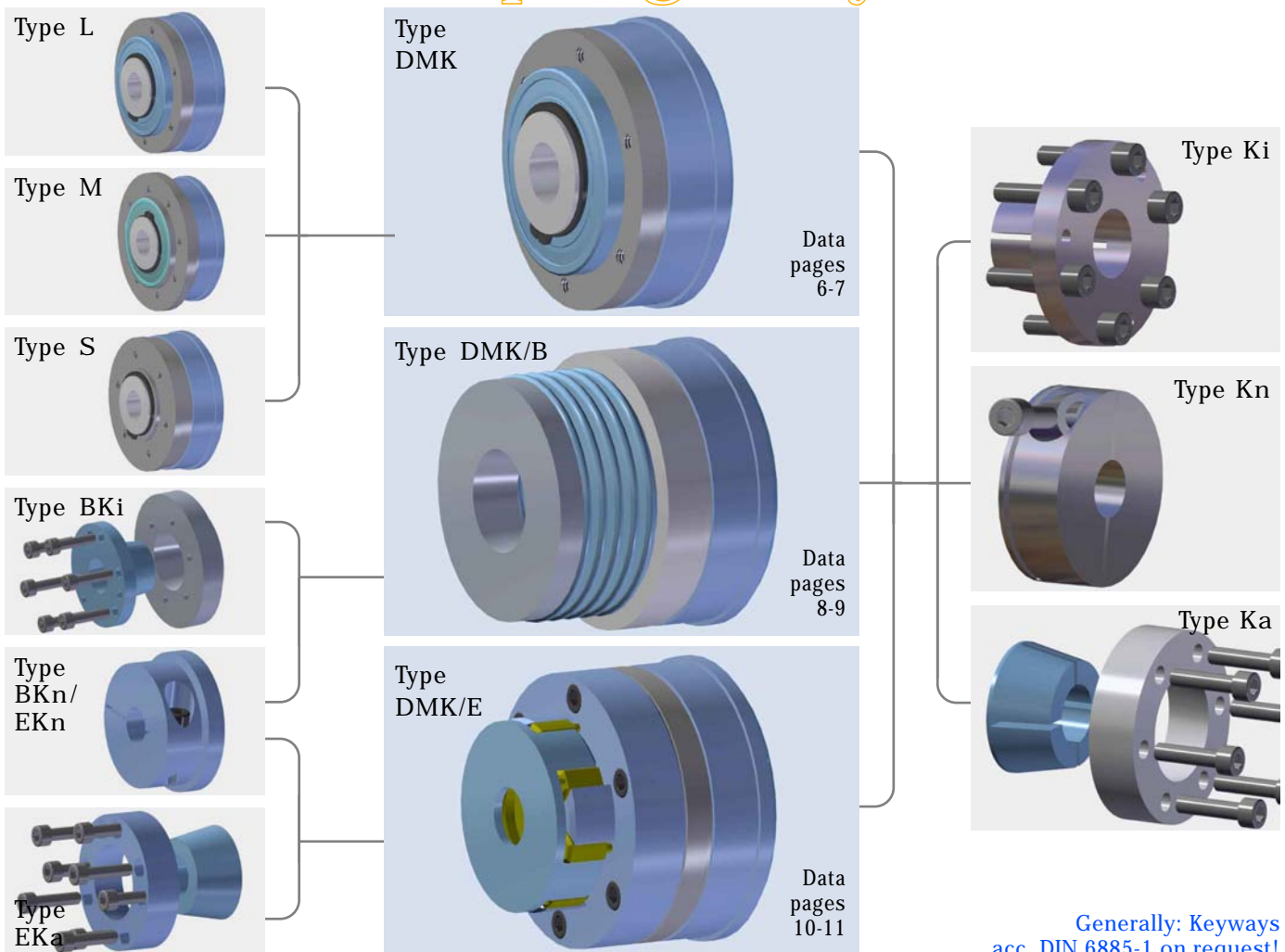
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# Safety Couplings The System

## Hub 1

## Coupling Body

## Hub 2



Combining desired!

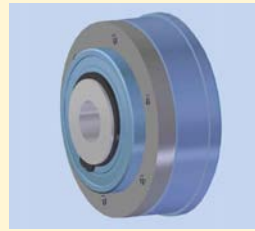


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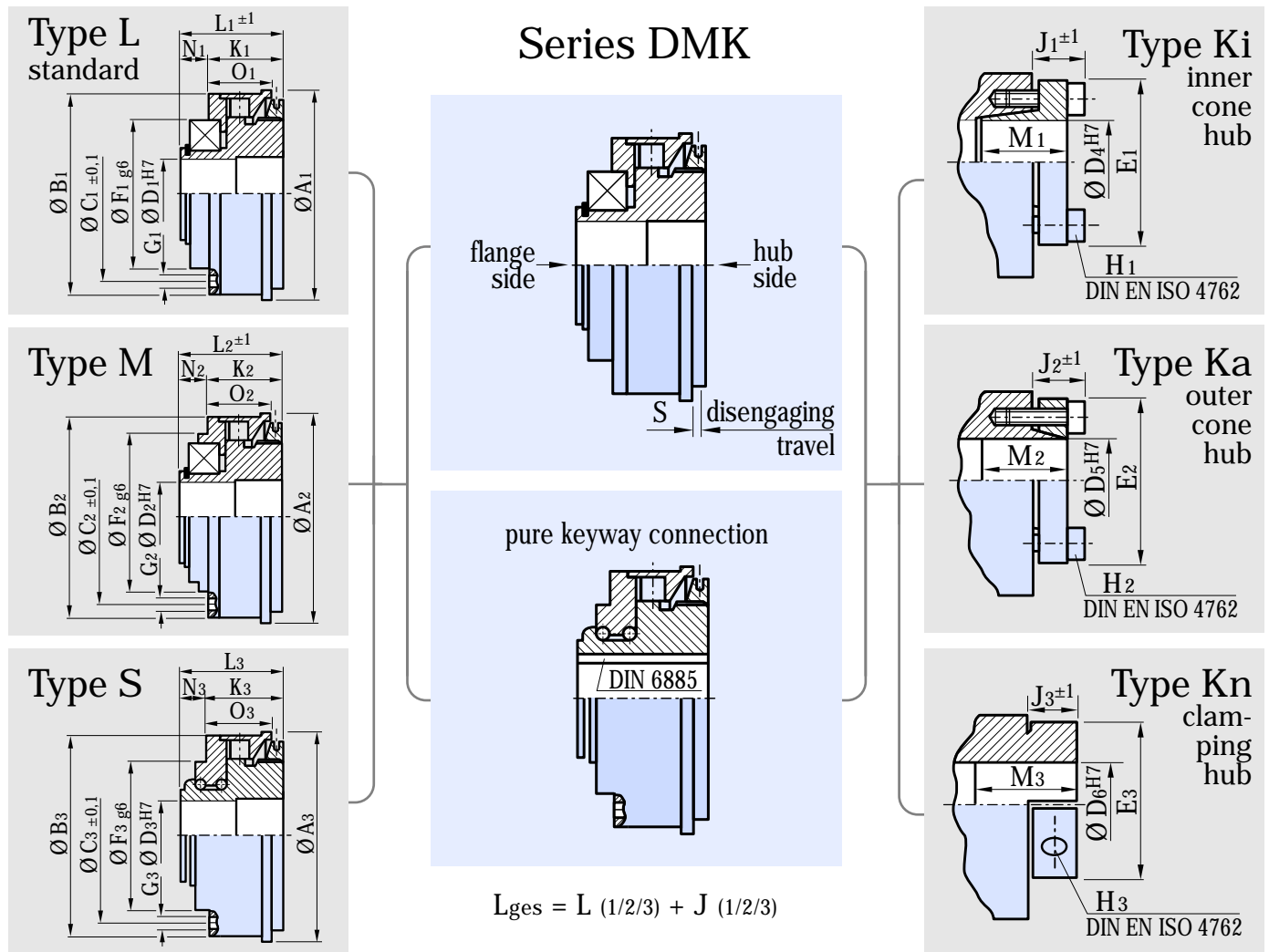
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# Backlash-free Safety Couplings



Series DMK:  
Safety  
Coupling  
with flange



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Ordering data example: **DMK/L - 150 - Ki/32<sup>H7</sup> - 80Nm/b - C**

flange size inner conical hub / bore size (mm) disengaging torque / torque adjustment range

C = single position re-engagement (360°) standard; (D = multi position re-engagement)



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# Technical Data Series DMK/L, DMK/M, DMK/S

Size		30	60	150	200	300	500	800	1200
Disengaging torque (Nm)	T <sub>KN</sub> version a	5-20	12-35	25-75	50-120	30-140	140-350	260-600	400-900
Torque adjustment range	T <sub>KN</sub> version b	15-35	20-70	65-150	80-200	100-300	250-500	500-1000	800-1400
Moment of inertia (10 <sup>3</sup> Kgm <sup>3</sup> )	J hub side	0,2	0,4	1,1	1,8	2,6	6,94	22,7	22,7
	J flange side	0,1	0,2	0,6	0,9	1,1	1,3	5,1	5,1
Weight (appr. kg)	m	0,45	0,8	1,4	1,7	25	3,8	11	11
Tightening torque of retaining screws (Nm)	MA H <sub>1</sub>	5	8,5	14	14	18	26	45	80
	MA H <sub>2</sub>	5	8,5	14	14	18	26	45	80
	MA H <sub>3</sub>	15	40	60/55	100/80	110/90	145		
Max. rotational speed (rpm)	n <sub>max</sub>	9240	8185	6230	5620	5610	4585	3470	3470
Disengaging travel (mm)	S	1,2	1,2	2	2	2	2	2	2

	Size	30	60	150	200	300	500	800	1200	
Flange L dimensions (mm)	Ø A1	65	75	95	105	115	129	169	169	
	Ø B1	62	72	92	102	110	125	165	165	
	Ø C1	46	55	78	86	90	110	125	125	
	Ø D1	min.-max		12-20	15-25	20-35	20-40	30-46	35-50	40-60
	Ø F1	min.-max		37	42	68	75	80	95	110
	G1	6 x thread/depth (mm)	M5/6	M6/6	M6/9	M6/10	M8/12	M8/12	M12/15	M12/15
	K1	min.-max		29	30	33	35	40	42	62
	L1	min.-max		36	37	46	49	54	52	77
	L <sub>ges.</sub>	= L1 + (J1) or (J2) or (J3)								
	N1	min.-max		7	7	13	14	14	10	15
	O1	min.-max		23	24	27	30	31	34	48
	Flange M dimensions (mm)	Ø A2	65	75	95	105		129		
Ø B2		62	77	92	102		125			
Ø C2		53	69	80	90		112			
Ø D2		min.-max		9-20	12-25	15-35	20-40	35-50		
Ø F2		min.-max		47	62	68	80	100		
G2		6 x thread/depth (mm)	M4/7	M5/8	M6/8	M6/10		M8/12		
K2		min.-max		29	32	36	39	42		
L2		min.-max		36	37	46	49	52		
L <sub>ges.</sub>		= L2 + (J1) or (J2) or (J3)								
N2		min.-max		7	5	10	14	10		
O2		min.-max		23	24	27	34	34		
Flange S dimensions (mm)		Ø A3	65	75	95	105	115	129	169	
	Ø B3	62	72	92	102	110	125	165		
	Ø C3	54	63	78	85	98	110	120		
	Ø D3	min.-max		12-20	15-25	20-35	20-40	30-46	35-50	40-60
	Ø F3	min.-max		47	55	68	75	82	90	100
	G3	6 x thread/depth (mm)	M5/6	M5/8	M6/9	M6/10	M8/10	M8/12	M10/15	
	K3	min.-max		30	32	33	37	40	46	61
	L3	min.-max		41	43	45	50	55	67	82
	L <sub>ges.</sub>	= L3 + (J1) or (J2) or (J3)								
	N3	min.-max		11	11	12	12	15	21	21
	O3	min.-max		23	26	27	32	32	38	48
	Hub Ki inner cone dimensions (mm)	Ø D4	12-20	15-25	20-35	25-40	30-45	35-50	40-60	40-60
H1		6 x DIN EN ISO 4762	M4	M6	M6	M6	M8	M12	M12	
J1		min.-max		12	16	17	17	21	32	
M1		min.-max		20	25	30	30	35	38	
E1		min.-max		41	54	62	68	76	85	
		min.-max							120	
Hub Ka outer cone dimensions (mm)	Ø D5	12-20	15-25	20-35	25-40	30-45	35-50	40-70	40-70	
	H2	6 x DIN EN ISO 4762	M4	M6	M6	M6	M8	M12	M12	
	J2	min.-max		22	28	30	26	35	36	
	M2	min.-max		30	38	45	40	50	53	
	E2	min.-max		45	55	51	79	79	90	
		min.-max							139	
Hub Kn clamping hub dimensions (mm)	Ø D6	12-20	15-25	20-35	25-40	30-45	35-50			
	H3	1 x DIN EN ISO 4762	M6	M8	M10	M12	M12	M12		
	J3	min.-max		19	24	26	30	30	34	
	M3	min.-max		30	40	45	50	50	59	
	E3	min.-max		47	66	68/76	80/90	91/96	110	
		min.-max								

Couplings for torque ranges different from above also available!

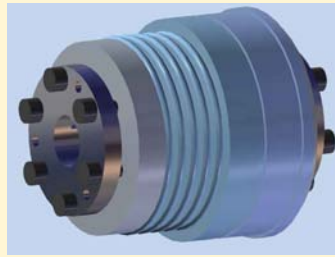


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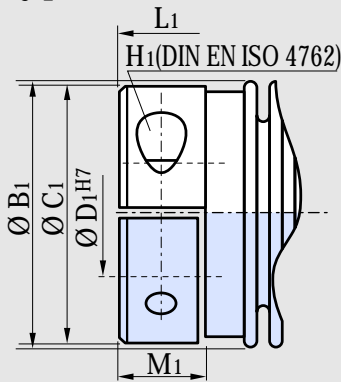
# Backlash-free Safety Couplings



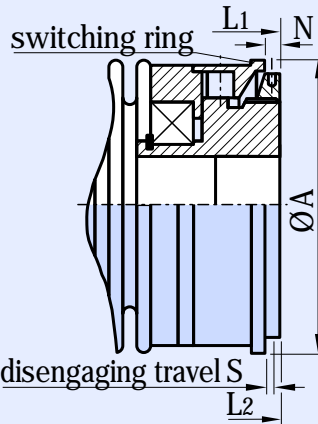
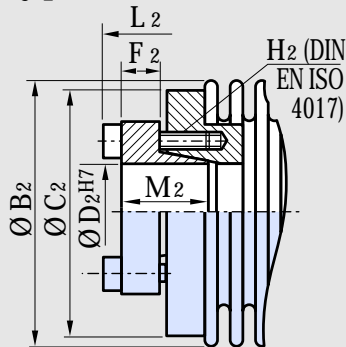
Series DMK/B:  
Safety Coupling  
with metal bellow  
as torsion-proof  
misalignment com-  
pensating element

## Series DMK/B

### Type BKn

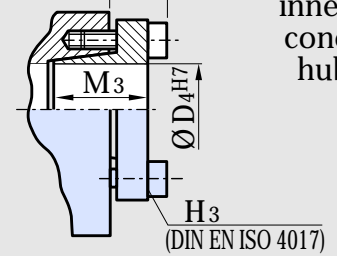


### Type BKi

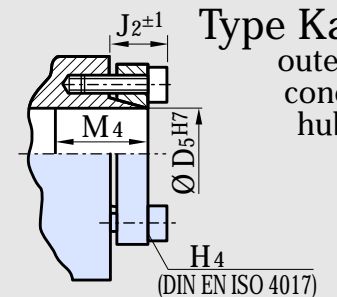


$$L_{ges} = L (1/2) + J (1/2/3)$$

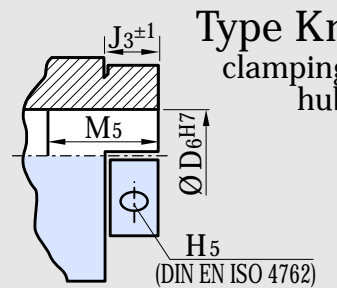
### Type Ki inner cone hub



### Type Ka outer cone hub



### Type Kn clamping hub



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Ordering data example: **DMK/B - 60/4 - BKn/25<sup>H7</sup> - Ki/20<sup>H7</sup> - 50Nm/b - C**

type  
size / bellow<sup>1)</sup>  
hub on bellow side / Ø  
hub on safety element side / Ø  
disengaging torque / torque adjustment range  
C = single position re-engagement (360°) standard; (D = multi position re-engagement)

<sup>1)</sup> two metal bellow sizes available: 4 = short bellow, 6 = long bellow





# Technical Data Series DMK / B

Size			30	60	150	200	300	500	800	1200
Disengaging torque (Nm)	T <sub>KN</sub> version a		5-20	12-35	25-75	50-120	30-140	140-350	260-600	400-900
torque adjustment range	T <sub>KN</sub> version b		15-35	20-70	65-150	80-200	100-300	250-500	500-1000	800-1400
Moment of inertia BKn	(10 <sup>-3</sup> Kgm <sup>2</sup> )	J hub side	0,16	0,4	1,5	1,65	3,25	3,8	-	-
		J metal bellow side	0,16	0,4	1,5	1,65	3,25	3,8	-	-
Moment of inertia BKi	(10 <sup>-3</sup> Kgm <sup>2</sup> )	J hub side	0,21	0,53	1,3	2,1	4,3	11,3	36	36
		J metal bellow side	0,11	0,27	0,7	1,1	2,2	5,7	18	18
Weight BKn	(appr. kg)	m	0,7	1,4	2,4	3	5,3	6,2	-	-
Weight BKi	(appr. kg)	m	0,7	1,5	2,5	3,2	5,5	7,1	19	20
Tightening torque of retaining screw H1 (Nm)	Ma		15/12	40/30	80/70/50	100/80	110/90	145	-	-
Tightening torque of retaining screw H2 (Nm)	Ma		5	8,5	14	14	18	26	45	80
Tightening torque of retaining screw H3 (Nm)	Ma		5	8,5	14	14	18	26	45	80
Tightening torque of retaining screw H4 (Nm)	Ma		5	8,5	14	14	18	26	45	80
Tightening torque of clamp screw H5 (Nm)	Ma		15	40	60/55	100/80	110/90	145	-	-
Dynamic torsional stiffness (10 <sup>3</sup> Nm/rad)	C <sub>Tdyn</sub>	4/6 <sup>1)</sup>	36/26	73/49	151/101	173/116	499/280	680/310	758	1266
Radial spring stiffness (N/mm)	C <sub>r</sub>	4/6 <sup>1)</sup>	718/222	1125/333	2030/601	1531/450	6328/1470	8800/972	512	706
Axial spring stiffness (N/mm)	C <sub>a</sub>	4/6 <sup>1)</sup>	48/27	91/53	147/86	147/85	284/153	105/86	186	278
Max. rotation speed (rpm)	n <sub>max</sub>		9240	8183	6830	5620	5210	4585	3470	3470
Disengaging travel (mm)	S		1,2	1,2	2	2	2	2	2	2

Max. allowable misalignment: see page 15

	Size		30	60	150	200	300	500	800	1200
BKn clamping hub dimensions (mm)	Ø A		65	75	95	105	115	129		
	Ø B1		56	66	82	90	110	122		
	Ø C1		47/65	57/66	68/80/84	80/90	91/96	110		
	Ø D1 <sup>H7</sup>	min.	10/20	14/23	20/28/35	25/32	32/40	40/55		
		max.	20/25	23/35	26/35/40	32/42	40/45			
	H1	DIN EN ISO 4762	M6	M8	M10	M12	M12	M12		
	L1 <sup>2)</sup>		70/78	82/90	102/114	113/121	110/118	121/129		
	L <sub>ges.</sub> = L1 + (J1) or (J2) or (J3)									
	N		6	6	7	5	9	8		
	M1		24	29	31	38	37	41		
BK <sub>i</sub> inner cone hub dimensions (mm)	Ø A		65	75	95	105	115	129	169	169
	Ø B2		56	66	82	90	110	122	157	157
	Ø C2		52	63	80	85	110	122	142	142
	Ø D2	min. - max.	12-20	15-25	20-35	20-40	30-50	35-55	40-70	40-70
	F2		8	9	11	11	13	13	20	20
	H2	DIN EN ISO 4017	M4	M6	M6	M6	M8	M8	M12	M12
	L2 <sup>2)</sup>		64/72	74/82	101/109	103/111	104/112	124/132	188	188
	L <sub>ges.</sub> = L2 + (J1) or (J2) or (J3)									
	N		6	6	7	5	9	8	14	14
	M2		18	26	30	33	33	40	50	50
Hub K <sub>i</sub> inner cone dimensions (mm)	Ø D4		12-20	15-25	20-35	25-40	30-45	35-50	40-70	40-70
	H3	6 x DIN EN ISO 4017	M4	M6	M6	M6	M6	M8	M12	M12
	J1		11	14	15	15	19	19	32	32
	M3		20	25	30	30	35	38	60	60
Hub K <sub>a</sub> outer cone dimensions (mm)	Ø D5		12-20	15-25	20-35	25-40	30-45	35-50	40-70	40-70
	H4	6 x DIN EN ISO 4017	M4	M6	M6	M6	M6	M8	M12	M12
	J2		21	26	28	28	33	34	51	51
	M4		30	38	40	40	50	53	80	80
Hub K <sub>n</sub> clamping hub dimensions (mm)	Ø D6		12-20	15-25	20-35	25-40	30-45	35-50		
	H5	1 x DIN EN ISO 4762	M6	M8	M10	M12	M12	M12		
	J3		19	24	26	30	30	34		
	M5		30	40	42	50	50	59		

<sup>2)</sup> Two metal bellow dimensions featuring different degrees of torsional stiffness are available: 4= short bellow, 6 = long bellow. Consequently, length dimensions L1 and L2 vary

Couplings for torque ranges different from above also available!

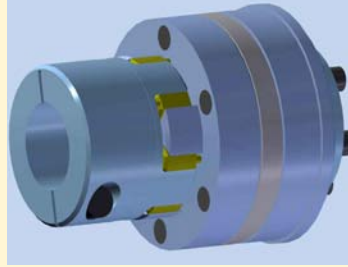


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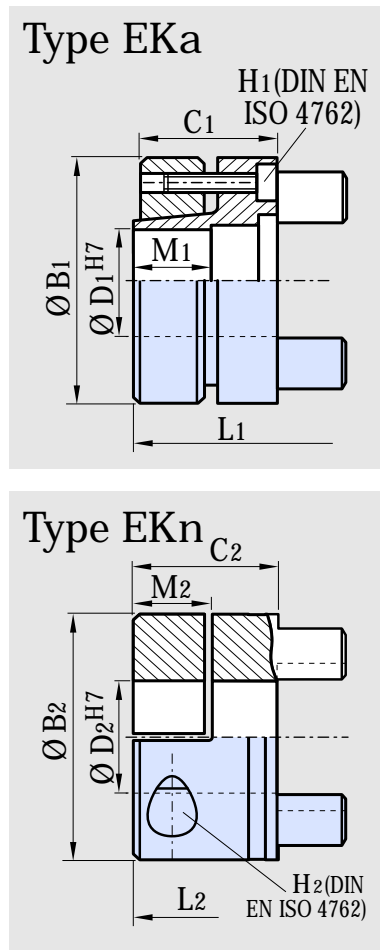
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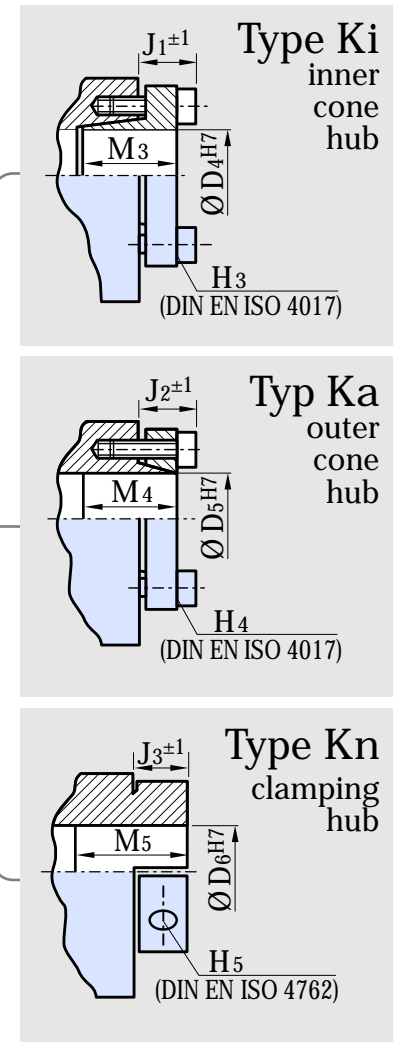
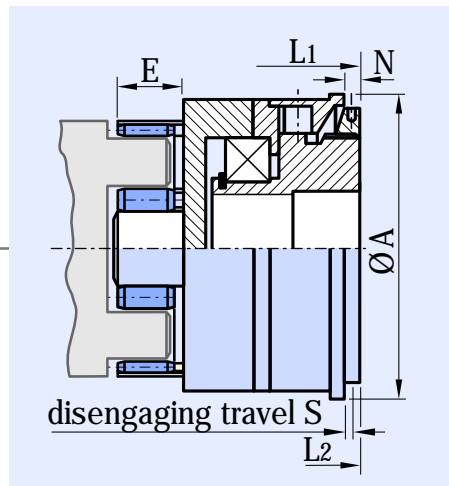
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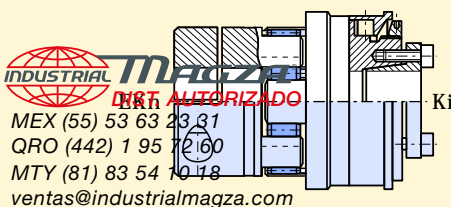
Series DMK/E:  
Safety Coupling  
with elastomer spider  
as torsionally elastic  
misalignment com-  
pensating element



## Series DMK/E



$$L_{ges} = L (1/2) + J (1/2/3)$$



Ordering data example: **DMK/E - 30 - EKKn/25<sup>H7</sup> - Ki/20<sup>H7</sup> - 60Nm/b - C**

type  
size  
hub on elastomer side / bore size  
inner conical hub on safety element side / bore size  
disengaging torque / torque adjustment range  
C = single position re-engagement (360°) standard;  
(D = multi position re-engagement)

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# Technical Data Series DMK/E

Size		30	60	150	300	500
Disengaging torque (Nm)	TKN version a	5-20	12-35	25-75	30-140	140-350
torque adjustment range	TKN version b	15-35	20-70	65-150	100-300	250-500
Moment of inertia (10 <sup>-3</sup> Kgm <sup>2</sup> )	J hub side	0,1	0,32	0,8	3	5
	J elastomer spider side	0,036	0,15	0,33	1,04	3,1
Weight (appr. Kg)	m	0,5	1,4	28	4,6	7,5
Tightening torque of retaining screw H1 (Nm)	Ma	3	6	6	10	35
Tightening torque of clamping screw H2 (Nm)	Ma	15	40	60/55	110/80	145
Tightening torque of retaining screw H3 (Nm)	Ma	5	8,5	14	18	26
Tightening torque of retaining screw H4 (Nm)	Ma	5	8,5	14	18	26
Tightening torque of clamping screw H5 (Nm)	Ma	15	40	60/55	110/80	145
Max. rotational speed (rpm)	n <sub>max</sub>	8950	7000	6000	5000	3600
Disengaging travel (mm)	S	1,2	1,2	2	2	2
Standard shore hardness of spider		98 SH A (red) - (spider with different shore hardness available!)				
Max. allowable misalignment: see page 15						

	Size	30	60	150	300	500		
EKa outer cone hub dimensions (mm)	Ø A	65	75	95	115	129		
	Ø B1	40	55	65	80	95		
	C1	25	30	35	45	50		
	D1 <sup>H7</sup>	min. - max.		10-20	11-25	15-36	20-41	27-50
	E	16	18	20	24	26		
	H1	DIN EN ISO 4762		M4	M6	M6	M8	
	L1	81	94	106	132	140		
	L <sub>ges.</sub> = L1 + (J1) or (J2) or (J3)							
	M1	14	16	21	28	28		
	N	6	6	7	9	8		
	EKn clamping hub dimensions (mm)	A	65	75	95	115	129	
Ø B2		40	55	65	80	105		
C2		25	30	35	45	56		
D2 <sup>H7</sup>		min. - max.		10-20	20-28	24-35	32-44	40-60
E		16	18	20	24	26		
H2		DIN EN ISO 4762		M6	M8	M10	M12	M12
L2		81	94	106	132	146		
L <sub>ges.</sub> = L2 + (J1) or (J2) or (J3)								
M2		24	29	31	37	41		
N		6	6	7	9	8		
Hub Ki inner cone dimensions (mm)		Ø D4	12-20	15-25	20-35	30-45	35-50	
	H3	6 x DIN EN ISO 4017		M4	M6	M6	M8	
	J1	11	14	15	19	19		
	M3	20	25	30	35	38		
Hub Ka outer cone dimensions (mm)	Ø D5	12-20	15-25	20-35	30-45	35-50		
	H4	6 x DIN EN ISO 4017		M4	M6	M6	M8	
	J2	21	26	28	33	34		
	M4	30	38	40	50	53		
Hub Kn clamping hub dimensions (mm)	Ø D6	12-20	15-25	20-35	30-45	35-50		
	H5	M6	M8	M10	M12	M12		
	J3	19	24	26	30	34		
	M5	30	40	42	50	59		

Bore size range D1/D2 and applicable transmissible torque values (Nm)	Typ	Ø10	Ø11	Ø13	Ø14	Ø15	Ø17	Ø19	Ø20	Ø24	Ø25	Ø27	Ø30	Ø32	Ø36	Ø38	Ø41	Ø42	Ø44	Ø48	Ø50	Ø55	Ø60
30	17	17	17	17	17	17	17	17	17														
60		22	37	46	56	60	60	60	60	60													
150					56	68	114	134	160	160	160	160	160	160									
300								134	230	261	325	325	325	325	325	325							
500											329	450	450	450	450	435	450	450	450	450	450	500	500

Couplings for torque ranges different from above also available!



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# Safety Couplings Product Information

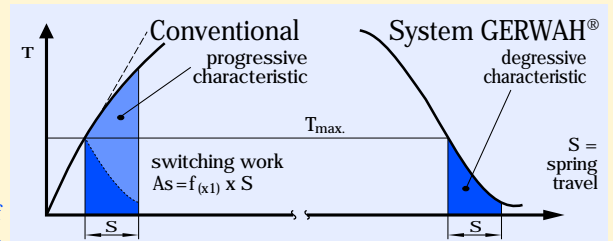


Figure 1: advantage of the GERWAH® system

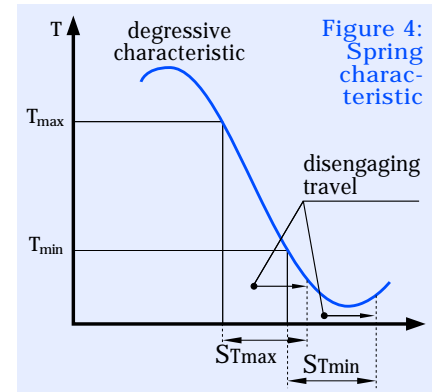
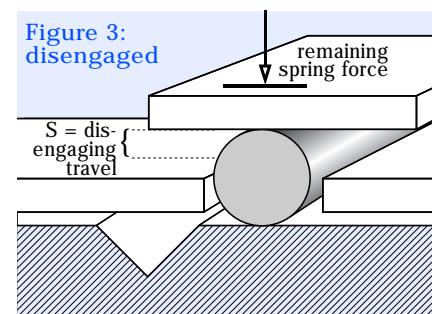
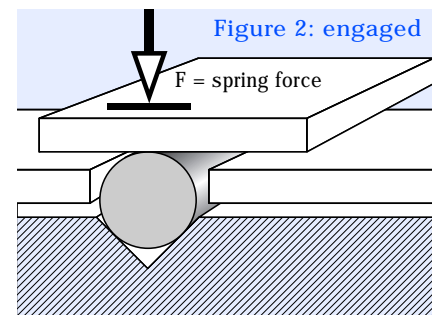
GERWAH® backlash-free safety couplings work as spring-loaded positive couplings. The special roller or ball guides guarantee a totally backlash-free transmission of the torque in both directions of rotation (patented). The couplings are therefore especially suitable for use in speed and direction controlled drives. Uniform loading of the rollers and balls guarantees high system stiffness, which is important especially for modern servo drives. The roller guides simultaneously guarantee high reliability and switching frequencies when used with dynamic servo drives.

In the event of an overload the rollers move out of the guides (fig. 2 and fig. 3). This results in an axial movement (S), which activates a proximity switch that immediately makes contact to switch off drive (fig. page 13).

To avoid damage to the safety coupling, the drive must be switched off immediately after an overload. In order to re-engage the safety coupling, the drive needs to be turned off. Then, the motor will be rotated at very low speed or manually. The coupling re-engages on its own in its original angular position (C-synchronous engagement) or in the next position (D-continuous engagement). The re-engaging of the coupling is clearly audible

and is displayed through the switch contact. After re-engaging, the safety coupling features its original disengaging torque. The drive can be switched on again after the cause of the torque overload has been removed.

GERWAH® backlash-free safety couplings have been developed especially for dynamic drives. The safety couplings work exclusively with specially selected disc springs with a pronounced degressive characteristic (see figures 1 and 4). This advantage guarantees shortest switching times and a low residual torque. The coupling disengages immediately when the predetermined amount of torque is exceeded. The torque drops immediately to a small residual value, typically 2 to 5%. The switching work required of our couplings corresponds to only a fraction of that of conventional safety couplings with progressive characteristics (see fig. 1). This is a crucial advantage because even ultra-short surges in speed are rendered harmless by the safety coupling.



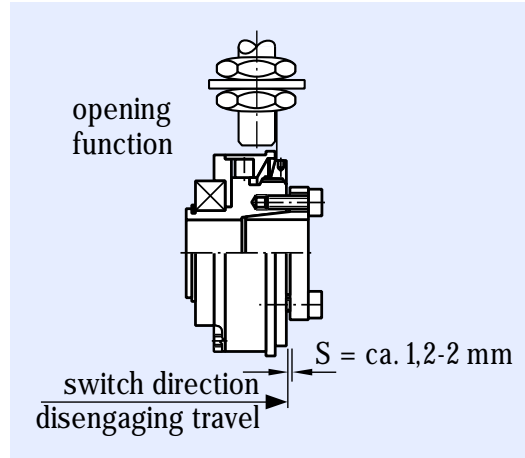
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# Limit Switches Application examples

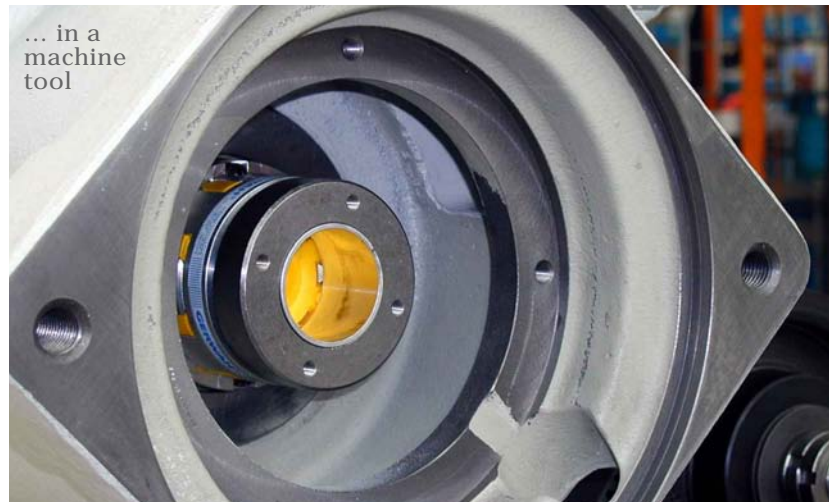
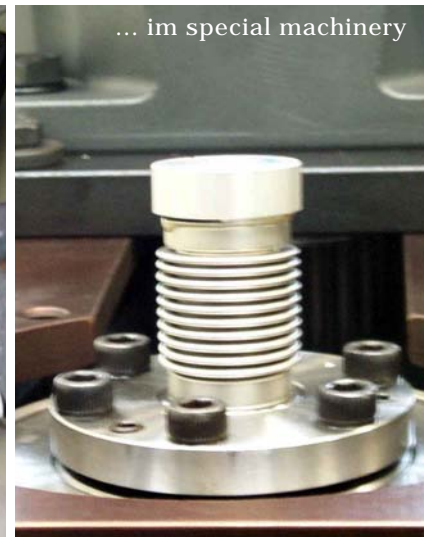
## Proximity sensor as mechanical limit switch

GERWAH® backlash-free safety couplings produce an axial movement (disengaging travel) of the outer cover or the ring in the event of an overload (see figure). This disen-



gaging motion allows a proximity sensor or a mechanical limit switch to switch off the drive and simultaneously emit an acoustical or optical signal.

## Application examples of GERWAH® Safety Couplings...



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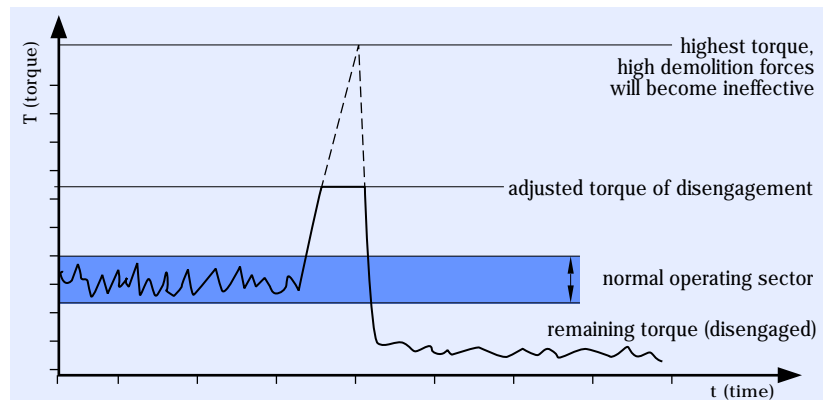
# Safety Couplings Dimensioning

A good concept offers many possibilities

Even large destructive forces have no chance!

When determining the disengaging torque of the safety coupling, brief peaks of torque in the drive assembly as well as the machine need to be taken into account. GERWAH® safety couplings have been developed for rapid interruption. We recommend paying special attention to the motor characteristic regarding the maximal acceleration torque.

When using dynamic drives (servo motors), e.g. machine tools, we suggest to consider the influence of the moments of inertia. Since the acceleration torque in both positive and negative direction is usually much higher than



the nominal moment, the sizing of the safety coupling and the disengaging torque level needs to be based on the maximum acceleration torque.

The following values have been determined for a correct dimensioning of couplings on highly dynamic drives.

Generally, the following equation applies:

$$T_A = K \times T_{\max} \times \frac{J_{\text{mach}}}{J_{\text{mot}} + J_{\text{mach}}} = [\text{Nm}]$$

- $J_{\text{mot}}$  = moment of inertia of motor
- $J_{\text{mach}}$  = moment of inertia of machine
- $T_{\max}$  = max. acceleration torque
- $T_A$  = cut-off (disengaging torque) of coupling
- $K$  = load or impact factor
- $K = 1,5$  (regular movements)
- $K = 2$  (irregular movements)
- $K = 2,5 - 4$  (shock loads)

A load/impact factor of  $K=1.5 - 2$  should be applied to servo drives in machine tools. A higher load factor should be used for extreme applications.

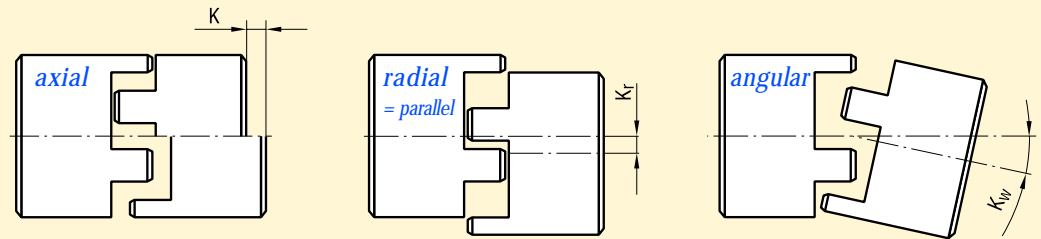
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# Safety Couplings Installation Instructions

Types of misalignment (figure 1)



## Shaft alignment:

Figure 1 shows the types of misalignment. Prior to mounting the coupling, both the coupling and the shafts must be aligned. The precision in aligning the shafts will determine the amount of reserves the coupling offers for compensation of misalignment occurring during operation. Well aligned shafts prolongue the life cycle of the coupling and help reducing the noise level of the drive.

When more than one type of misalignment are present at once, each single type of misalignment must not reach the maximal value. Instead, they have to be balanced (see figure 3).

## Assembly:

Clean and degrease shaft ends and coupling bores and check tolerances. **The max. clearance between shaft and hubs must not exceed 0.03 mm.**

Slide coupling hubs onto shaft ends, check axial installation di-

mensions and tighten locking screws according to the tightening torque values shown in the technical data pages.

## Removal:

Loosen locking screws. When necessary, use the push-off threads to loosen the backlash free connection. Should the shaft/hub connection not come loose, use a rubber hammer, applying light taps.

[Please ask us for a detailed installation instruction or download from our website!](#)

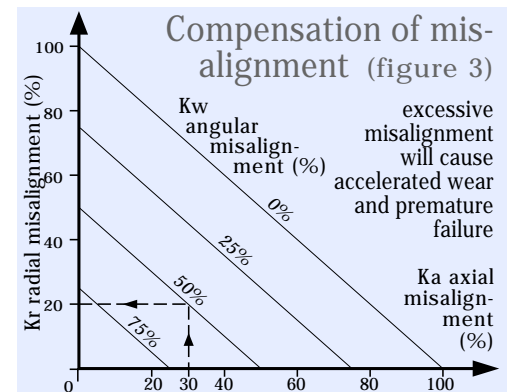
## Misalignment - DMK/B

size	bellow short / long	mm axial $K_a^{1)}$	mm radial $K_r$	degree angular $K_w$
30	4 / 6	0,4 / 0,5	0,1 / 0,2	1,0 / 1,5°
60	4 / 6	0,4 / 0,5	0,1 / 0,2	1,0 / 1,5°
150	4 / 6	0,4 / 0,5	0,2 / 0,2	1,0 / 1,5°
200	4 / 6	0,4 / 0,5	0,2 / 0,2	1,0 / 1,5°
300	4 / 6	0,4 / 0,5	0,2 / 0,2	1,0 / 1,5°
500	4 / 6	0,4 / 0,5	0,2 / 0,2	1,0 / 1,5°
800	6	0,5	0,2	1,0°
1200	6	0,5	0,2	1,0°

## Misalignment - DMK/E

size	elastomer spider	shore-scale	mm axial $K_a^{1)}$	mm radial $K_r$	degree angular $K_w$
30	98	A	-0,5	0,06	0,9°
60	98		-0,5	0,10	0,9°
150	98	A	-0,7	0,11	0,9°
300	98		-0,7	0,12	0,9°
500	98	A	-1,0	0,14	0,9°

<sup>1)</sup> The  $K_a$  values need to be added to the length dimension L of the selected coupling type



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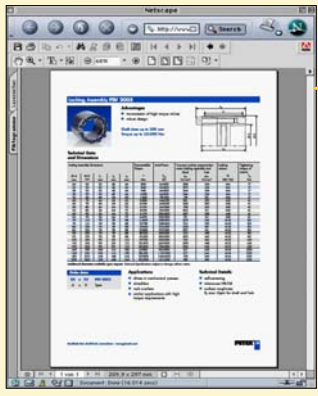
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