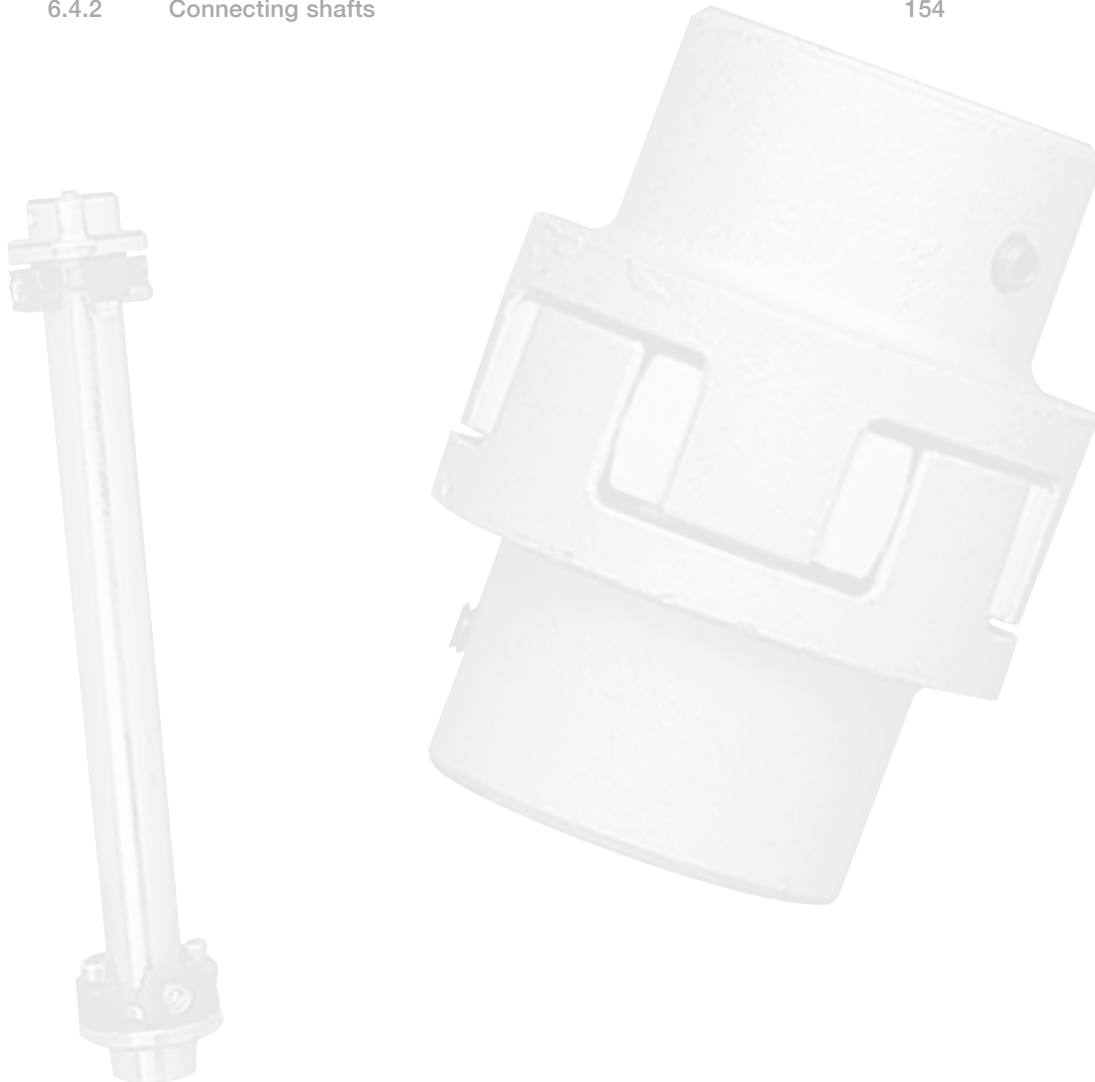


Couplings and connecting shafts

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Couplings and connecting shafts

6.1 Flexible couplings

The impact- and vibration-absorbing effect of flexible couplings helps protecting the worm gear screw jacks and bevel gear boxes, as well as the motors.

6.1.1 R range

They also even out small, angular, radial and axial shaft displacements – which makes them preferable to rigid couplings or shaft connections.

Technical information

Size R	Nominal torque T_N [Nm]			Max. angle displacement [°]	Torsional angle T_N	Max. axial displacement [mm]	Max. radial displacement [mm]	Mass inertia moments ¹⁾ J [kgm ²]	Material ²⁾	Weight ³⁾ [kg] Layout	
	92 ° Shore	95 ° Shore	98 ° Shore							a/a	b/b
14	7		12	1,2°	6,4°	1,0	0,17	$5,60 \times 10^{-6}$	Al	0,14	0,14
19/24	10		17	1,2°		1,2	0,20	$1,03 \times 10^{-6}$	Al	0,32	0,36
24/28	35		60	0,9°	3,2°	1,4	0,22	$4,30 \times 10^{-4}$	or	0,60	0,72
28/38	95		160	0,9°		1,5	0,25	$9,80 \times 10^{-4}$	St	0,97	1,33
38/45	190		325	1,0°		1,8	0,28	$96,5 \times 10^{-4}$		2,08	2,46
42/55	265		450	1,0°		2,0	0,32	$0,35 \times 10^{-2}$		3,21	3,93
48/60	310		525	1,1°		2,1	0,36	$1,06 \times 10^{-2}$	cast iron	4,41	5,19
55/70	410		685	1,1°	3,2°	2,2	0,38	$2,03 \times 10^{-2}$	or	6,64	8,10
65/75	625	940	-	1,2°		2,6	0,42	$3,80 \times 10^{-2}$	St	10,13	11,65
75/90	1280	1920	-	1,2°		3,0	0,48	$8,20 \times 10^{-2}$		16,03	19,43
90/100	2400	3600	-	1,2°		3,4	0,50	$23,8 \times 10^{-2}$		27,50	31,70

Color coding Various flexible spiders:
 92 ° Shore yellow
 95/98 ° Shore red

Operating temperature: 92 ° Shore -40 ° to + 90 °C
 95/98 ° Shore -30 ° to + 90 °C

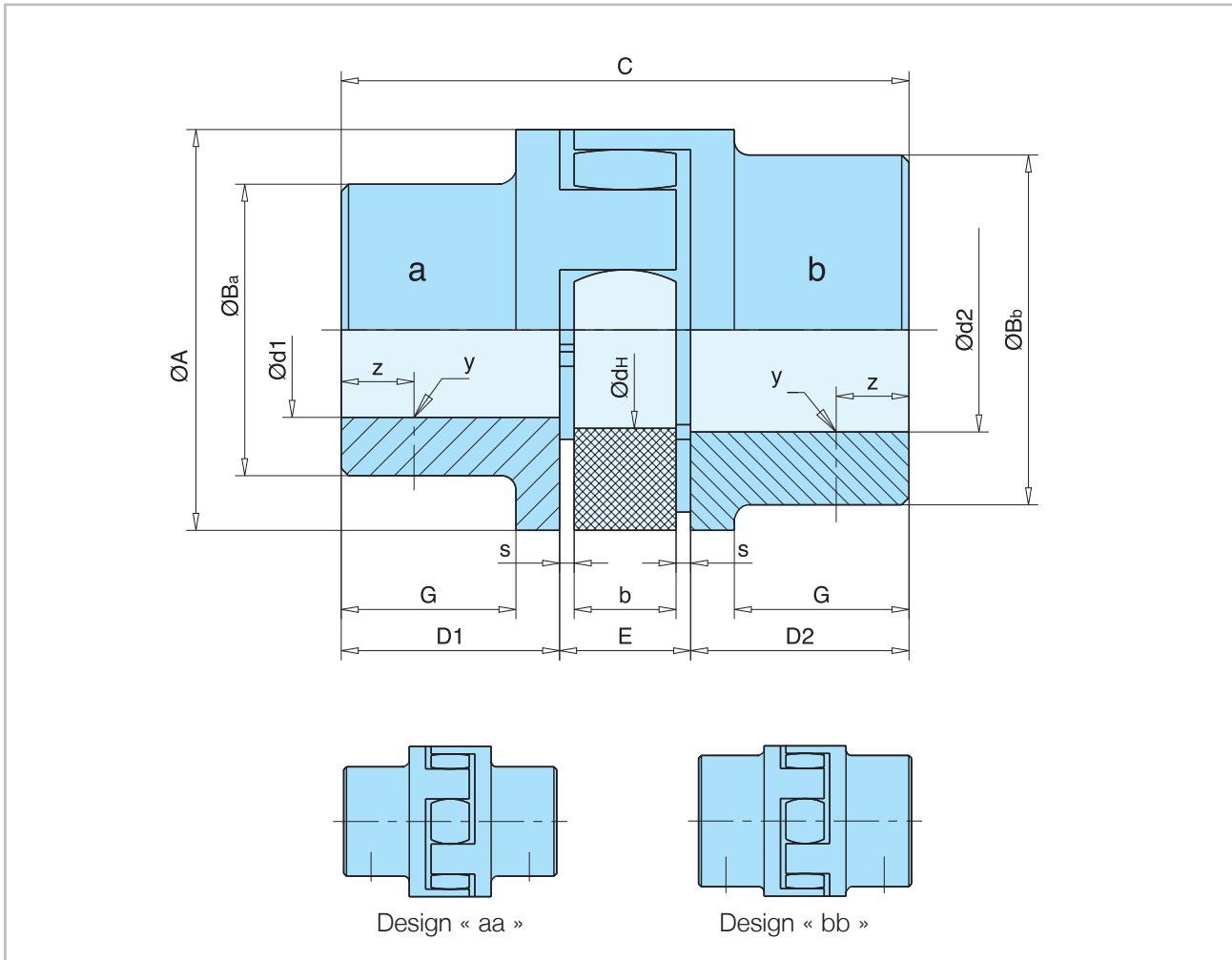
Dimensioning: The nominal torque (T_N) of the couplings - with impact factor S^4) taken into account-- must be at least equal to the system torque (T_{Anl}) to be transferred

$$T_N \geq T_{Anl} * S$$

Couplings and connecting shafts

6.1 Flexible couplings

Dimension plan



6

Size R	Ready-drilled holes $\text{\O}dH7^{5)}$				$\text{\O}A$	$\text{\O}B_a$	$\text{\O}B_b$	C	D1 ⁶⁾ and D2 ⁶⁾		E	s	b	G	$\text{\O}d_H$	y	z
	Hub a $\text{\O}d1$		Hub b $\text{\O}d2$														
	min	max	min	max													
14	-	-	6	14	30	30	-	35	11	13	1,5	10	-	10	M4	-5	
19/24	6	19	6	24	40	32	40	66	25	16	2	12	20	18	M5	10	
24/28	8	24	8	28	55	40	48	78	30	18	2	14	24	27	M5	10	
28/38	10	28	10	38	65	48	65	90	35	20	2,5	15	28	30	M8	15	
38/45	12	38	38	45	80	66	77	114	45	24	3	18	37	38	M8	15	
42/55	14	42	42	55	95	75	94	126	50	26	3	20	40	46	M8	20	
48/60	15	48	48	60	105	85	102	140	56	28	3,5	21	45	51	M8	20	
55/70	20	55	55	70	120	98	120	160	65	30	4	22	52	60	M10	20	
65/75	22	65	65	75	135	115	135	185	75	35	4,5	26	61	68	M10	20	
75/90	30	75	75	90	160	135	160	210	85	40	5	30	69	80	M10	25	
90/100	40	90	90	100	200	160	180	245	100	45	5,5	34	81	100	M12	25	

- 1) Values for steel hubs b-b and max. ready-drilled hole without grooves. This value is reduced by an approximate factor of 3 for Aluminium.
- 2) A coupling in material cast iron or steel should be selected for use with hardened drive-shafts. (sizes R19/24 – R48/60 also in stainless steel 1.4571)
- 3) Weight for cast iron material, approx. 60 % lower in the case of aluminium
- 4) Impact coefficient S = 2 for use with three-phase motors
- 5) Feather key grooves are configured according to DIN 6885/1 standards
- 6) Special hub lengths available on request

Couplings and connecting shafts

6.2 Flexible overload couplings

Flexible overload couplings limit the drive torque (lifting force) of the lifting system, thus protecting the mechanism from overloads and malfunctions in the event of the drive system becoming blocked.

6.2.1 MKR range

Torque is transferred via wear-resistant, oil-proof and temperature-protected friction linings, which are held in place by means of disc springs. **MKR** (R = friction linings). Friction linings are also available in rust-free configuration for outdoor use.

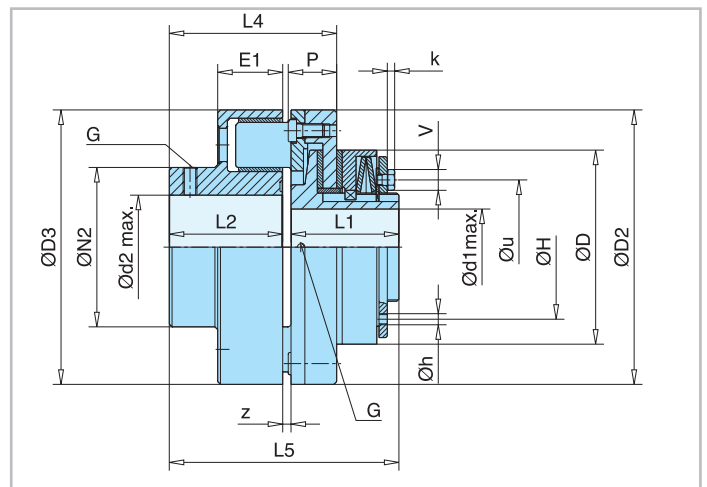
Technical information

Size	Torque limit for overload		Rotary speed n max [min ⁻¹]	Weight pre-drilled [kg]
	Type MKR 1 [Nm]	Type MKR 2 [Nm]		
0	2- 10	10- 20	7000	1,3
01	6- 30	30- 60	6500	3,0
1	14- 70	70- 130	5600	3,2
2	26- 130	130- 250	4300	6,5
3	50- 250	250- 550	3300	10,1
4	110- 550	550- 1100	2700	19,5
5	140- 700	700- 1400	2200	23,4

Dimensioning:

The controlling torque of the overload coupling is factory-adjusted, with reference to starting torque T_A to 1.4 times the torque to be transferred (TN).

Dimension plan



Size	ØD	ØD3	ØD2	Ød1 _{min}	Ød1 _{max}	Ød2 _{min}	Ød2 _{max}	E1	G	H
0	45	80	80	7	20 ¹⁾	11	30	23	M4	37
01	58	105	105	12	22	11	42	32	²⁾	46
1	68	105	105	12	25	11	42	32	²⁾	50
2	88	135	135	15	35	13	60	36	³⁾	67
3	115	160	160	19	45	25	60	38	⁴⁾	84
4	140	198	198	25	55	30	75	47	M8	104
5	170	198	198	30	65	50	75	47	M8	125

Size	Øh	k	L1	L5	L4	P	L2	ØN2	z	Øu	v
0	3	⁵⁾	33	66	52	18	30	50 _{h11}	4	37	2 ⁵⁾
01	5	0,3 ⁵⁾	45	91	68	22	42	65 _{h11}	4	46	2,5 ⁵⁾
1	5	1,3 ⁵⁾	52	98	69	23	42	65 _{h11}	4	50	3 ⁵⁾
2	6	3	57	116	86	27	55	85 _{h11}	4	67	10
3	6	5,5	68	128	91	31	55	90	6	84	13
4	7	5,5	78	165	122	35	82	115	6	97	13
5	8	5,5	92	179	127	40	82	115	6	109	13

1) up to Ø19 groove according to DIN 6885-1,
over Ø19 groove according to DIN 6885-3

2) up to Ø12 -M4, over Ø12 up to Ø17 -M5, over Ø17 -M6

3) up to Ø17 -M5, over Ø17 -M6

4) up to Ø22 -M6, over Ø22 -M8

5) Countersunk screw with hexagon socket DIN 7991

Couplings and connecting shafts

6.2 Flexible overload couplings

6.2.2 MKE and MKS range with electrical shut-off

If the set torque limit is exceeded, the coupling disengages. The torque immediately drops. A mounted limit switch detects the disengagement movement and switches off the drive.

The safety coupling with electrical shut-off is available as configurations **MKE** (E = ratchet configuration) and **MKS** (S = synchronize configuration).

Technical information

- The ratchet coupling **MKE** locks in the event of an overload, pushing out the switching rod. During the locking procedure, the torque is considerably less than the pre-adjusted torque limit. The system re-engages automatically.
- The locked coupling **MKS** locks in the event of an overload, the torque is considerably less than the pre-adjusted torque limit. The system re-engages automatically after 360 °.

Size	Torque limit for overload coupling [Nm]						Rotary speed n_{max} [min ⁻¹]		Weight [kg]
	MKE 5	MKE 6	MKE 7	MKS 5	MKS 6	MKS 7	MKE 5-7	MKS 5-7	
01	5-12,5	10-25	20-50	5-12,5	10-25	20-50	4000	3000	1,0
0	10-25	20-50	40-100	10-25	20-50	40-100	3000	3000	2,0
1	20-50	40-100	80-200	20-50	40-100	80-200	2500	2500	2,7
2	40-100	80-200	160-400	40-100	80-200	160-400	2000	2000	6,2
3	70-175	140-350	280-700	70-175	140-350	280-700	1200	1200	9,6
4	120-300	240-600	480-1200	120-300	240-600	480-1200	800	800	21,1

Option:

Limit switch with amplifier
 Mechanical limit switch
 Contact-free limit switch

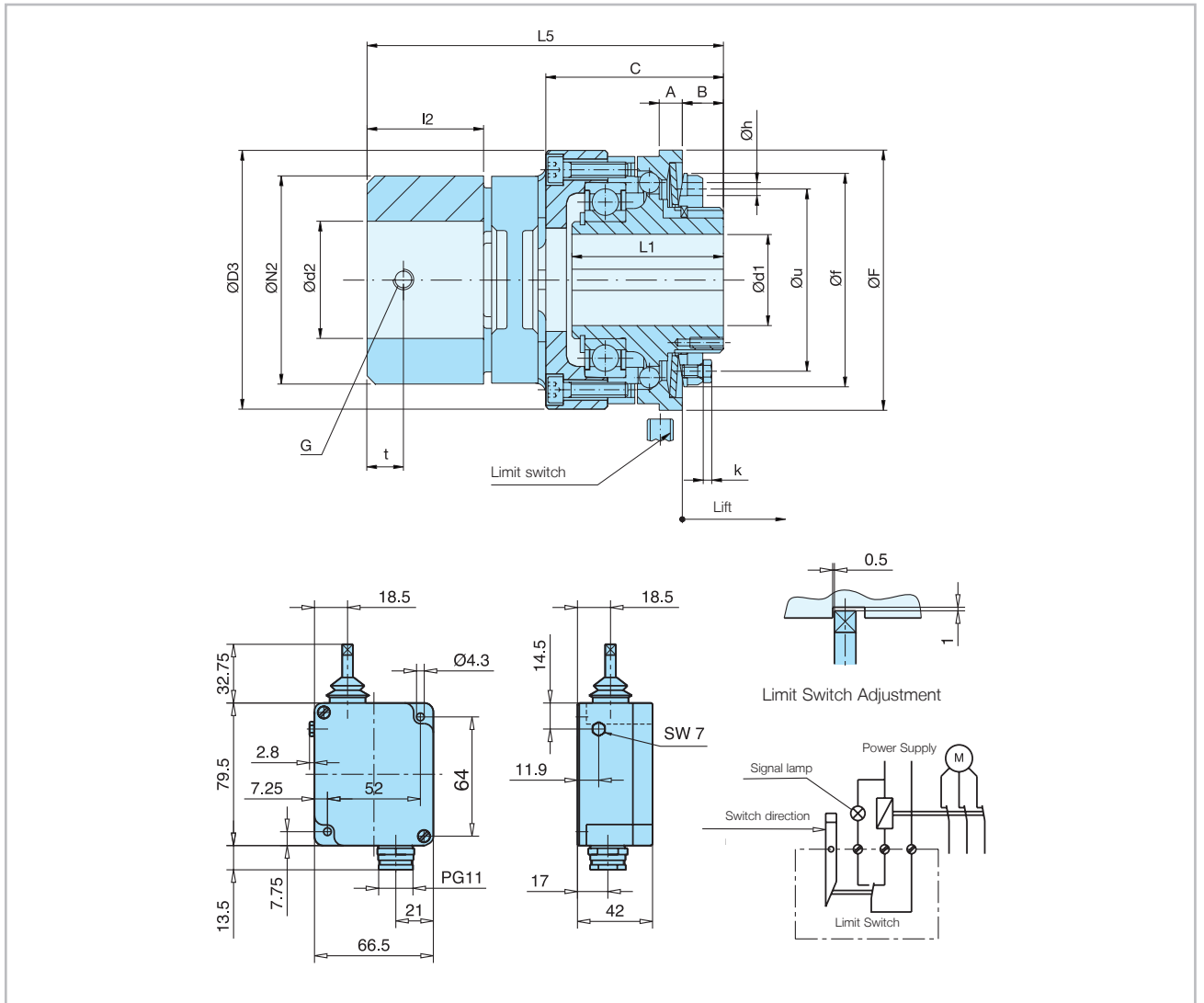
Dimensioning:

The controlling torque of the overload coupling is factory-adjusted, with reference to starting torque T_A to 1.4 times the torque to be transferred (T_N).

Couplings and connecting shafts

6.2 Flexible overload coupling

Dimension plan



Size	Ød1 _{min}	Ød1 _{max} ¹⁾	Ød2 _{min}	Ød2 _{max}	ØD ₃	G	A	B	ØF	ØU	t	Øh
01	12	20 ¹⁾	8	28	70	M5	7	12	70	50	10	5
0	15	25 ²⁾	10	38	85	M6	8	13,5	85	55	15	5
1	22	30	12	45	100	M8	9	16	100	70	15	5
2	28	40	14	55	115	M8	10	17	115	84	20	6
3	32	50	20	60	135	M8	12	20,5	135	100	25	7
4	40	65	38	80	175	M10	16	46	166	-	20	-

Size	k	L1	L5	C	l2	ØN2	Øf	Switching-rod lift in the event of an overload [mm]	
								MKE	MKS
01	2,8	40	95	47	30	55	61,5	1,2	1,2
0	2,8	48	111,5	56,5	35	65	67	1,5	1,5
1	3,5	59	138	69	45	80	82	1,8	1,8
2	4,0	64	150	74	50	95	97	2,0	2,0
3	4,0	75	171	87	56	105	117	2,2	2,2
4	-	115	240	130	75	135	150	2,5	2,5

¹⁾ Over Ø16 groove according to DIN 6885-3

²⁾ Over Ø22 groove according to DIN 6885-3

Couplings and connecting shafts

6.3 Connecting shafts

Connecting shafts are used to link individual drive-system elements to a centrally driven lifting system as a whole. They dampen vibrations and sudden impacts, compensate axial, radial and angular displacements and can be used up to critical speed without pillow blocks (see speed-length diagram).

The fitting of pillow blocks allows the shaft length (L) to be doubled or further multiplied, although a limit of 6 m is imposed with one-piece configuration due to the standard lengths of tube normally available.

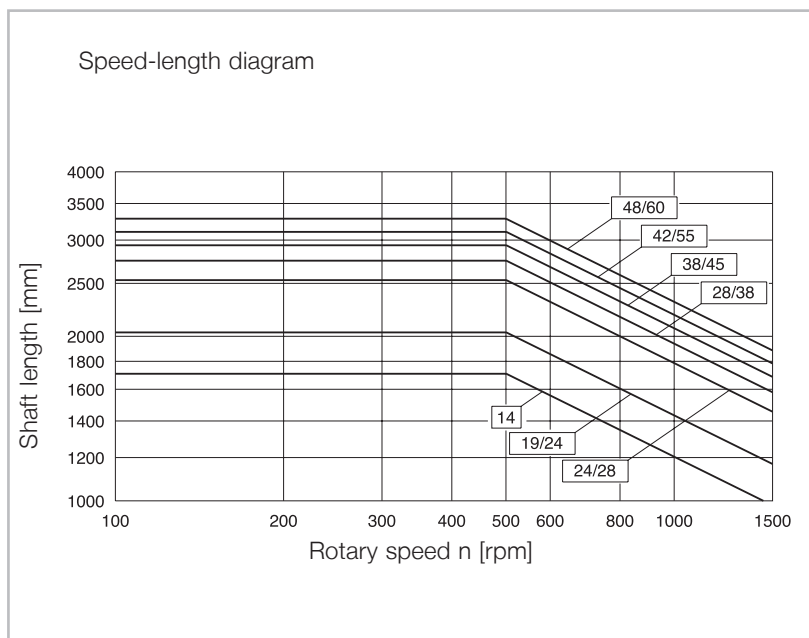
Four different configurations are available for various speed ranges and requirements.

6.3.1 ZR range

Technical information

Size ZR	Nominal torque $T_N^{1)}$ [Nm]	Locking screw		Axial displacement [mm]	Max. angle displacement	Mass moments of inertia [kgm ²]		Weight [kg]		Suitable pillow blocks
		Starting torque T [Nm]	M1			for 2 hubs	for 1 m tube length	for 2 hubs	for 1 m tube length	
14	6	1,3	M3	1,0	0,9°	$0,1317 \times 10^{-4}$	$0,218 \times 10^{-4}$	0,1	0,6	–
19/24	24	10	M6	1,2	0,9°	$0,8278 \times 10^{-4}$	$0,932 \times 10^{-4}$	0,3	1,3	SN 505
24/28	30	10	M6	1,4	0,9°	$8,830 \times 10^{-4}$	$4,414 \times 10^{-4}$	1,5	2,0	SN 507
28/38	70	25	M8	1,5	0,9°	$20,05 \times 10^{-4}$	$7,431 \times 10^{-4}$	2,7	3,1	SN 508
38/45	130	49	M10	1,8	1,0°	$20,15 \times 10^{-4}$	$11,59 \times 10^{-4}$	3,0	3,6	SN 509
42/55	150	49	M10	2,0	1,0°	$47,86 \times 10^{-4}$	$17,07 \times 10^{-4}$	5,0	4,1	SN 510
48/60	245	86	M12	2,1	1,1°	$74,68 \times 10^{-4}$	$24,06 \times 10^{-4}$	6,5	4,6	SN 511

¹⁾ These nominal torque settings are suitable for operation with light impacts. If impacts are heavy, an impact factor of 1.4 must be taken into account.



Rotary speed range:

$n = 1500 \text{ rpm}$

Operating temperature:

– 40 to 90 °C

(up to 120 °C for brief periods)

Dimensioning:

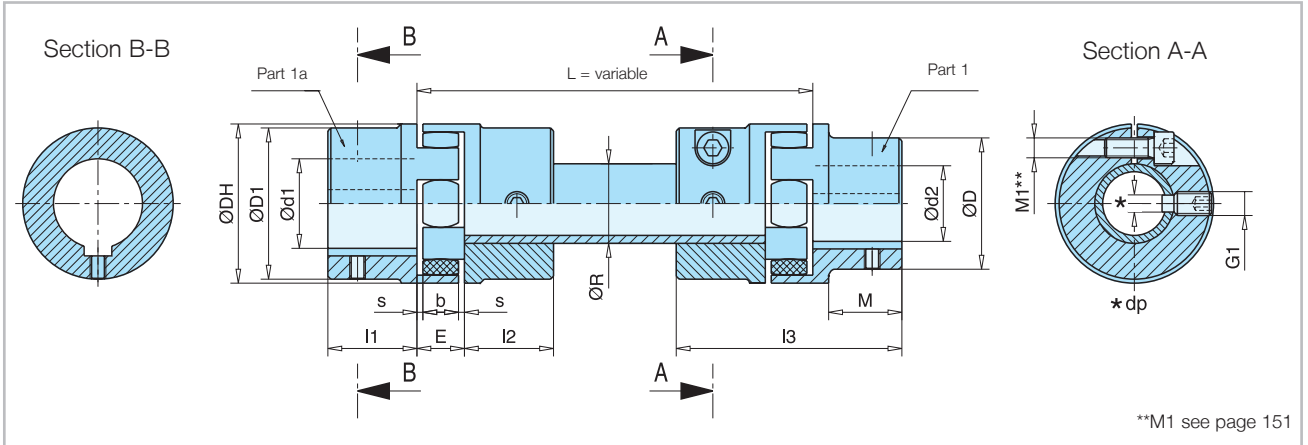
The nominal torque (T_N) of the ZR shaft - with **impact factor S^1** taken into account - must be at least equal to the system torque (T_{Anl}) to be transferred.

$$T_N \geq T_{Anl} \cdot S$$

Couplings and connecting shafts

6.3 Connecting shafts

Dimension plan



Size ZR	Ready-drilled holes ØdH7 ²⁾				ØDH	ØD	ØD1	ØdH	l2	l1	M	s	b	E	l3	ØR	G1	dp
	min Ød2	max Ød2	min Ød1	max Ød1														
14	-	-	4	14	30	-	30	10,5	11	-	1,5	10	13	35	14x2	M4	2,5	
19/24	6	19	19	24	40	32	41	18	25	20	2	12	16	66	20x3	M6	4	
24/28	8	24	24	28	55	40	55	27	30	24	2	14	18	78	30x4	M8	5,5	
28/38	10	28	28	38	65	48	65	30	35	28	2,5	15	20	90	35x4	M10	7	
38/45	12	38	38	45	80	66	77	38	45	37	3	18	24	114	40x4	M12	8,5	
42/55	28	42	42	55	95	75	94	46	50	40	3	20	26	126	45x4	M12	8,5	
48/60	28	48	48	60	105	85	102	51	56	45	3,5	21	28	140	50x4	M16	12	

²⁾ Feather key groove conforming to DIN 6885/1

6.3.2 G / GX / GZ range

Technical information

	G range	GX range	GZ range
Rotary speed range	n= 750 rpm	n= 1500 rpm	n= 3000 rpm
Operating temperature	-40 to 90 °C (up to 120 °C for brief periods)	max. 150 °C ³⁾	max. 80 °C

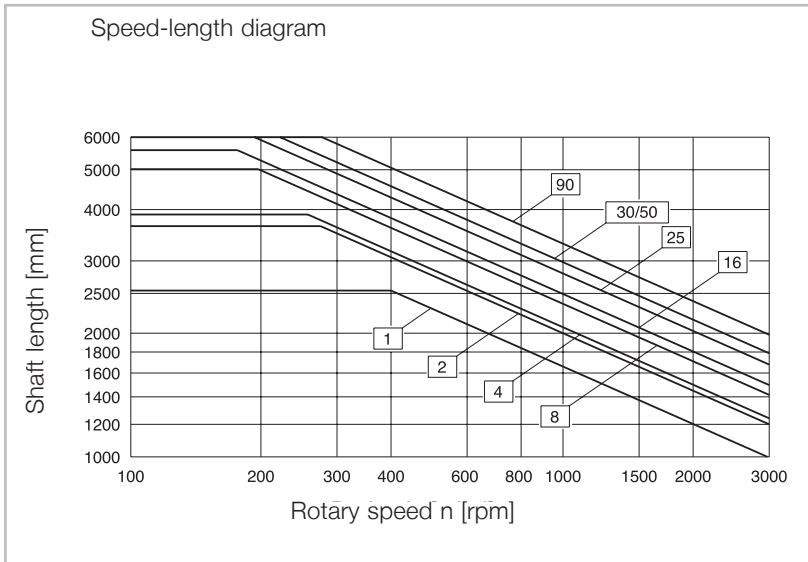
Size	Nominal torque T_N [Nm] ¹⁾³⁾			Weight [kg]		Max. angle displacement		Mass moment of inertia [kgm ²]	Suitable pillow blocks
	G	GX	GZ	for 2 hubs	for 1m tube	G+GZ	GX		
1	10	10	10	1,0	1,1	3°	1°	0,00021	SN 507
2	20	30	20	2,2	1,4	3°	1°	0,00052	SN 509
4	40	60	40	3,4	1,6	3°	1°	0,00076	SN 510
8	80	120	80	7,3	2,2	3°	1°	0,00185	SN 513
16	160	240	160	12,4	2,5	3°	1°	0,00297	SN 516
25	250	370	250	19,1	3,1	3°	1°	0,00538	SN 519
30	400	550	400	31,1	4,8	3°	1°	0,0116	SN 522
50	600	-	600	32,1	4,8	3°	1°	0,0116	SN 522
90	900	-	900	58,7	7,6	3°	1°	0,0283	SN 528

¹⁾ These nominal torque settings are suitable for operation with light impacts. If impacts are heavy, an impact factor of 1.4 must be taken into account.

²⁾ From +80 °C onwards, the nominal torque is considerably reduced. In this case, please contact us.

Couplings and connecting shafts

6.3 Connecting shafts

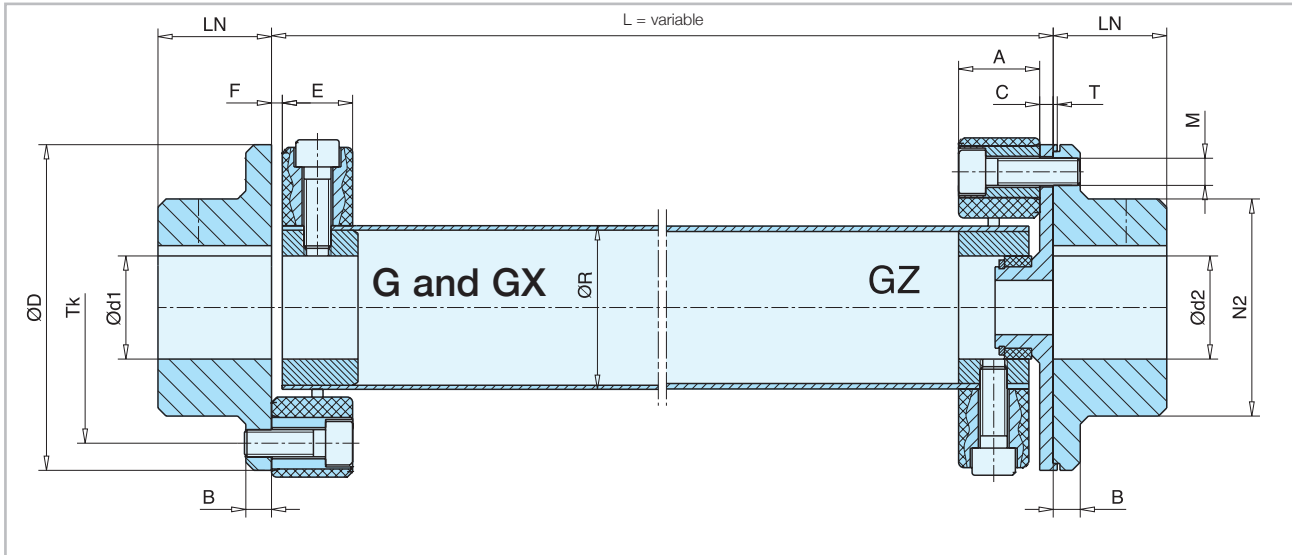


Dimensioning:

The nominal torque (T_N) of the G/GX/GZ shaft – with impact factor S^1 taken into account – must be at least equal to the system torque (T_{Anl}) to be transferred.

$$T_N \geq T_{Anl} * S$$

Dimension plan



6

Size	A	B	C	ØD	Ready-drilled holes Ød H7 ²⁾		E	F	L _N	ØN ₂	ØR	T	T _R /M
					min. Ø d1/d2	max. Ø d1/d2							
1	24	7	5	56	8	25	22	2	24	36	30	1,5	Ø44/2xM6
2	24	8	5	85	12	38	20	4	28	55	40	1,5	Ø68/2xM8
4	28	8	5	100	15	45	24	4	30	65	45	1,5	Ø80/3xM8
8	32	10	5	120	18	55	28	4	42	80	60	1,5	Ø100/3xM10
16	42	12	5	150	20	70	36	6	50	100	70	1,5	Ø125/3xM12
25	46	14	5	170	20	85	40	6	55	115	85	1,5	Ø140/3xM14
30	58	16	5	200	25	100	50	8	66	140	100	1,5	Ø165/3xM16
50	58	16	5	200	25	100	50	8	66	140	100	1,5	Ø165/3xM16
90	70	19	5	260	30	110	62	8	80	160	125	2,0	Ø215/3xM20

¹⁾ These nominal torque settings are suitable for operation with light impacts. If impacts are heavy, an impact factor of 1.4 must be taken into account.

²⁾ Feather key groove conforming to DIN 6885/1.

Couplings and connecting shafts

6.3 Connecting shafts

6.3.3 PW range

Technical information

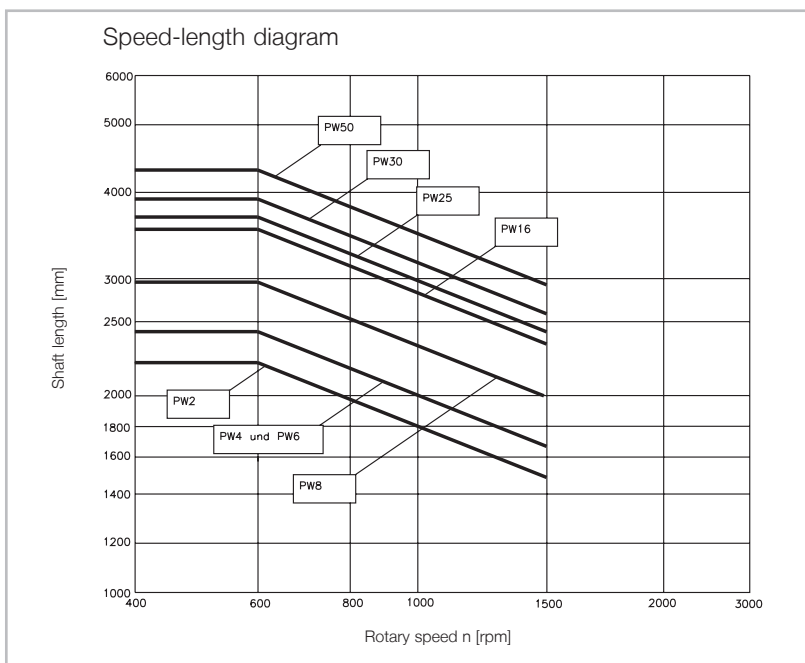
	PW range
Rotary speed range	n= 1500 rpm*
Operating temperature	-57 to +120 °C

* to 3000 rpm on request

Size	Nominal torque T_N [Nm] ¹⁾	Weight [kg]		Max. angle displacement	Mass moment of inertia [kgm ²]		Suitable pillow blocks
		2 x hubs with 300 mm tube	for 1m tube		2 x hubs with 300 mm tube	for 1m tube	
2	45	0,9	1,0	1°	0,00025	0,00021	SN 507
4	65	1,5	1,4	1°	0,00056	0,00052	SN 509
6	124	1,9	2,1	1°	0,00101	0,00098	SN 510
8	230	3,8	2,15	1°	0,00345	0,00185	SN 513
16	370	6,0	2,5	1°	0,00824	0,00297	SN 516
25	500	9,5	3,1	1°	0,01790	0,00538	SN 519
30	800	12,8	4,8	1°	0,03200	0,01160	SN 522
50	1300	18,0	7,13	1°	0,05870	0,01680	SN 522

¹⁾ The rated torques are valid for normal operation. If impacts are light, an impact factor of 1.5 must be taken into account.

6



Dimensioning:

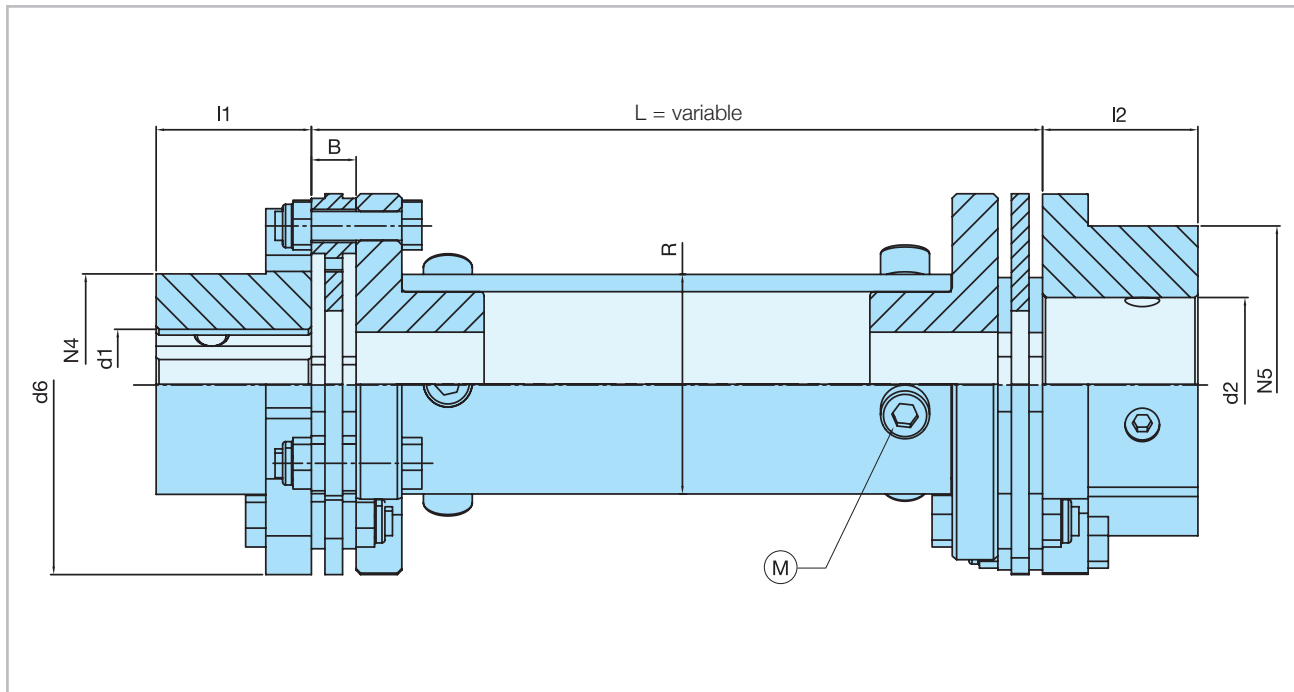
The nominal torque (T_N) of the PW shaft - with impact factor S^1 taken into account - must be at least equal to the system torque (T_{An}) to be transferred.

$$T_N > T_{An} \cdot S$$

Couplings and connecting shafts

6.3 Connecting shafts

Dimension plan



Size PW	Ød6	max. Ød1 ²⁾	max. Ød2 ²⁾	Ød4	ØN5	l1 / l2	M	ØR	ØB
2	57	16	26	31	47	24	3xM 8	30	7,9
4	66	19	32	38	55	27	3xM 8	40	7,9
6	76	25	35	43	64	32	3xM 10	45	11,7
8	95	32	46	56	79	36	3xM 12	60	13,2
16	114	42	60	68	95	43	3xM 12	70	14,7
25	133	48	66	84	111	49	3xM 16	85	16,5
30	152	60	76	93	127	62	3xM 16	100	19,6
50	171	66	85	109	143	70	3xM 20	100	21,8

¹⁾ Feather key groove conforming to DIN 6885/1

²⁾ Finish bore Ø H7

Couplings and connecting shafts

6.4 Order codes

6.4.1 Couplings

1 - 2 / 3 - 4 / 5



- 1) Range: R / MKR / MKE / MKS
- 2) Size
- 3) Torque (applies to MKR / MKE / MKS ranges only)
- 4) Hub drill-hole d1
- 5) Hub drill-hole d2

6.4.2 Connecting shafts

1 - 2 / 3 - 4 / 5



- 1) Range: G / GX / GZ / ZR / PW
- 2) Size
- 3) Length
- 4) Hub drill-hole d1
- 5) Hub drill-hole d2