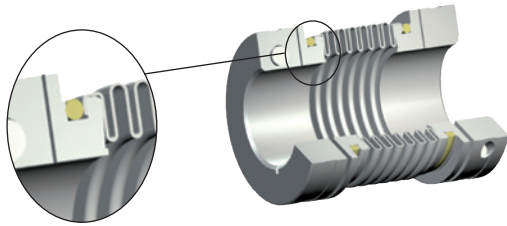


TOOLFLEX®

Metal bellow-type couplings

Technical description

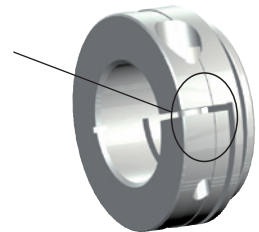
TOOLFLEX® is a metal bellow-type coupling, a coupling system which has proven in the field with numerous applications. The metal bellow optimally compensates for axial, radial and angular displacements. At the same time its geometric shape allows for high torsional stiffness and a low mass moment of inertia. TOOLFLEX® is manufactured in twelve sizes for maximum torques up to 600 Nm. Its main application ranges are both positioning drives, e. g. ball spindles with a high pitch, and indexing tables or planetary and worm gears with small gear ratios.



Subject to its proven bonding technique a non-positive, backlash-free connection of the aluminium hubs with the multilayer bellows made of stainless steel is generated. The flanged insert connection for sizes 16 to 55 ensures torque transmission of every single bellow-layer. Since TOOLFLEX® is a metal coupling, it remains fatigue-endurable in the high-temperature range up to a maximum of 200 °C. Apart from that it is resistant to the effect of media respectively critical operating conditions.

The renowned shaft-hub-connection made by clamping hubs ensures an easy assembly by a radial clamping screw. Subject to two slots in the hub there is no deformation of the bellow when tightening the clamping screw. For higher friction torques type KN with taper hubs can be used.

Double slotted clamping hub



Types



Type with
setscrew

Type with
clamping hubs

Type
S-H / M-H

Type
ZR

Type
PI

Type
KN

Type
CF

Summary										
Size	Type	Bel- low-hub-con- nection	Torque of bellow [Nm]		Standard types				Special types	
			TKN [Nm]	TK max [Nm]	Max. speed [rpm]					
					Setscrew 1.0 / 1.1	Clamping hubs 2.5 / 2.6	S-H / M-H 7.8 / 7.9	ZR 7.5 / 7.6	PI	
5	S	Bonded Maximum ambient temperature 100 °C	0.1	0.15	47,700					
	M									
7	S		1	1.5	31,800	31,800				
	M									
9	S		1.5	2.25	23,800	23,800				
	M									
12	S	Flanged Maximum ambient temperature 200 °C	2	3	19,000	19,100				
	M									
16	S		5	7.5	14,900	14,900				
	M									
20	S		15	22.5	11,900	11,900	9,550	3,000	11,900	
	M									
30	S	Welded Maximum ambient temperature 200 °C	35	52.5		8,700	6,950	3,000	8,700	15,280
	M									
38	S		65	97.5		7,350	5,850	3,000	7,350	12,600
	M									
42	S		95	142.5		6,820			6,820	11,580
	M									
45	S		170	255		5,750	4,750	3,000	5,750	9,300
	M									
55 Al	S		340	510		4,800				
	M									
55	S		340	510		4,800			4,800	7,870
	M									
65	S		600	900		3,850				
	M									

TOOLFLEX®

Metal bellow-type couplings

Types of hubs

Due to the use of TOOLFLEX® for many different applications and mounting conditions, this coupling system is available with various hub types and two different lengths of bellows. A combination of the components forms a type.

TOOLFLEX® is supplied as a complete unit; a supply of individual components is not possible.



Type 1.0
with feather keyway and setscrew

Positive-locking power transmission. Permissible torque depending on the permissible surface pressure. Not suitable for backlash-free power transmission with heavily reversing operation.



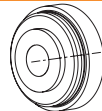
Type 1.1
without feather keyway, with setscrew

Non-positive torque transmission. Suitable for backlash-free transmission of very low torques.



Type 1.3
with spline bore

Positive-locking power transmission. Spline on request of customers (e. g. for shaft with flattening).



Type 1.2
without feather keyway, without setscrew

For low torques. Suitable for bonding or pressing of the shaft.



Type 2.5 clamping hub
double slotted, without feather keyway

Frictionally engaged, backlash-free shaft-hub-connection. Transmittable torques depending on bore diameter.



Type 2.6 clamping hub
double slotted, with feather keyway

Positive-locking power transmission with additional friction fit. The friction fit avoids resp. reduces reverse backlash. Surface pressure of the keyway connection is reduced.



Type 7.5 clamping hub type DH
without feather keyway for double-cardanic connection

Frictionally engaged, backlash-free shaft-hub-connection for radial assembly of coupling. Transmittable torques depending on bore diameter.



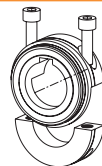
Type 7.6 clamping hub type DH
with feather keyway for double-cardanic connection

Positive-locking power transmission with additional friction fit for radial assembly of coupling. The friction fit avoids resp. reduces reverse backlash. Surface pressure of the keyway connection is reduced.



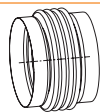
Type 7.8 clamping hub type H
without feather keyway for single-cardanic connection

Frictionally engaged, backlash-free shaft-hub-connection for radial assembly of coupling. Transmittable torques depending on bore diameter.



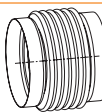
Type 7.9 clamping hub type H
with feather keyway for single-cardanic connection

Positive-locking power transmission with additional friction fit for radial assembly of coupling. The friction fit avoids resp. reduces reverse backlash. Surface pressure of the keyway connection is reduced.



Bellow type S

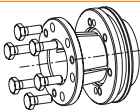
Bellow with 4 layers made of stainless steel; compact design with high torsion spring stiffness.



Bellow type M

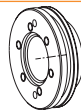
Bellow with 6 layers made of stainless steel; realizing large shaft distance dimensions and displacements.

Special designs on request of customers



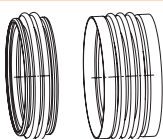
Type 6.5 taper hub KN

Integrated frictionally engaged shaft-hub-connection for the transmission of higher torques in the area of the shaft-hub-connection.



Flange

Flange to connect to customer's component. Special dimensions on request.



Special bellows

Bellows with 1, 2 or 3 layers available on request.

ROTEX® GS

Backlash-free
servo couplings

ROTEX® GS HP

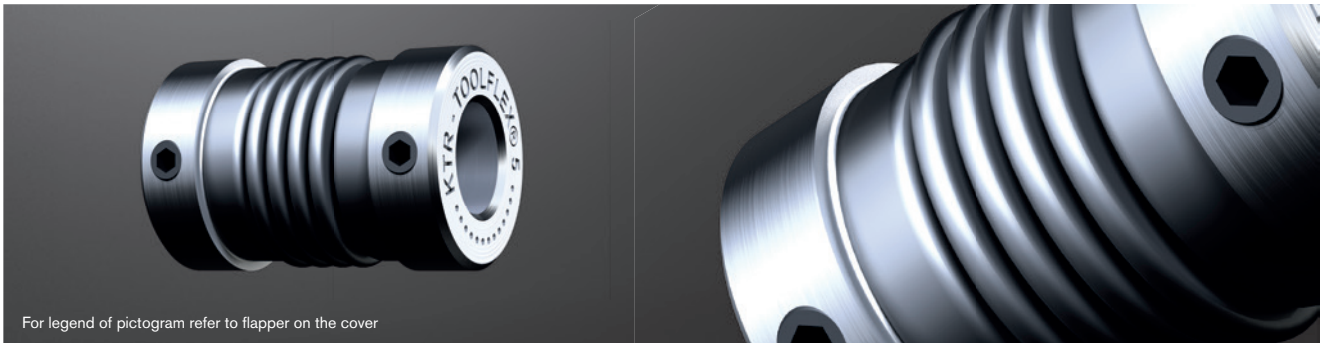
TOOLFLEX®

RADEX®-NC

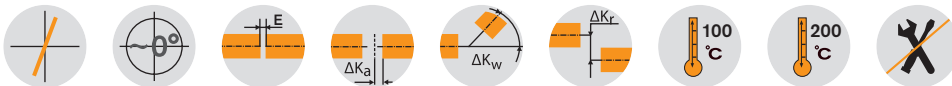
TOOLFLEX® S

Metal bellow-type couplings

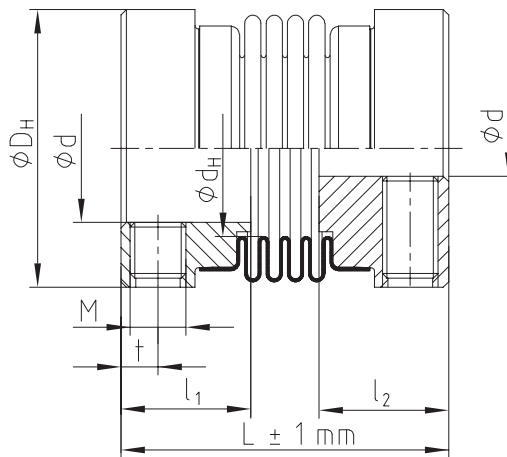
Type S: Hubs with setscrews



For legend of pictogram refer to flapper on the cover



TOOLFLEX® S type 1.1



TOOLFLEX® S with setscrew (type 1.1) - Hub material aluminium/bellow material stainless steel

Size	Bellow-hub-connection	Torque of bellow T _{KN} ¹⁾ [Nm]	Max. speed [rpm]	Dimensions [mm]									Perm. displacements			Torsion spring stiffness C _T [Nm/rad]	Weight ³⁾ [kg]
				Finish bore d		General				Setscrew							
				min.	Max.	D _H	d _H	L	l ₁ , l ₂	M	t	z = number ²⁾	Axial [mm]	Radial [mm]	Angular [degree]		
5	4)	0.1	47700	2	5	10	6	15	6	M2	1.8	1	±0.30	0.10	0.7	97	0.0027
7		1.0	31800	3	8	15	9	18	7	M3	2.0	1	±0.30	0.10	0.7	390	0.005
9		1.5	23800	3	10	20	12	21	8	M3	2.2	2	±0.35	0.15	1.0	750	0.010
12		2.0	19000	4	14	25	16	27.5	11	M4	2.8	2	±0.40	0.15	1.0	1270	0.017
16	5)	5.0	14900	5	18	32	20	37	13	M5	4	2	±0.30	0.15	1.0	4500	0.046
20		15	11900	6	25	40	27	42	15	M5	5	2	±0.40	0.15	1.0	9600	0.076

¹⁾ For selection see page 22 et seqq.

²⁾ Number per hub; from size 9: 2 x 120° offset.

³⁾ Figures refer to the complete coupling with max. bore.

⁴⁾ Bonded

⁵⁾ Flanged

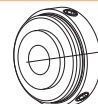
Types of hubs

Type 1.0



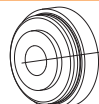
Hub with feather keyway and setscrew

Type 1.1



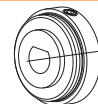
Hub without feather keyway, with setscrew

Type 1.2



Hub without feather keyway, without setscrew

Type 1.3



Hub with spline bore

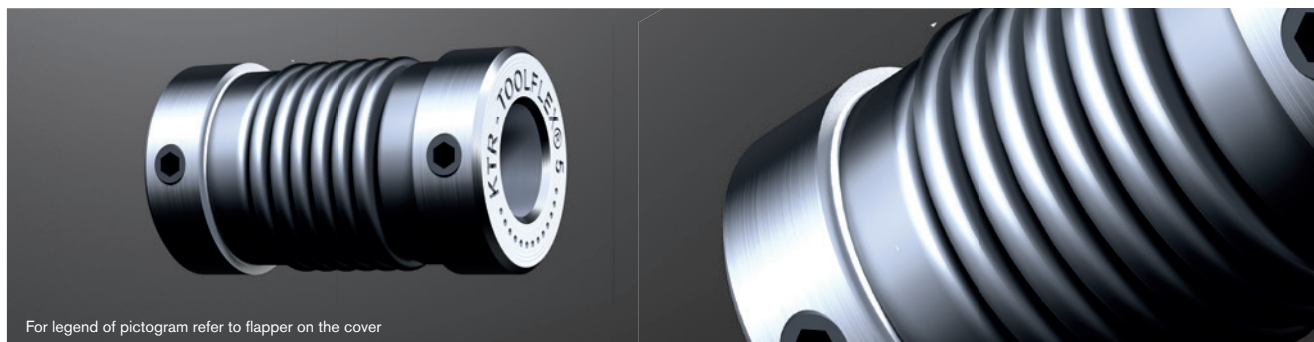
Ordering example:

TOOLFLEX® 7 S	1.1 - Ø4		1.1 - Ø6	
Size and type of coupling	Hub type	Finish bore	Hub type	Finish bore

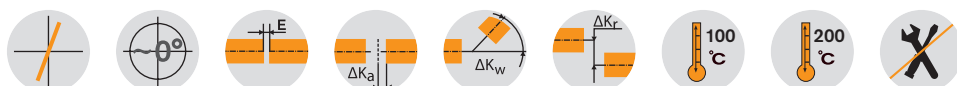
TOOLFLEX® M

Metal bellow-type couplings

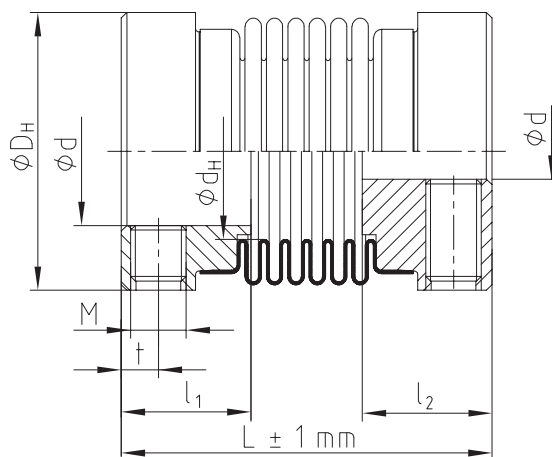
Type M: Hubs with setscrews



For legend of pictogram refer to flapper on the cover



TOOLFLEX® M type 1.1



TOOLFLEX® M with setscrew (type 1.1) - Hub material aluminium/bellow material stainless steel

Size	Bellow-hub-connection	Torque of bellow T _{KN} ¹⁾ [Nm]	Max. speed [rpm]	Dimensions [mm]									Perm. displacements			Torsion spring stiffness C _T [Nm/rad]	Weight ³⁾ [kg]
				Finish bore d		General				Setscrew							
				min.	Max.	D _H	d _H	L	l ₁ , l ₂	M	t	z = number ²⁾	Axial [mm]	Radial [mm]	Angular [degree]		
5	4)	0.1	47700	2	5	10	6	17	6	M2	1.8	1	±0.40	0.15	1.0	75	0.003
7		1.0	31800	3	8	15	9	20	7	M3	2.0	1	±0.40	0.15	1.0	300	0.006
9		1.5	23800	3	10	20	12	24	8	M3	2.2	2	±0.50	0.20	1.5	580	0.011
12		2.0	19000	4	14	25	16	31	11	M4	2.8	2	±0.60	0.20	1.5	980	0.019
16	5)	5.0	14900	5	18	32	20	41	13	M5	4	2	±0.50	0.20	1.5	3050	0.049
20		15	11900	6	25	40	27	49	15	M5	5	2	±0.60	0.20	1.5	6600	0.082

¹⁾ For selection see page 22 et seqq.

²⁾ Number per hub; from size 9: 2 x 120° offset.

³⁾ Figures refer to the complete coupling with max. bore.

4) Bonded

5) Flanged

Types of hubs

Type 1.0



Hub with feather keyway and setscrew

Type 1.1



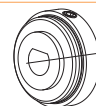
Hub without feather keyway, with setscrew

Type 1.2



Hub without feather keyway, without setscrew

Type 1.3



Hub with spline bore

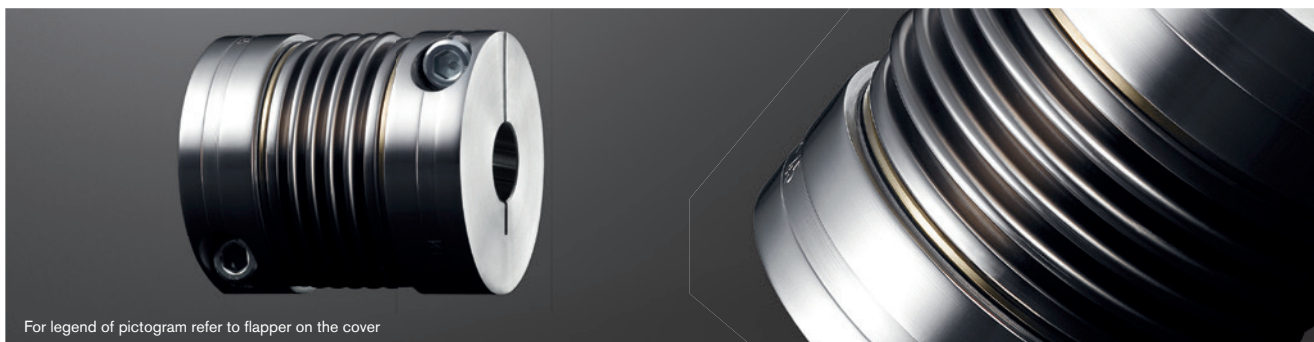
Ordering example:

TOOLFLEX® 7 M		1.1 - Ø4		1.1 - Ø6	
Size and type of coupling		Hub type	Finish bore	Hub type	Finish bore

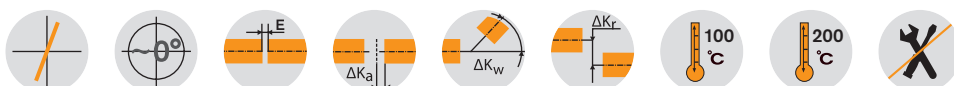
TOOLFLEX® S

Metal bellow-type couplings

Type S: with clamping hubs



For legend of pictogram refer to flapper on the cover



TOOLFLEX® Type S with clamping hubs - Hub material aluminium (size 55/65 steel)/bellow material stainless steel												
Size	Dimensions [mm]											
	Finish bore d		General					Clamping screws DIN EN ISO 4762				
	min.	Max.	L	I ₁ , I ₂	E	D _H	d _H	M ₁	DK	t ₁	e ₁	T _A [Nm]
7	3	7	24	9	6	15	9	M2	16.5	3.2	5	0.37
9	3	9	29	11	7	20	12	M2.5	21.5	3.5	7.1	0.76
12	4	12	34.5	13	8.5	25	16	M3	26.5	4	8.5	1.34
16	5	16	45	17.0	11	32	20	M4	35.0	5	12.0	2.9
20	8	20	55	21.5	12	40	27	M5	43.5	6	14.5	6
30	10	30	63	23.0	17	55	33	M6	58.0	7	19	10
38	12	38	69	25.5	18	65	42	M8	72.6	9	25	25
42	14	42	84	30.0	24	70	46	M8	76.1	9	27	25
45	14	45	86.5	32.0	22.5	83	58	M10	89.0	11	30	49
55 Al	20	55	111	40.0	31	100	73	M12	106.0	14	37	86
55 ³⁾	20	55	111	40.0	31	100	73	M12	106.0	14	37	120
65 ³⁾	30	65	126	45.0	36	125	95	M14	127.2	15	45	190

Technical data												
Size	Bellow-hub-connection	Torque of bellow T _{KN} ¹⁾ [Nm]	Max. speed [rpm]	Hub material	Moment of inertia ²⁾ [x10 ⁻⁶ kgm ²]	Torsion spring stiffness C _T [Nm/rad]	Axial stiffness C _a [N/mm]	Radial stiffness C _r [N/mm]	Perm. displacements			Weight ²⁾ [kg]
									Axial [mm]	Radial [mm]	Angular [degree]	
7	Bonded	1	31800	Aluminium	0.26	390	—	—	±0.3	0.10	0.7	0.007
9		1.5	23800	Aluminium	0.97	750	—	—	±0.35	0.15	1.0	0.014
12		2	19100	Aluminium	2.6	1270	—	—	±0.4	0.15	1.0	0.025
16		5	14900	Aluminium	9	4500	43	138	±0.3	0.15	1.0	0.06
20	Flanged	15	11950	Aluminium	30	9600	63	189	±0.4	0.15	1.0	0.12
30		35	8700	Aluminium	114	17800	97	233	±0.5	0.20	1.5	0.24
38		65	7350	Aluminium	245	37400	108	318	±0.6	0.20	1.5	0.35
42		95	6820	Aluminium	396	54700	120	499	±0.6	0.20	1.5	0.49
45		170	5750	Aluminium	931	95800	132	738	±0.9	0.20	1.5	0.82
55 Al		340	4800	Aluminium	1665	144100	160	894	±1.1	0.25	1.5	1.50
55 ³⁾	³⁾	340	4800	Steel	4996	144100	160	894	±1.0	0.25	1.5	3.20
65 ³⁾		600	3850	Steel	13318	322740	212	1365	±1.0	0.30	1.5	5.50

¹⁾ For selection see page 22 et seqq.

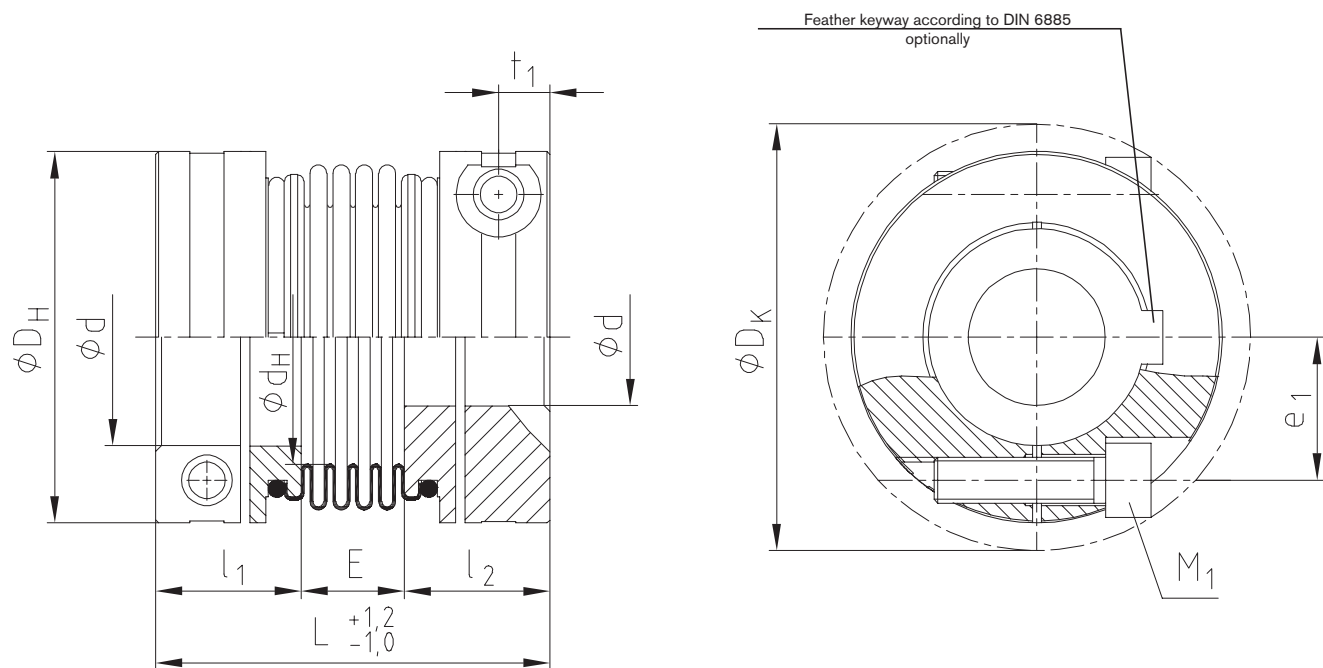
²⁾ Figures refer to the complete coupling with max. bore.

³⁾ Hub made of steel welded with bellow.

Review of shaft-hub-connection: Friction torques T_R [Nm] for hub type 2.5																															
Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø50	Ø55	Ø60	Ø65	
7	0.7	0.9	1.0	1.2	1.4																										
9	1.2	1.5	1.9	2.2	2.5	2.8	3.1																								
12		2.3	2.8	3.3	3.8	4.3	4.8	5.2	5.7	6.1																					
16			5.4	6.4	7.3	8.2	9.1	10.0	10.9	11.7	13.4	14.2	15.0																		
20						13.5	15.0	16.5	18.0	19.3	22.1	23.5	24.8	27.4	28.7	30.0															
30										26	28	32	34	36	40	42	43	51	53	58	61										
38											63	67	71	79	82	86	101	105	115	122	129	139	148								
42											63	67	71	79	83	87	102	106	117	124	130	141	150	157	163						
45																	136	160	166	183	194	206	222	238	248	259	274				
55 Al																205	242	251	277	295	312	337	362	378	394	418	457	494			
55 ³⁾																	341	354	391	416	440	475	510	533	556	589	644	697			
65 ³⁾																				576	610	660	710	743	775	823	901	977	1051	1124	

Ordering example:

TOOLFLEX® 30 S	2.5	Ø25	2.5	Ø30
Size and type of coupling	Hub type	Finish bore	Hub type	Finish bore



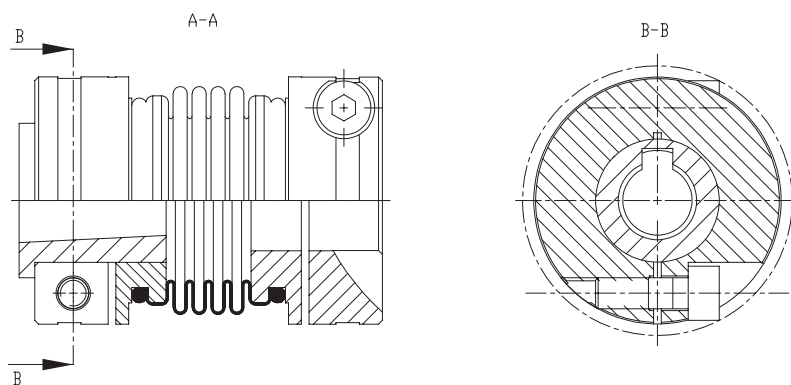
ROTEX® GS

Backlash-free
servo couplings

ROTEX® GS HP

Other types:

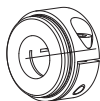
Type for FANUC motors



TOOLFLEX®

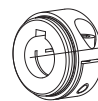
Types of hubs

Type 2.5



Clamping hub double slot without feather keyway

Type 2.6



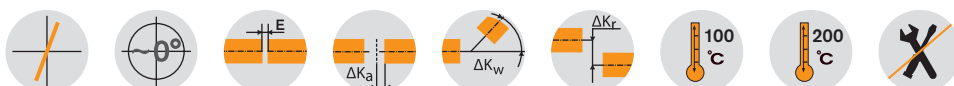
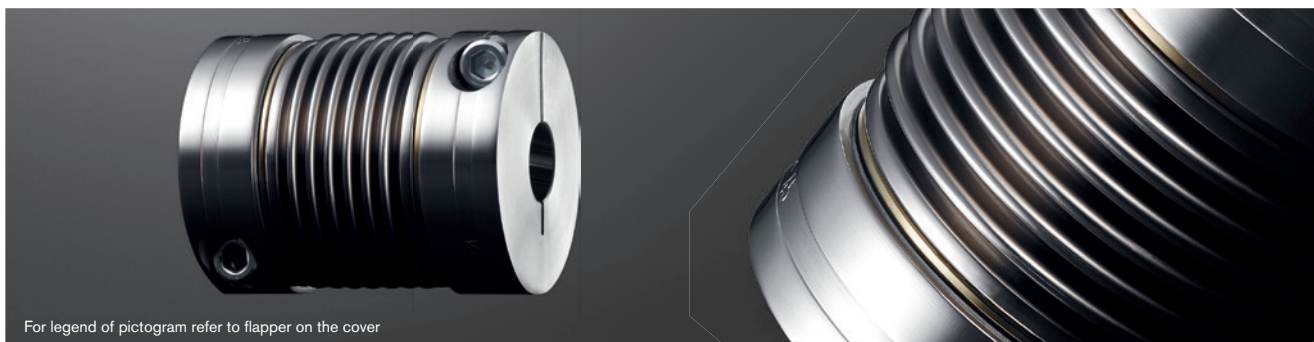
Clamping hub double slot with feather keyway

RADEX®-NC

TOOLFLEX® M

Metal bellow-type couplings

Type M: with clamping hubs



TOOLFLEX® Type M with clamping hubs - Hub material aluminium (size 55/65 steel)/bellow material stainless steel												
Size	Dimensions [mm]											
	Finish bore d		General					Clamping screws DIN EN ISO 4762				
	min.	Max.	L	l ₁ , l ₂	E	D _H	d _H	M ₁	DK	t ₁	e ₁	T _A [Nm]
7	3	7	26	9	8	15	9	M2	16.5	3.2	5	0.37
9	3	9	32	11	10	20	12	M2.5	21.5	3.5	7.1	0.76
12	4	12	38	13	12	25	16	M3	26.5	4	8.5	1.34
16	5	16	49	17.0	15	32	20	M4	35.0	5	12	2.9
20	8	20	62	21.5	19	40	27	M5	43.5	6	14.5	6
30	10	30	72	23.0	26	55	33	M6	58.0	7	19	10
38	12	38	81	25.5	30	65	42	M8	72.6	9	25	25
42	14	42	95	30.0	35	70	46	M8	76.1	9	27	25
45	14	45	103	32.0	39	83	58	M10	89.0	11	30	49
55 Al	20	55	125	40.0	45	100	73	M12	106.0	14	37	86
55 ³⁾	20	55	125	40.0	45	100	73	M12	106.0	14	37	120
65 ³⁾	30	65	142	45.0	52	125	95	M14	127.2	15	45	190

Technical data												
Size	Bellow-hub-connection	Torque of bellow T _{KN} ¹⁾ [Nm]	Max. speed [rpm]	Hub material	Moment of inertia ²⁾ [x10 ⁻⁶ kgm ²]	Torsion spring stiffness C _T [Nm/rad]	Axial stiffness C _a [N/mm]	Radial stiffness C _r [N/mm]	Perm. displacements			Weight ²⁾ [kg]
									Axial [mm]	Radial [mm]	Angular [degree]	
7	Bonded	1	31800	Aluminium	0.3	300	—	—	±0.4	0.15	1.0	0.008
9		1.5	23800	Aluminium	1.0	580	—	—	±0.5	0.20	1.5	0.015
12		2	19100	Aluminium	2.7	980	—	—	±0.6	0.20	1.5	0.03
16		5	14900	Aluminium	10	3050	29	92	±0.5	0.20	1.5	0.06
20	Flanged	15	11950	Aluminium	32	6600	42	126	±0.6	0.20	1.5	0.14
30		35	8700	Aluminium	123	14800	65	155	±0.8	0.25	2.0	0.31
38		65	7350	Aluminium	262	24900	72	212	±0.8	0.25	2.0	0.45
42		95	6820	Aluminium	427	36500	80	333	±0.8	0.25	2.0	0.52
45	3)	170	5750	Aluminium	1020	64000	88	492	±1.0	0.25	2.0	1.13
55 Al		340	4800	Aluminium	1706	96100	107	598	±1.1	0.30	2.0	2.0
55 ³⁾		340	4800	Steel	5118	96100	107	598	±1.0	0.30	2.0	3.3
65 ³⁾		600	3850	Steel	13727	226550	135	910	±2.0	0.35	2.0	5.6

¹⁾ For selection see page 22 et seqq.

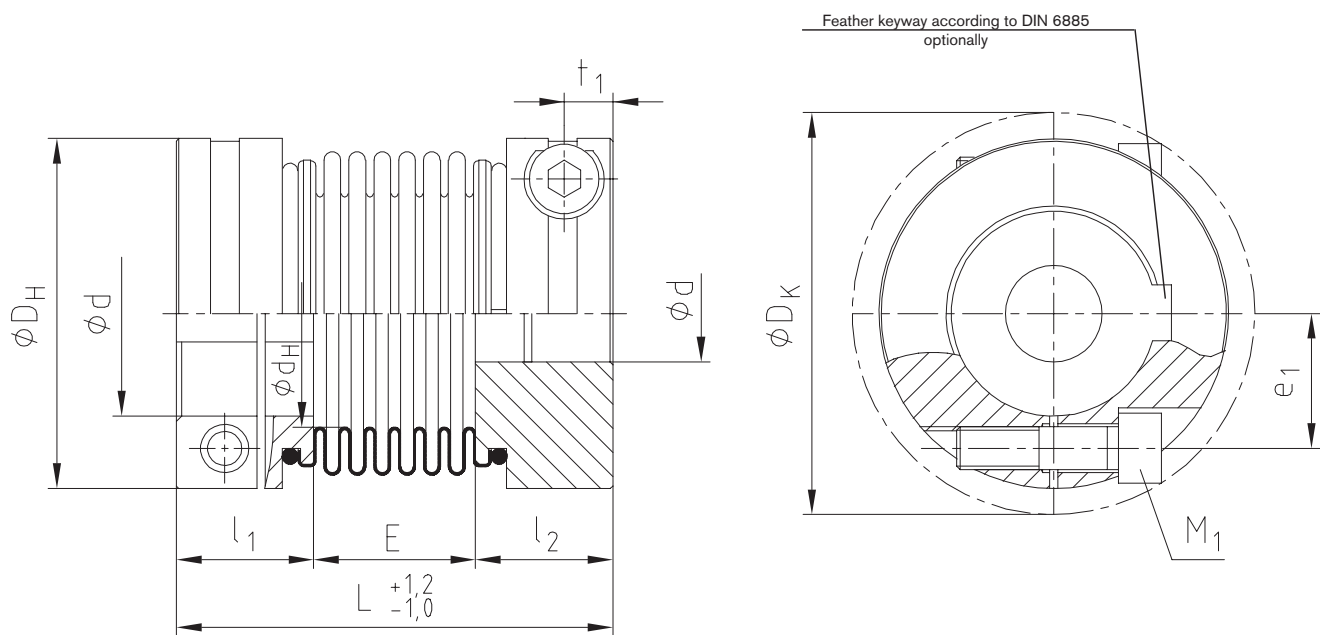
²⁾ Figures refer to the complete coupling with max. bore.

³⁾ Hub made of steel welded with bellow.

Review of shaft-hub-connection: Friction torques T_R [Nm] for hub type 2.5																															
Size	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø50	Ø55	Ø60	Ø65	
7	0.7	0.9	1.0	1.2	1.4																										
9	1.2	1.5	1.9	2.2	2.5	2.8	3.1																								
12		2.3	2.8	3.3	3.8	4.3	4.8	5.2	5.7	6.1																					
16			5.4	6.4	7.3	8.2	9.1	10.0	10.9	11.7	13.4	14.2	15.0																		
20						13.5	15.0	16.5	18.0	19.3	22.1	23.5	24.8	27.4	28.7	30.0															
30									26	28	32	34	36	40	42	43	51	53	58	61											
38											63	67	71	79	82	86	101	105	115	122	129	139	148								
42											63	67	71	79	83	87	102	106	117	124	130	141	150	157	163						
45																	136	160	166	183	194	206	222	238	248	259	274				
55 A)																205	242	251	277	295	312	337	362	378	394	418	457	494			
55 3)																	341	354	391	416	440	475	510	533	556	589	644	697			
65 3)																					576	610	660	710	743	775	823	901	977	1051	1124

Ordering example:

TOOLFLEX® 30 M		2.5 - Ø25			2.5 - Ø30		
Size and type of coupling		Hub type		Finish bore	Hub type		Finish bore

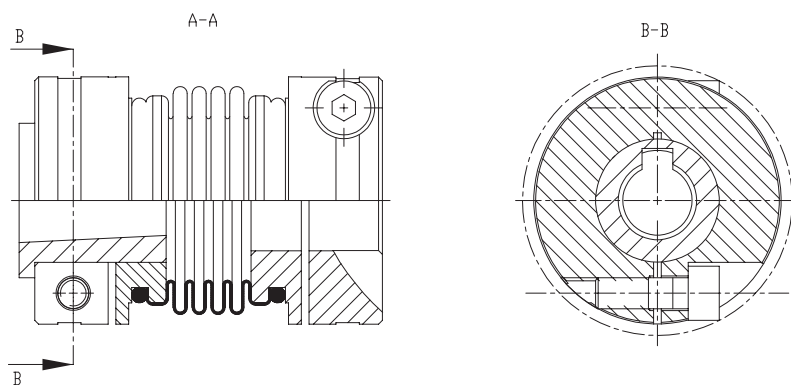


ROTEX® GS

Backlash-free
servo couplings

ROTEX® GS HP

Other types:
Type for FANUC motors



TOOLFLEX®

Types of hubs

Type 2.5



Clamping hub double slot without feather keyway

Type 2.6



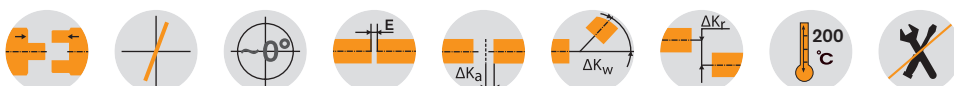
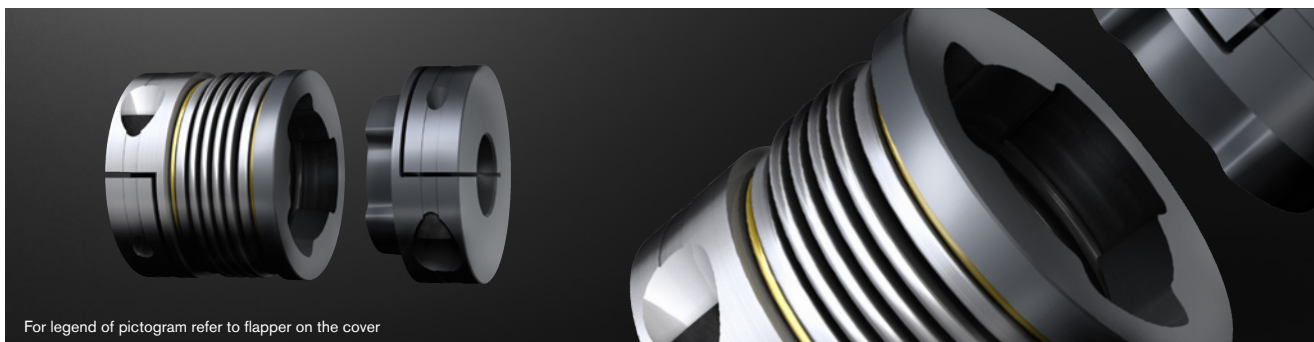
Clamping hub double slot with feather keyway

RADEX®-NC

TOOLFLEX® PI

Metal bellow-type couplings

Axial plug-in



TOOLFLEX® Type S-PI - Hub material aluminium/bellow material stainless steel

Size	Type	Dimensions [mm]													
		General									Clamping screws DIN EN ISO 4762				
		Min. d ₁ , d ₂	Max. d ₁	Max. d ₂	L ¹⁾	I ₁	I ₂	E	D _H	H	M ₁ , M ₂	DK	e	t ₁ , t ₂	T _A [Nm]
20	S	8	20	20	67.0	21.5	33.5	12.0	40	0.5 - 1	M5	43.5	14.5	6	6
30	S	10	30	28	73.5	23.0	33.5	17.0	55	0.5 - 1	M6	58.0	19.0	7	10
38	S	12	38	32	87.5	25.5	44.0	18.0	65	0.5 - 1.5	M8	72.6	25.0	9	25
42	S	14	42	35	93.0	30	39.0	21.0	70	0.5 - 1.5	M8	76.1	25.0	9	25
45	S	14	45	42	96.0	32.0	41.5	22.5	83	0.5 - 1.5	M10	89.0	30.0	11	49
55 ⁴⁾	S	20	55	55	130.1	40	58.5	31.5	100	0.5 - 1.5	M12	106.0	37	14	120

Technical data of TOOLFLEX® S-PI

Size	Type	Torque of bellow TKN ²⁾ [Nm]	Max. speed [rpm]	Moment of inertia ³⁾ [x10 ⁻⁶ kgm ²]	Torsion spring stiffness C _T [Nm/rad]	Axial stiffness C _a [N/mm]	Radial stiffness C _r [N/mm]	Perm. displacements		Weight ³⁾ [kg]
								Radial [mm]	Angular [degree]	
20	S	15	11950	37	6600	63	189	0.15	1.0	0.15
30	S	35	8700	140	11500	97	233	0.20	1.5	0.29
38	S	65	7350	329	21500	108	318	0.20	1.5	0.50
42	S	95	6820	396	31500	120	499	0.20	1.5	0.49
45	S	170	5750	1031	55000	132	738	0.25	1.5	0.93
55 ⁴⁾	S	340	4800	6150	144100	160	894	0.25	1.5	3.80

TOOLFLEX® Type M-PI - Hub material aluminium/bellow material stainless steel

Size	Type	Dimensions [mm]													
		General									Clamping screws DIN EN ISO 4762				
		Min. d ₁ , d ₂	Max. d ₁	Max. d ₂	L ¹⁾	I ₁	I ₂	E	D _H	H	M ₁ , M ₂	DK	e	t ₁ , t ₂	T _A [Nm]
20	M	8	20	20	74.0	21.5	33.5	19.0	40	0.5 - 1	M5	43.5	14.5	6	6
30	M	10	30	28	82.5	23.0	33.5	26.0	55	0.5 - 1	M6	58.0	19.0	7	10
38	M	12	38	32	99.5	25.5	44.0	30.0	65	0.5 - 1.5	M8	72.6	25.0	9	25
42	M	14	42	35	104.0	30	39.0	32.0	70	0.5 - 1.5	M8	76.1	25.0	9	25
45	M	14	45	42	112.5	32.0	41.5	39.0	83	0.5 - 1.5	M10	89.0	30.0	11	49
55 ⁴⁾	M	20	55	55	143.6	40	58.5	45	100	0.5 - 1.5	M12	106.0	37	14	120

Technical data of TOOLFLEX® M-PI

Size	Type	Torque of bellow TKN ²⁾ [Nm]	Max. speed [rpm]	Moment of inertia ³⁾ [x10 ⁻⁶ kgm ²]	Torsion spring stiffness C _T [Nm/rad]	Axial stiffness C _a [N/mm]	Radial stiffness C _r [N/mm]	Perm. displacements		Weight ³⁾ [kg]
								Radial [mm]	Angular [degree]	
20	M	15	11950	38	4900	42	126	0.20	1.5	0.16
30	M	35	8700	145	10200	65	155	0.25	2.0	0.31
38	M	65	7350	346	15100	72	212	0.25	2.0	0.52
42	M	95	6820	427	22000	80	333	0.25	2.0	0.52
45	M	170	5750	1127	41000	88	492	0.30	2.0	1.00
55 ⁴⁾	M	340	4800	6270	96100	107	598	0.30	2.0	3.90

¹⁾ When plugged in

²⁾ For selection see page 22 et seqq.

³⁾ Figures refer to the complete coupling with max. bore.

⁴⁾ Hub made of steel welded with bellow.

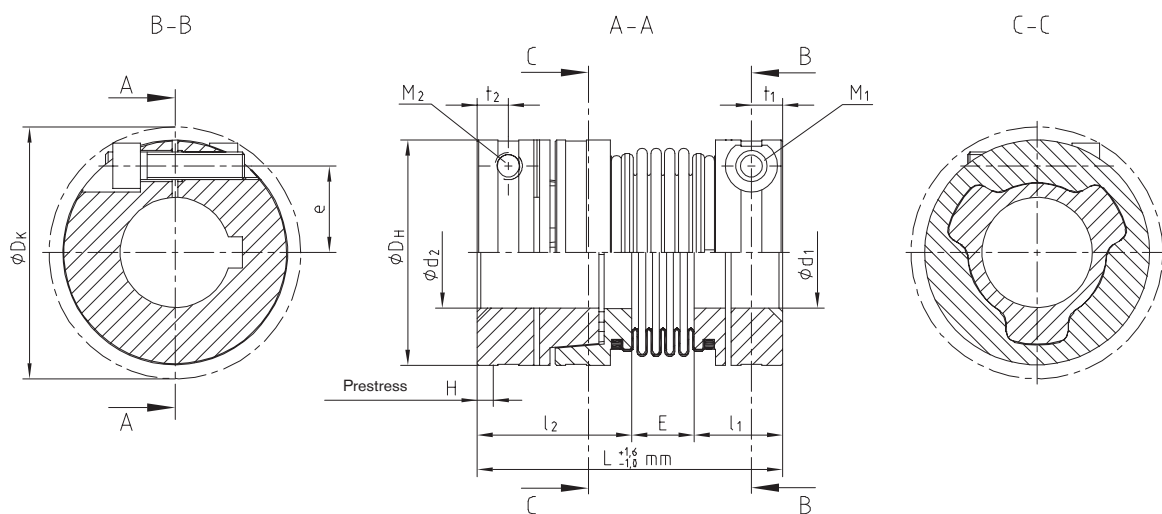
Review of shaft-hub-connection: Friction torques T_R [Nm] for hub type 2.5 for Ød₁/Ød₂

Size	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42
20	13.5	15.0	16.5	18.0	19.3	22.1	23.5	24.8	27.4	28.7	30.0									
30				26	28	32	34	36	40	42	43	51	53	58	61					
38						63	67	71	79	82	86	101	105	115	122	129	139	148		
42							63	67	71	79	83	87	102	106	117	124	130	141	150	163
45											136	160	166	183	194	206	222	238	248	259
55 ⁴⁾												341	354	391	416	440	475	510	533	556

**Ordering
example:**

TOOLFLEX® 30 S-PI	d ₁ - Ø22	d ₂ - Ø18
Size and type of coupling	Finish bore	Finish bore

TOOLFLEX® S-PI

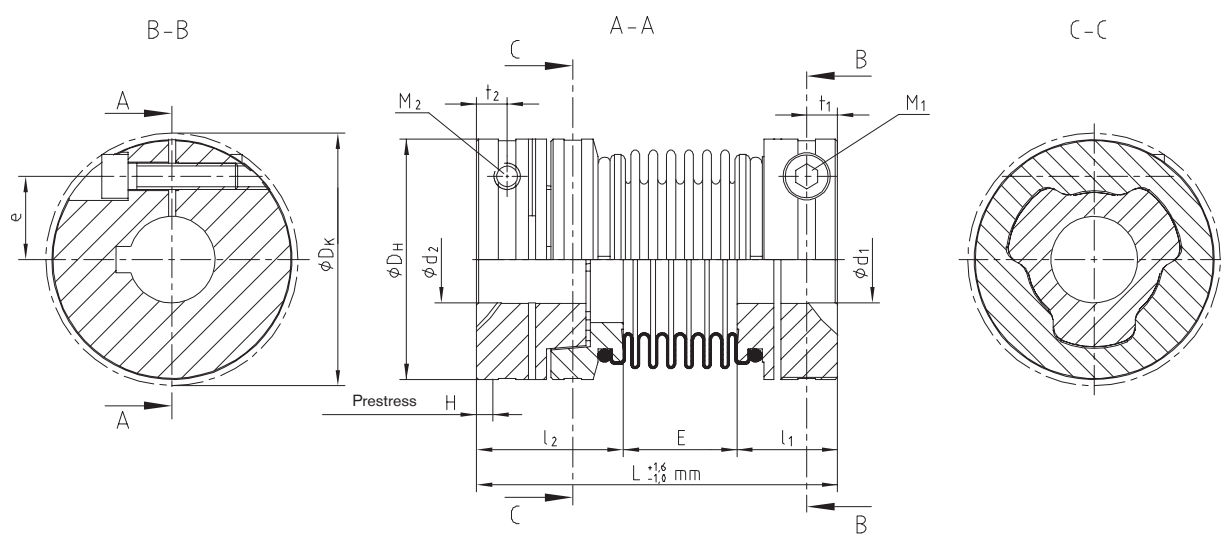


ROTEX® GS

Backlash-free
servo couplings

ROTEX® GS HP

TOOLFLEX® M-PI



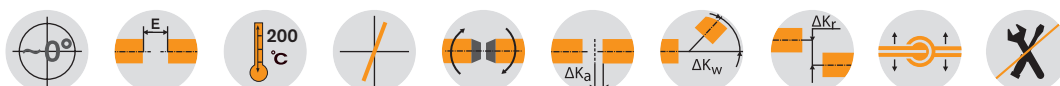
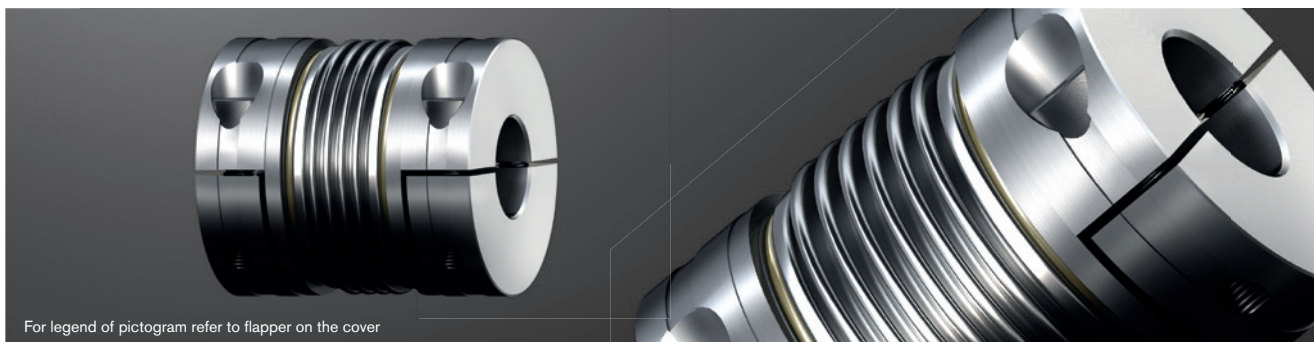
TOOLFLEX®

RADEX®-NC

TOOLFLEX® S-H / M-H

Metal bellow-type couplings

Half shell clamping hubs



TOOLFLEX® type S-H / half shell clamping hubs - Hub material aluminium/bellow material stainless steel

Size	Finish bore d		Dimensions [mm]										
	min.	Max.	General								Clamping screws DIN EN ISO 4762		
			L	l ₁ , l ₂	E	D _H	DK	E ₁	t ₁	x ₁ , x ₂	e	M	T _A [Nm]
20	8	20	51	19.5	12.0	40	41.2	26.0	5.5	12.5	14.5	M4	5.0
30	10	30	68	25.5	17.0	55	57.7	34.0	7.5	17.0	19.0	M6	15.0
38	12	38	78	30.0	18.0	65	72.6	36.0	9.5	21.0	25.0	M8	40.0
45	14	45	94.5	36.0	22.5	83	88.8	46.5	11.0	24.0	30.0	M10	70.0

Technical data of TOOLFLEX® S-H

Size	Bel- low-hub-con- nection	Torque of bellow T _{KN} ¹⁾ [Nm]	Max. speed [rpm]	Moment of inertia ²⁾ [x10 ⁻⁶ kgm ²]	Torsion spring stiffness C _T [Nm/rad]	Axial stiffness C _a [N/mm]	Radial stiffness C _r [N/mm]	Perm. displacements			Weight ²⁾ [kg]
								Axial [mm]	Radial [mm]	Angular [degree]	
20	Flanged	15	9550	28	9600	63	189	±0.4	0.15	1.0	0.110
30		35	6950	132	17800	97	233	±0.5	0.20	1.5	0.285
38		65	5850	292	37400	108	318	±0.6	0.20	1.5	0.422
45		170	4750	1003	95800	132	738	±0.9	0.20	1.5	0.897

TOOLFLEX® type M-H / half shell clamping hubs - Hub material aluminium/bellow material stainless steel

Size	Finish bore d		Dimensions [mm]										
	min.	Max.	General								Clamping screws DIN EN ISO 4762		
			L	l ₁ , l ₂	E	D _H	DK	E ₁	t ₁	x ₁ , x ₂	e	M	T _A [Nm]
20	8	20	58	19.5	19.0	40	41.2	33.0	5.5	12.5	14.5	M4	5.0
30	10	30	77	25.5	26.0	55	57.7	43.0	7.5	17.0	19.0	M6	15.0
38	12	38	90	30.0	30.0	65	72.6	48.0	9.5	21.0	25.0	M8	40.0
45	14	45	111	36.0	39.0	83	88.8	63.0	11.0	24.0	30.0	M10	70.0

Technical data of TOOLFLEX® M-H

Size	Bel- low-hub-con- nection	Torque of bellow T _{KN} ¹⁾ [Nm]	Max. speed [rpm]	Moment of inertia ²⁾ [x10 ⁻⁶ kgm ²]	Torsion spring stiffness C _T [Nm/rad]	Axial stiffness C _a [N/mm]	Radial stiffness C _r [N/mm]	Perm. displacements			Weight ²⁾ [kg]
								Axial [mm]	Radial [mm]	Angular [degree]	
20	Flanged	15	9550	29	6600	42	126	±0.6	0.20	1.5	0.115
30		35	6950	138	14800	65	155	±0.8	0.25	2.0	0.304
38		65	5850	310	24900	72	212	±0.8	0.25	2.0	0.445
45		170	4750	1069	64000	88	492	±1.0	0.25	2.0	0.947

¹⁾ For selection see page 22 et seqq.

²⁾ Figures refer to the complete coupling with max. bore.

To make sure that the coupling can be radially assembled/disassembled, observe the insertion dimension x₁/x₂ of the shafts.

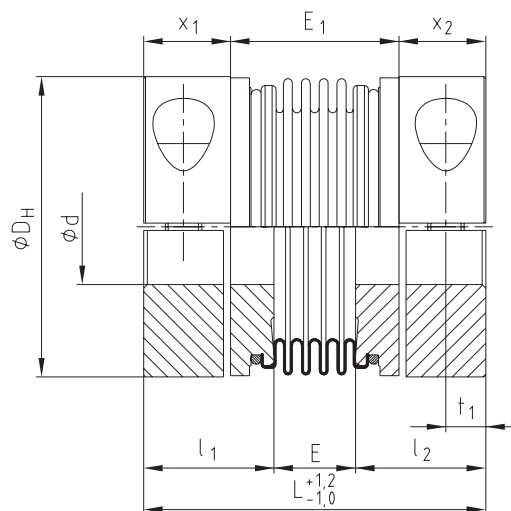
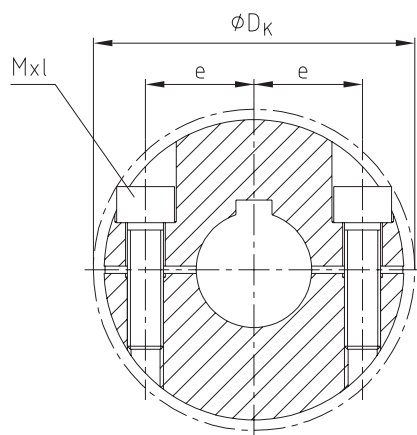
Review of shaft-hub-connection: Friction torques T_R [Nm] for hub type 7.8 for Ød₁/Ød₂

Size	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45
20	20	23	25	28	30	35	38	40	45	48	50										
30			51	56	61	71	76	81	92	97	102	122	127	143							
38					120	140	150	160	180	190	200	240	250	280	300	320	350	380			
45						197	211	226	254	268	282	338	352	395	423	451	493	536	564	592	634

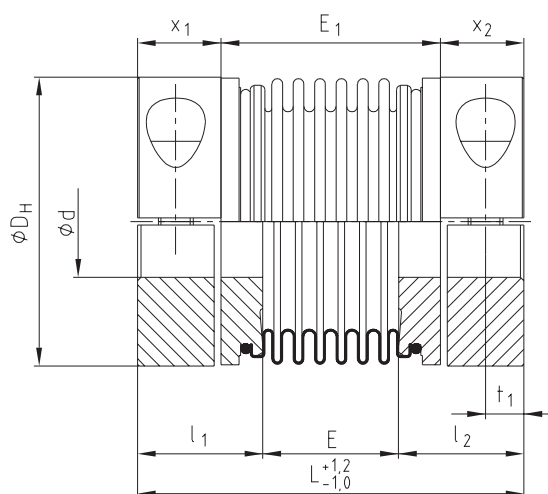
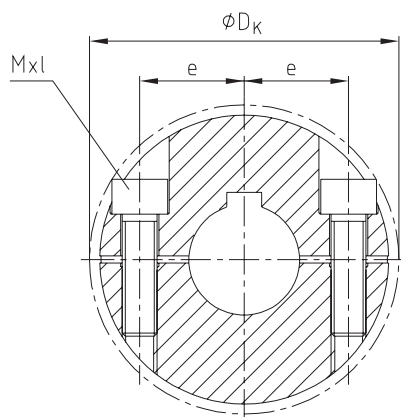
Ordering
example:

TOOLFLEX® 30 S-H	7.8 - Ø25				7.9 - Ø30			
Size and type of coupling	Hub type		Finish bore		Hub type		Finish bore	

TOOLFLEX® S-H



TOOLFLEX® M-H



ROTEX® GS

Backlash-free
servo couplings

ROTEX® GS HP

TOOLFLEX®

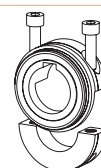
Types of hubs

Type 7.8



clamping hub type H without feather keyway for
single-cardanic connection

Type 7.9



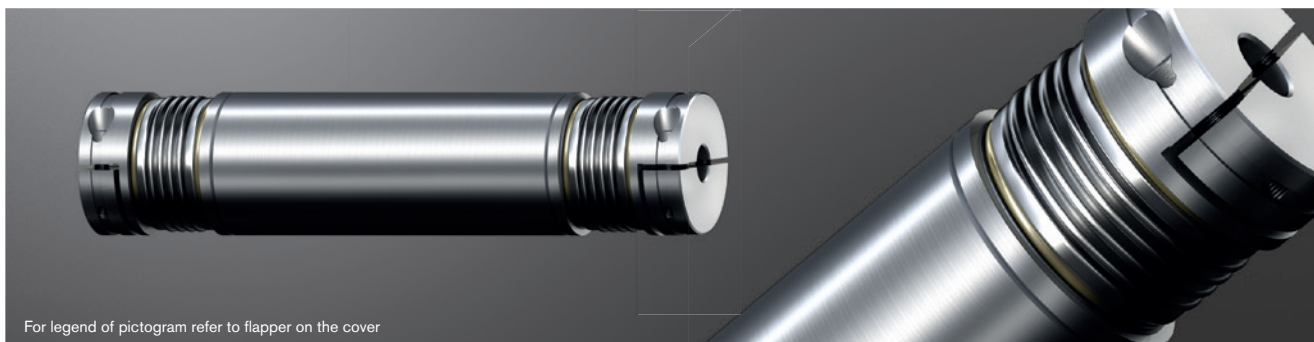
clamping hub type H with feather keyway for
single-cardanic connection (on request)

RADEX®-NC

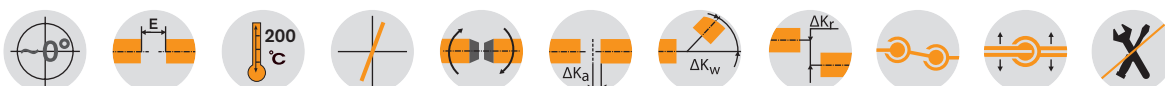
TOOLFLEX® ZR

Metal bellow-type couplings

Intermediate shaft coupling with bonded aluminium pipe



For legend of pictogram refer to flapper on the cover



TOOLFLEX® type ZR / half shell clamping hubs - Hub material aluminium/bellow material stainless steel															
Size	Finish bore d		Dimensions [mm]												
	min.	Max.	General											Clamping screws DIN EN ISO 4762	
			D _H	L	l ₃	L _R		L _{ZR} = L _R + 2 • l ₃		d _R	DK	t ₁	e		
						min.	Max.	min.	Max.					M	T _A [Nm]
20	8	20	40	40	12.5	80	2975	105	3000	40	41.2	5.5	14.5	M4	5
30	10	28	55	58.5	17.0	114	3466	148	3500	50	58.0	7.5	19	M6	15
38	12	38	65	61	21.0	129	3958	171	4000	60	72.6	9.5	25	M8	40
45	14	45	83	78.5	25.0	149	3950	199	4000	80	89.0	11.0	30	M10	70

Technical data of TOOLFLEX® ZR				
Size	Torque of bellow T _{KN} ¹⁾ [Nm]	Moment of inertia [10 ⁻³ kgm ²]		Static torsion spring stiffness [Nm/rad]
		ZR hub ²⁾	Pipe/meter	
20	15	0.024378	0.329	3245
30	35	0.121256	0.673	6630
38	65	0.253162	1.199	11,815
45	170	0.961451	4.560	44,930

¹⁾ For selection see page 22 et seqq.

²⁾ Figures refer to the complete coupling with max. bore.

³⁾ Torsion spring stiffness with a length of 1 m of intermediate pipe with L_{pipe} = L_{ZR} - 2 • L.

For inquiries and orders please specify the shaft distance dimension L_R along with the maximum speed to review the critical bending speed.

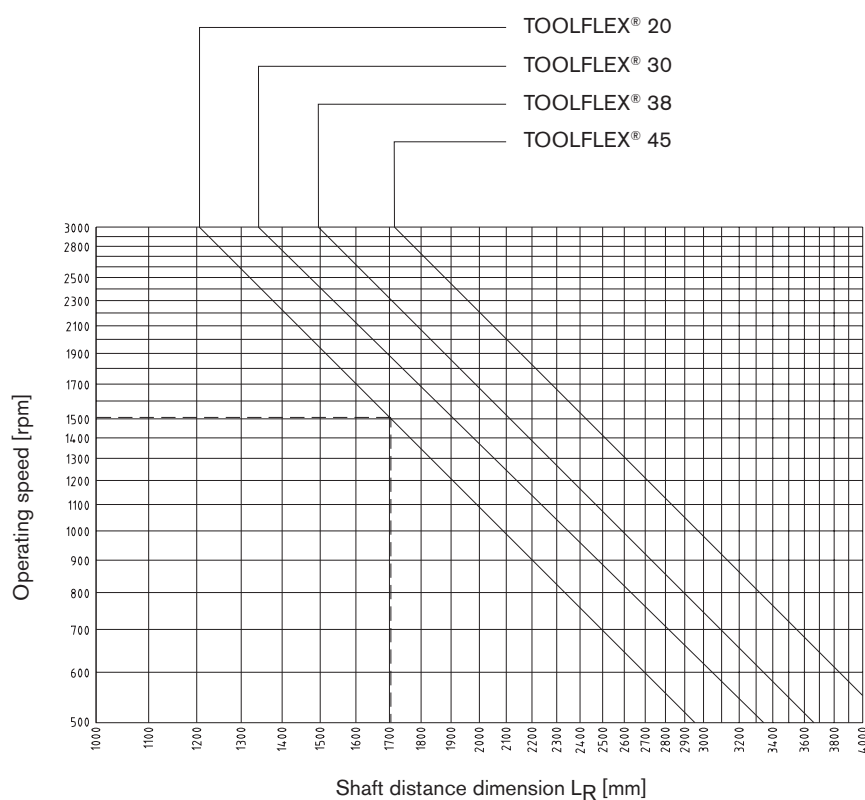
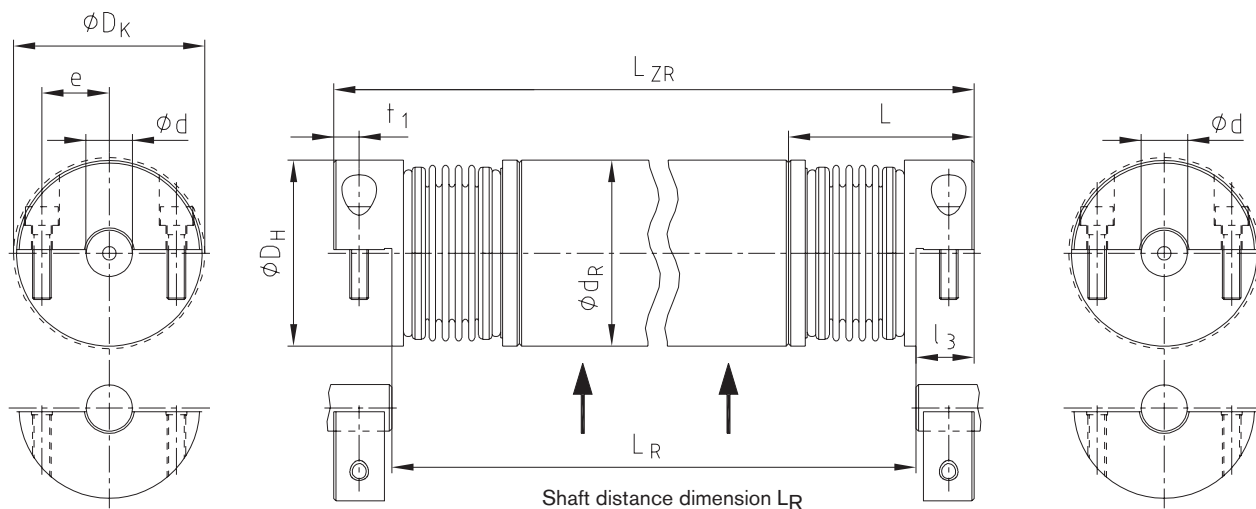
Straightness/concentricity of pipes according to DIN EN 755-1.

Review of shaft-hub-connection: Friction torques T _R [Nm] for hub type 7.5 for Ød ₁ /Ød ₂																					
Size	Ø8	Ø9	Ø10	Ø11	Ø12	Ø14	Ø15	Ø16	Ø18	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45
20	20	23	25	28	30	35	38	40	45	48	50										
30			51	56	61	71	76	81	92	97	102	122	127	143							
38					120	140	150	160	180	190	200	240	250	280	300	320	350	380			
45						197	211	226	254	268	282	338	352	395	423	451	493	536	564	592	634

Ordering example:

TOOLFLEX® 30	ZR	1200 mm	7.5 - Ø24	7.6 - Ø24
Size and type of coupling	Type	Shaft distance dimension (L _R)	Hub type	Finish bore

TOOLFLEX® ZR



ROTEX® GS

Backlash-free
servo couplings

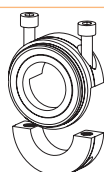
ROTEX® GS HP

TOOLFLEX®

RADEX®-NC

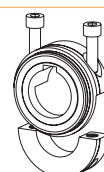
Types of hubs

Type 7.5



Clamping hub type DH without feather keyway for double-cardanic connection

Type 7.6



Clamping hub type DH with feather keyway for double-cardanic connection (on request)