



TOOLFLEX®

Backlash-free, torsionally stiff and
maintenance-free coupling



TOOLFLEX® is a backlash-free, torsionally stiff and maintenance-free metal bellow-type coupling designed to be used on machine tools, positioning systems, indexing tables as well as planetary and worm gears. It is able to compensate for shaft displacement caused by, as an example, inaccuracies in production, heat expansion, etc.

Table of Contents

1 Technical Data

2 Hints

- 2.1 Coupling Selection
- 2.2 General Hints
- 2.3 Safety and Advice Hints
- 2.4 General Hints to Danger
- 2.5 Proper Use

3 Storage

4 Assembly

- 4.1 Components of the Couplings
- 4.2 Assembly of the Couplings Types 1.1 and 2.5
- 4.3 Assembly of the Couplings Type 6.5
- 4.4 Disassembly of the Coupling Type 6.5
- 4.5 Remark for Remachining on the Coupling
- 4.6 Displacements - Alignment of the Couplings
- 4.7 Spares Inventory, Customer Service Addresses

5 Starting

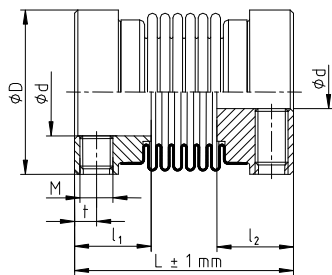
- 5.1 Breakdowns, Causes and Elimination

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:

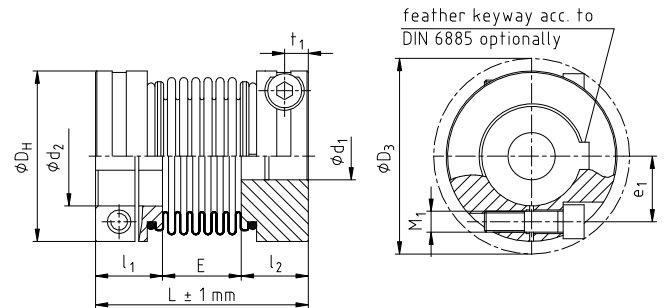
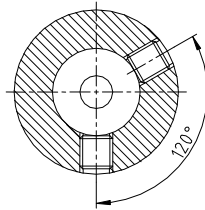


1 Technical Data

TOOLFLEX® design M



picture 1: TOOLFLEX® design M – type 1.1



picture 2: TOOLFLEX® design M – type 2.5

Table 1: dimensions – design M (type of 6 shafts)

TOOLFLEX® design M (hubs: AL-H, bellow: stainless steel)									
TOOLFLEX® size	nominal torque T_{KN} [Nm]	dimensions							
		finish bore ¹⁾ [mm]		general [mm]					
		d_{min}	d_{max}	L	$L_{type 1.1}$	l_1, l_2	l_3, l_4	E	D_H
5	0,1	2	5	-	17	-	6	5	10
7	1,0	3	8	26	20	9,2	7	6	15
9	1,5	4	10	32	24	10,7	8	8	20
12	2	5	14	38	31	13,2	11	9	25
16	5	5	16	49	-	17,0	-	15	32
20	15	8	20	62	-	21,5	-	19	40
30	35	10	30	72	-	23,0	-	26	55
38	65	14	38	81	-	25,5	-	30	65
45	150	14	45	103	-	32,0	-	39	83
55	340	15	55	125	-	40,0	-	45	100

TOOLFLEX® design M (hubs: AL-H, bellow: stainless steel)										
TOOLFLEX® size	dimensions [mm]									
	clamping screws – DIN EN ISO 4762						setscrews – DIN EN ISO 4029			
	M_1	D_3	t_1	e_1	quantity z	T_A [Nm]	M	t	quantity ²⁾ z	T_A [Nm]
5	-	-	-	-	-	-	M2	1,8	1	-
7	M2	16,5	3,2	5,0	1	0,37	M3	2,0	1	0,5
9	M2,5	21,5	3,5	7,1	1	0,76	M3	2,5	2	0,5
12	M3	27,3	4	8,5	1	1,34	M4	2,5	2	1,5
16	M4	35,0	5	12,0	1	2,90	-	-	-	-
20	M5	43,5	6	14,5	1	6	-	-	-	-
30	M6	58,0	7	19	1	10	-	-	-	-
38	M8	73,0	9	25	1	25	-	-	-	-
45	M10	89,0	11	30	1	49	-	-	-	-
55	M12	106,0	14	37	1	120	-	-	-	-

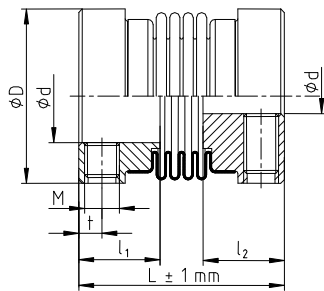
1) Bore F7 with feather keyway according to DIN 6885, sheet 1 [JS9] on request.

2) Quantity each hub; from size 9: 2 x 120° offset.

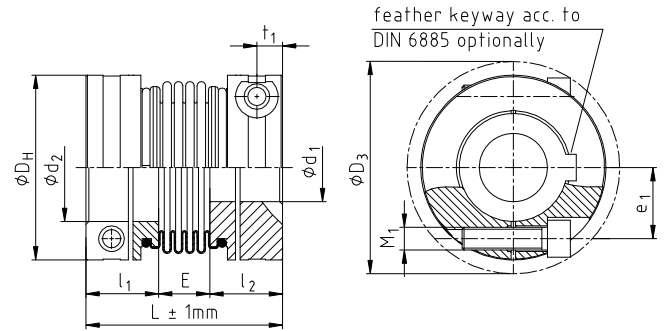
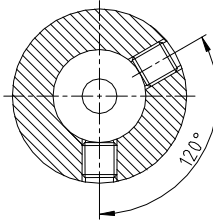


1 Technical Data

TOOLFLEX® design S



picture 3: TOOLFLEX® design S – type 1.1



picture 4: TOOLFLEX® design S – type 2.5

Table 2: dimensions – design S (type of 4 shafts)

TOOLFLEX® design S (hubs: AL-H, bellow: stainless steel)									
TOOLFLEX® size	nominal torque T_{KN} [Nm]	dimensions							
		finish bore ¹⁾ [mm]		general [mm]					
		$d_{min.}$	d_{max}	L	$L_{type\ 1.1}$	$l_1; l_2$	$l_3; l_4$	E	D_H
5	0,1	2	5	-	15,0	-	6	3,0	10
7	1,0	3	8	23,5	18,0	9,2	7	4,0	15
9	1,5	4	10	29,5	21,0	10,7	8	5,0	20
12	2	5	14	34,5	27,5	13,2	11	5,5	25
16	5	5	16	45,0	-	17,0	-	11,0	32
20	15	8	20	55,0	-	21,5	-	12,0	40
30	35	10	30	63,0	-	23,0	-	17,0	55
38	65	14	38	69,0	-	25,5	-	18,0	65
45	150	14	45	86,5	-	32,0	-	22,5	83
55	340	15	55	111,0	-	40,0	-	31,0	100

TOOLFLEX® design S (hubs: AL-H, bellow: stainless steel)										
TOOLFLEX® size	dimensions [mm]									
	clamping screws – DIN EN ISO 4762						setscrews – DIN EN ISO 4029			
	M_1	D_3	t_1	e_1	Anzahl z	T_A [Nm]	M	t	Anzahl ²⁾ z	T_A [Nm]
5	-	-	-	-	-	-	M2	1,8	1	-
7	M2	16,5	-	-	1	0,37	M3	2,0	1	0,5
9	M2,5	21,5	-	-	1	0,76	M3	2,5	2	0,5
12	M3	27,3	-	-	1	1,34	M4	2,5	2	1,5
16	M4	35,0	5	12,0	1	2,90	-	-	-	-
20	M5	43,5	6	14,5	1	6	-	-	-	-
30	M6	58	7	19	1	10	-	-	-	-
38	M8	73	9	25	1	25	-	-	-	-
45	M10	89	11	30	1	49	-	-	-	-
55	M12	106	14	37	1	120	-	-	-	-

1) Bore F7 with feather keyway according to DIN 6885, sheet 1 [JS9] on request.

2) Quantity each hub; from size 9: 2 x 120° offset.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



1 Technical Data

TOOLFLEX® designs M and S

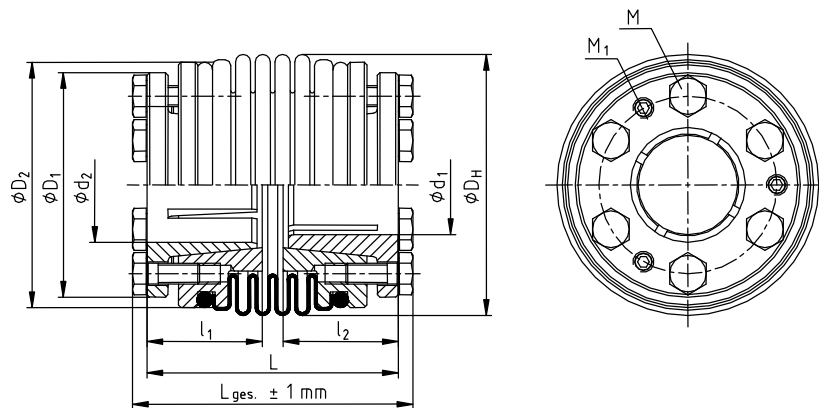
Table 3: torques and surface pressure of clamping hubs

TOOLFLEX® size	7	9	12	16	20	30	38	45	55
clamping screw M ₁	M2	M2,5	M3	M4	M5	M6	M8	M10	M12
dimension t ₁	3,2	3,5	4,0	5,0	6,0	7	9	11	14
dimension e ₁	5,0	7,1	8,5	12,0	14,5	19	25	30	37
dimension Ø D ₃	16,5	21,5	27,3	35,0	43,5	58	73	89	106
tightening torque T _A [Nm]	0,37	0,76	1,34	2,9	6,0	10	25	49	120
bore Ø	transmittable torque of clamping hub [Nm] surface pressure [N/mm ²]								
Ø3	0,84 92,1	1,87 164,6							
Ø4	0,91 55,8	1,98 98	3,48 172,3						
Ø5	0,97 38,2	2,09 66,1	3,65 115,5	8,5 189,5					
Ø6	1,04 28,3	2,20 48,3	3,81 83,8	8,8 136,1					
Ø7	1,1 22,1	2,31 37,3	3,98 64,3	9,1 103,3					
Ø8		2,41 29,9	4,14 51,3	9,4 81,7	17,6 113,2				
Ø9		2,51 24,7	4,31 42,1	9,4 66,5	18,1 91,9				
Ø10			4,48 35,4	9,9 55,5	18,6 76,4	32 133,2			
Ø11			4,64 30,4	10,2 47,2	19,0 64,7	33 112,4			
Ø12			4,81 26,4	10,5 40,8	19,5 55,8	34 96,4			
Ø14				11,1 31,7	20,5 43,0	35 73,6			
Ø15				11,4 28,3	21,0 38,3	36 65,4			
Ø16				11,7 25,5	21,4 34,4	36 58,6			
Ø19					22,9 26,0	38 43,8	85 84,2		
Ø20					23,3 24,0	39 40,3	87 77,1	157 104,2	381 198
Ø24						42 29,9	92 56,6	165 76,0	397 143,4
Ø25						43 28,0	93 52,9	167 70,9	401 133,5
Ø28						45 23,4	97 43,8	173 58,5	413 109
Ø30						46 21,0	99 39,2	177 52,1	421 97,4
Ø32							102 35,3	181 46,8	429 87,2
Ø35							105 30,6	187 40,4	441 75
Ø38							109 26,9	193 35,4	454 65,4
Ø40								197 32,6	462 60,0
Ø42								200 30,1	470 55,4
Ø45								206 27	482 49,5
Ø48									494 44,6
Ø50									502 41,8
Ø55									522 35,9



1 Technical Data

TOOLFLEX® design KN



picture 5: TOOLFLEX® S-KN – type 6.5

Table 4: dimensions – design KN

TOOLFLEX® design KN (hubs: steel, bellow: stainless steel)												
TOOLFLEX® size	nominal torque T_{KN} [Nm]	dimensions										
		finish bore [mm]		general [mm]								
		$d_{min.}$	$d_{max.}$	$L^{1)}$ 4 shafts	$L^{2)}$ 6 shafts	$L_{ges.}^{1)}$ 4 shafts	$L_{ges.}^{2)}$ 6 shafts	l_1, l_2	D_H	D_1	D_2	
30	35	12	22	48,0	57	54,0	63	22	50,0	43	47	
38	65	12	28	56,0	68	63,0	75	26	60,5	52	56	
45	150	15	40	74,5	91	82,5	99	34	82,0	68	77	
55	340	15	56	95,5	109	106	120	40	97,0	95	95	

TOOLFLEX® design KN (hubs: steel, bellow: stainless steel)						
TOOLFLEX® size	dimensions					
	clamping screws – DIN EN ISO 4014			pull-off threads – DIN EN ISO 4762		
	M	quantity z	T_A [Nm]	M_1	quantity z	T_A [Nm]
30	M4	12	2,9	M4	6	1,2
38	M5	12	6	M5	6	1,4
45	M6	12	14	M6	6	3
55	M8	12	35	M8	6	6

- 1) design S = 4 shafts
- 2) design M = 6 shafts

Table 5: transmittable torque of the taper ring hubs

TOOLFLEX® size	bore range d and the corresponding transmittable torque T_R [Nm]																		
	Ø12	Ø14	Ø15	Ø16	Ø19	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø35	Ø38	Ø40	Ø42	Ø45	Ø48	Ø50	Ø55
30	37	50	58	66	71	79													
38	52	71	81	92	130	103	149	161	202										
45		113	129	147	208	230	332	230	288	309	377	450	531	588					
55			174	198	279	309	445	483	606	696	792	585	690	764	842	967	1100	1194	1445

The transmittable torques of the clamping connection take into account the max. fit clearance with bore H7/shaft fit k6. The torque is reduced in case of bigger fit clearance.



CAUTION!

For the assembly of the coupling onto hollow shafts it is necessary to check the permissible tensions and deformation (see item 4.3).

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



2 Hints

2.1 Coupling Selection



CAUTION!

To ensure a permanently smooth operation of the coupling a corresponding operating factor (see TOOLFLEX® catalogue) has to be taken into consideration with dimensioning, depending on the application. If the operating conditions (performance, speed, changes at engine and machine) change, the coupling selection must be checked again. The transmissible torque of the shaft/hub connection must be checked by the orderer, and he is responsible for the same.

2.2 General Hints

Please read through these mounting instructions carefully before you set the coupling into operation. Please pay special attention to the safety instructions!
The mounting instructions are part of your product. Please keep them carefully and close to the coupling. The copyright for these mounting instructions remains with **KTR Kupplungstechnik GmbH**.

2.3 Safety and Advice Hints



DANGER!

Danger of injury to persons.



CAUTION!

Damages on the machine possible.



ATTENTION!

Pointing to important items.

2.4 General Hints of Danger



DANGER!

With assembly, operation and maintenance of the coupling it has to be made sure that the entire drive train is protected against unintentional engagement. You can be seriously hurt by rotating parts. Please make absolutely sure to read through and observe the following safety instructions.

- All operations on and with the coupling have to be performed taking into account "safety first".
- Please make sure to disengage the power pack before you perform your work.
- Protect the power pack against unintentional engagement, e. g. by providing hints at the place of engagement or removing the fuse for current supply.
- Do not touch the operation area of the coupling as long as it is in operation.
- Please protect the coupling against unintentional touch. Please provide for the necessary protection devices and caps.



2 Hints

2.5 Proper Use

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

- carefully read through the mounting instructions and understood them
- had technical training
- are authorized to do so by your company

The coupling may only be used in accordance with the technical data (see table 1 to 5 in chapter 1). Unauthorized modifications on the coupling design are not admissible. We do not take any warranty for resulting damages. To further develop the product we reserve the right for technical modifications. The **TOOLFLEX®** described in here corresponds to the technical status at the time of printing of these mounting instructions.

3 Storage

Coupling components from steel (e. g. hubs) are supplied with preservation and may be stored in a dry place covered with a roof during 6 - 9 months. Couplings with aluminium components (e. g. hubs) and bellows from stainless steel are supplied without preservation.



CAUTION!

Humid storage rooms are not suitable. Please make sure that there is no condensation. The best relative air humidity is under 65%.

4 Assembly

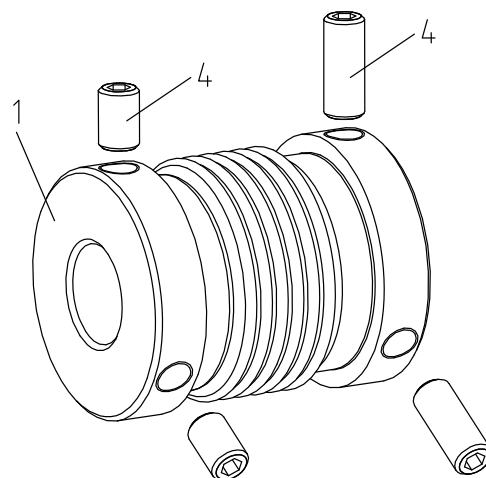
The coupling is supplied in assembled condition, including clamping screws and setscrews assembled. Before assembly the coupling has to be controlled for completeness.

4.1 Components of Couplings

Components of TOOLFLEX®, designs M and S – type 1.1

component	quantity	designation
1	2	bellow glued to the hubs
4	1/2 ¹⁾	setscrews DIN EN ISO 4029

1) quantity each hub; from size 9: 2 x 120° offset



picture 6:
TOOLFLEX®
designs M and S
type 1.1

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



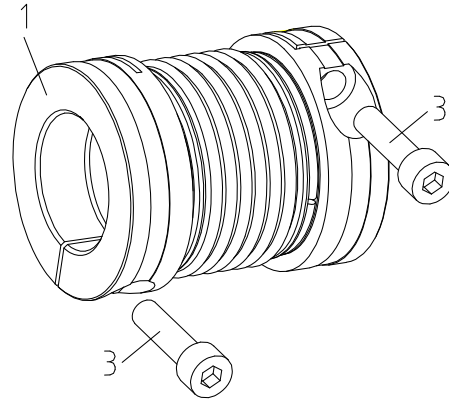
4 Assembly

4.1 Components of Couplings

Components of TOOLFLEX®, designs M and S – type 2.5

component	quantity	designation
1	2	bellow glued/bordered/ welded to the clamping hubs
3	1 ¹⁾	clamping screws DIN EN ISO 4762

1) quantity each hubs

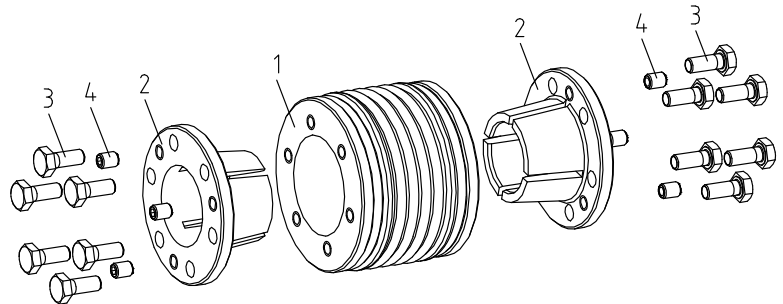


picture 7:
TOOLFLEX®
designs M and S
type 2.5

Components of TOOLFLEX®, design KN – type 6.5

component	quantity	designation
1	1	bellow bordered/welded to the clamping hubs
2	2	taper hub
3	6 ¹⁾	clamping screws DIN EN ISO 4017
4	3 ¹⁾	setscrews DIN EN ISO 4029

1) quantity each hub



picture 8: TOOLFLEX® design KN

4.2 Assembly of the Couplings Type 1.1 and 2.5



ATTENTION!

We recommend to check bores, shaft, keyway and feather key for dimensional accuracy before assembly. In addition we would recommend to review the overall length of the coupling. This dimension is necessary to align the coupling and may slightly deviate from the figures mentioned in the tables subject to production tolerances.



ATTENTION!

Before mounting preservatives have to be removed from the bores. Moreover, the shaft ends have to be cleaned carefully, too.



CAUTION!

Please note the manufacturer's instructions regarding the use of detergents.

- Lightly oil the shaft before assembly (e. g. with Klüber Quietsch-Ex or Castrol 4 in 1). Oils and greases with lubricants (e. g. MoS₂) must not be used.
- Unscrew the setscrews/clamping screws.
- Insert the shaft end of the driving machine into the TOOLFLEX® coupling. Please make sure that the shaft covers the overall length of the hub (dimension l₁, l₂ or l₃, l₄ from table 1, 2 or 4).
- Secure the hub by tightening the setscrews or clamping screws, respectively, at the tightening torques T_A mentioned in tables 1, 2 or 4.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



4 Assembly

4.2 Assembly of the Couplings Type 1.1 and 2.5

Continuation:

- Insert the shaft end of the driven side into the TOOLFLEX® coupling and repeat the steps mentioned above.
- Move the driving and driven machine in axial direction until the overall dimension L is achieved. If the power packs are already firmly assembled, axial movement of the coupling on the shafts allows for adjusting the dimension L.



ATTENTION!

Please make sure with the assembly of the coupling that the metal bellow is neither twisted, compressed nor damaged otherwise. If these remarks are not respected the coupling may be damaged and fail at an early stage. The fit backlash of the shaft-hub-connection should be between 0,01 mm and 0,05 mm.



CAUTION!

The tightening torque T_A (depending on the coupling type see table 1, 2 or 4) must not be exceeded during the assembly. During the assembly or disassembly, respectively, the metal bellow may be deformed two times the figure of the displacement figures mentioned in tables 6 and 7 at the maximum. If this remark is not respected, the coupling may be damaged and fail at an early stage.



CAUTION!

The frictionally engaged transmittable torques of the clamping hubs (see table 3) depend on the bore diameter.

4.3 Assembly of the Couplings Type 6.5

The power transmission of TOOLFLEX® KN is frictionally engaged. The necessary surface pressure is transmitted via the ring with internal taper to the taper hub and consequently to the shaft. The torques mentioned in table 5 take into account a combination of fit H7/k6. With a higher backlash of fit the torques mentioned in table 5 are reduced.

The stiffness and dimensions of the shafts (here specifically hollow shafts) have to be selected in a way that sufficient safety against plastic deformation is ensured. This may roughly be reviewed as per the following criterion:

For clamping connections with hollow shafts the required internal diameter of the hollow shaft d_{iW} is calculated based on the following formula:

$$d_{iW} \leq d \cdot \sqrt{\frac{R_{p0,2} - 2 \cdot p_W}{R_{p0,2}}} \quad [\text{mm}]$$

Shearing stress on the internal shaft diameter for hollow shaft:

$$\sigma_{iW} \approx - \frac{2 \cdot p_W}{1 - C_W^2} \quad [\text{N/mm}^2]$$

Shearing stress for solid shaft:

$$\sigma_{iW} = - p_W \quad [\text{N/mm}^2]$$

$R_{p0,2}$ = proof stress of shaft material $[\text{Nmm}^2]$
 p_W = surface pressure hub/shaft $[\text{N/mm}^2]$

d_{iW} = internal diameter of hollow shaft $[\text{mm}]$
 d = shaft diameter $[\text{mm}]$
 C_W = d_{iW}/d

The required strength does not exist if the hollow shaft bore is bigger than the max. internal bore calculated or if the shearing stress exceeds the yield strength of the material. For a detailed calculation please contact the KTR engineering department.

Schutzvermerk	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
ISO 16016 beachten.	Geprüft: 27.05.08 Sha	Ersetzt durch:



4 Assembly

4.3 Assembly of the Couplings Type 6.5

Continuation:

The following process should be noted for the assembly:

Clean the hub bore and shaft and afterwards lubricate with a thin-bodied oil (e. g. Castrol 4 in 1 or Klüber Quietsch-Ex).



ATTENTION!

We recommend to check bores and shafts for dimensional accuracy before assembly. In addition we would recommend to review the overall length of the coupling. This dimension is necessary to align the coupling and may slightly deviate from the figures mentioned in the tables subject to production tolerances.

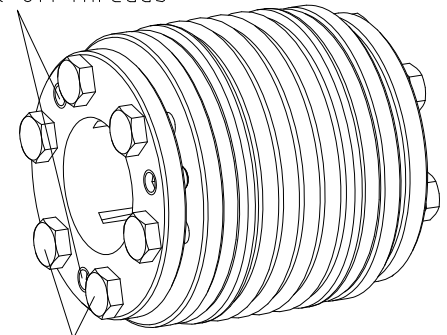


CAUTION!

Oils and greases containing molybdenum disulfide or other high-pressure additives as well as internal lubricants must not be used.

- Untighten the clamping screws slightly and pull the taper hub slightly out of the ring so that the taper hub can be moved easily.
- Push the TOOLFLEX® design KN onto the shaft of the driving machine. Please make sure that the overall clamping area is fully used.
- Tighten the clamping screws (M) stepwise and evenly crosswise to the final tightening torque (T_A) mentioned in table 4. This process has to be repeated until the tightening torque is achieved with all clamping screws. Insert the shaft end of the driven machine into the TOOLFLEX® design KN and repeat the aforementioned process.

pull-off threads



clamping screws

picture 9: assembly of the clamping ring hub type 6.5



ATTENTION!

By tightening the clamping screws the metal bellow (component 1) is moved axially. Subject to this effect it has to be made sure that a taper hub (component 2) is fully assembled first and afterwards the assembly of the second hub is started with. As a result an invalid twisting of the metal bellow in axial direction is avoided.

- Afterwards tighten the setscrews (M_1) of the pull-off threads at the tightening torque (T_A) mentioned in table 4.



CAUTION!

If this assembly process is not respected, the setscrews may release and fly around. This may cause danger for body and life.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



4 Assembly

4.4 Disassembly of the Coupling Type 6.5

The following process should be noted for the disassembly:

Untighten the clamping screws evenly one after the other. Each screw may only be untightened by half a revolution for each cycle. Unscrew all clamping screws by 3 - 4 convolutions.

Afterwards tighten the setscrews of the pull-off threads stepwise and evenly crosswise. Please repeat this process until the taper hub releases.



CAUTION!
If these hints are not observed, the operation of the coupling may be damaged.

In case of a repeated assembly the hub bore and shaft have to be cleaned and afterwards lubricated with a thin-bodied oil (e. g. Castrol 4 in 1 or Klüber Quietsch-Ex). The same applies for the taper surfaces of the taper hub and clamping ring. Before it is possible to assemble the hubs again it is necessary to unscrew the setscrews (component 4) until they are flush with the outside of the taper hub.



CAUTION!
Oils and greases containing molybdenum disulfide or other high-pressure additives as well as internal lubricants must not be used.

4.5 Remark for Remachining on the Coupling



CAUTION!
The orderer is responsible for all subsequently made machinings to pilot bored and to finish machined coupling parts. KTR does not assume any warranty claims resulting from insufficient refinish.

4.6 Displacements - Alignment of the Couplings

TOOLFLEX® compensates for displacements of the shafts to be connected as per table 6 or 7, respectively. Excessive misalignment may be caused by inaccurate alignment, production tolerances, heat expansion, shaft bending, twisting of machine frames, etc.



CAUTION!
In order to ensure a long service life of the coupling the shaft ends have to be aligned accurately. Please absolutely observe the displacement figures indicated (see tables 6 and 7). If the figures are exceeded, the coupling is damaged.
The exacter the alignment of the coupling, the higher is its lifetime.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



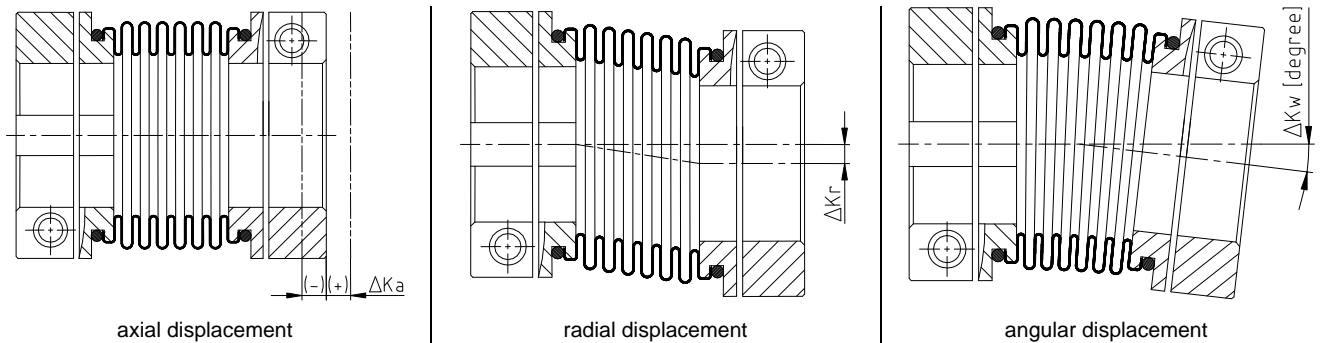
4 Assembly

4.6 Displacements - Alignment of the Couplings

Continuation:

Please note:

- The displacement figures mentioned in table 6 or 7, respectively, are maximum figures which must not arise at the same time. If radial and angular misalignment arise at the same time the amount of displacements must not exceed ΔK_r or ΔK_w , respectively.
- Please check with a dial gauge, ruler or feeler whether the permissible displacement figures of tables 6 and 7 can be observed.



picture 10: displacements

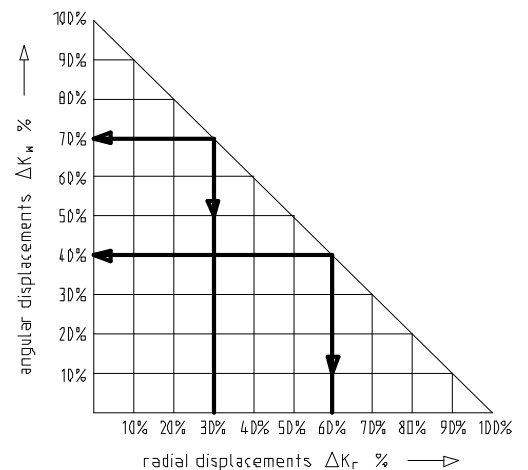
$$L_{perm.} = L + \Delta K_a \quad [mm]$$

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

Example for the misalignment combinations given in picture 11:

Example 1:
 $\Delta K_r = 30 \%$
 $\Delta K_w = 70 \%$

Example 2:
 $\Delta K_r = 60 \%$
 $\Delta K_w = 40 \%$



picture 11: combinations of displacement

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

Table 6: displacement figures – type of 6 shafts

TOOLFLEX® size	5	7	9	12	16	20	30	38	45	55
max. axial displacement ΔK_a [mm]	± 0,40	± 0,40	± 0,50	± 0,60	± 0,50	± 0,60	± 0,80	± 0,80	± 1,00	± 1,00
max. radial displacement ΔK_r [mm]	0,15	0,15	0,20	0,20	0,20	0,20	0,25	0,25	0,30	0,30
max. angular displacement ΔK_w [degree]	1,00	1,00	1,50	1,50	1,50	1,50	2,00	2,00	2,00	2,00

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



4 Assembly

4.6 Displacements - Alignment of the Couplings

Continuation:

Table 7: displacement figures – type of 4 shafts

TOOLFLEX® size	5	7	9	12	16	20	30	38	45	55
max. axial displacement ΔK_a [mm]	$\pm 0,30$	$\pm 0,30$	$\pm 0,35$	$\pm 0,40$	$\pm 0,30$	$\pm 0,40$	$\pm 0,50$	$\pm 0,60$	$\pm 0,90$	$\pm 1,00$
max. radial displacement ΔK_r [mm]	0,10	0,10	0,15	0,15	0,15	0,15	0,20	0,20	0,25	0,25
max. angular displacement ΔK_w [degree]	0,70	0,70	1,00	1,00	1,00	1,00	1,50	1,50	1,50	1,50

4.7 Spares Inventory, Customer Service Addresses

A basic requirement to guarantee 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 under www.ktr.com.

5 Starting

Before putting the coupling into operation please check if the clamping screws in the hubs are tightened, check the alignment and the overall length L and correct, if necessary, and check all screw connections depending on the coupling type for the necessary tightening torques.



CAUTION!

If you note any irregularities at the coupling during operation, the drive unit must be turned off immediately. The cause of the breakdown must be found out with the table „Breakdowns“ and, if possible, be eliminated according to the proposals. The possible breakdowns mentioned can be hints only. To find out the cause all operating factors and machine components must be considered.

5.1 Breakdowns, Causes and Elimination

The below-mentioned errors can lead to an incorrect use of the TOOLFLEX® coupling. In addition to the stipulations in these operating and mounting instructions please make sure to avoid these errors. The errors listed can only be clues to search for the errors. When searching for the error the adjacent components must be generally included.

General errors incorrect use

- Important data for the coupling selection was not forwarded.
- The calculation of the shaft/hub connection was not considered.
- Coupling parts with damage occurred during transport are assembled.
- The fits of the parts to be assembled are not coordinated with each other.
- Tightening torques are below/exceeded.
- No original KTR parts (purchased parts) are used.
- Maintenance intervals are not observed.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch:



5 Starting

5.1 Breakdowns, Causes and Elimination

Continuation:

breakdowns	causes	elimination
change of the running noises and/or occurring vibrations	misalignment	1) put the unit out of operation 2) eliminate the reason for the misalignment (e. g. loose foundation bolts, break of the engine fixing, heat expansion of unit components → change of the assembly dimensions of the coupling, missing or improper centering of housing)
	loose screws for axial securement of hubs	1) put the unit out of operation 2) check alignment of coupling 3) tighten the screws to secure the hubs and secure against self-loosening
fracture of the bellow and/or the hub	operating parameters do not correspond to the performance of the coupling	1) put the unit out of operation 2) check the operating parameters and select a larger coupling (consider installation space) 3) assemble new coupling size 4) check alignment
	mistake in service of the unit	1) put the unit out of operation 2) change complete coupling 3) check alignment 4) instruct and train the service staff



ATTENTION!

KTR does not assume any liabilities or guarantees regarding the use of spare parts and accessories which are not provided by KTR and for the damages resulting herefrom.

Schutzvermerk ISO 16016 beachten.	Gezeichnet: 26.05.08 Sha	Ersatz für: ---
	Geprüft: 27.05.08 Sha	Ersetzt durch: