FLENDER COUPLINGS

ZAPEX

Operating instructions 3502 en
Edition 10/2017

ZWBT, ZWBG, ZWB, ZWH, ZWHD

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ZAPEX
3502 en

Operating instructions

Translation of the original operating instructions

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Legal notes

Warning note concept

This manual comprises notes which must be observed for your personal safety and for preventing material damage. Notes for your personal safety are marked with a warning triangle or an "Ex" symbol (when applying Directive 2014/34/EU), those only for preventing material damage with a "STOP" sign.

WARNING! Imminent **explosion!**

The notes indicated by this symbol are given to prevent **explosion damage.**
Disregarding these notes may result in serious injury or death.

WARNING! Imminent **personal injury!**

The notes indicated by this symbol are given to prevent **personal injury.**
Disregarding these notes may result in serious injury or death.

WARNING! Imminent **damage to the product!**

The notes indicated by this symbol are given to prevent **damage to the product.**
Disregarding these notes may result in material damage.

NOTE!

The notes indicated by this symbol must be treated as general **operating information**.
Disregarding these notes may result in undesirable results or conditions.

WARNING! Hot surfaces!

The notes indicated by this symbol are made to prevent **risk of burns due to hot surfaces** and must always be observed.
Disregarding these notes may result in light or serious injury.

Where there is more than one hazard, the warning note for whichever hazard is the most serious is always used. If in a warning note a warning triangle is used to warn of possible personal injury, a warning of material damage may be added to the same warning note.

Qualified personnel

The product/system to which this documentation relates may be handled only by **persons qualified** for the work concerned and in accordance with the documentation relating to the work concerned, particularly the safety and warning notes contained in those documents.
Qualified personnel must be specially trained and have the experience necessary to recognise risks associated with these products and to avoid possible hazards.

Proper use of Flender products

Observe also the following:

Flender products must be used only for the applications provided for in the catalogue and the relevant technical documentation. If products and components of other makes are used, they must be recommended or approved by Flender. The faultfree, safe operation of the products calls for proper transport, proper storage, erection, assembly, installation, start-up, operation and maintenance. The permissible ambient conditions must be adhered to. Notes in the relevant documentations must be observed.

Trade marks

All designations to which the registered industrial property mark ® is appended are registered trademarks of Flender GmbH. Other designations used in this document may be trademarks the use of which by third parties for their own purposes may infringe holders' rights.

Exclusion of liability

We have checked the content of the document for compliance with the hard- and software described. Nevertheless, variances may occur, and so we can offer no warranty for complete agreement. The information given in this document is regularly checked, and any necessary corrections are included in subsequent editions.

Explanation regarding Machinery Directive 2006/42/EC

The couplings described here are "components" in accordance with the Machinery Directive and do not require a declaration of incorporation.

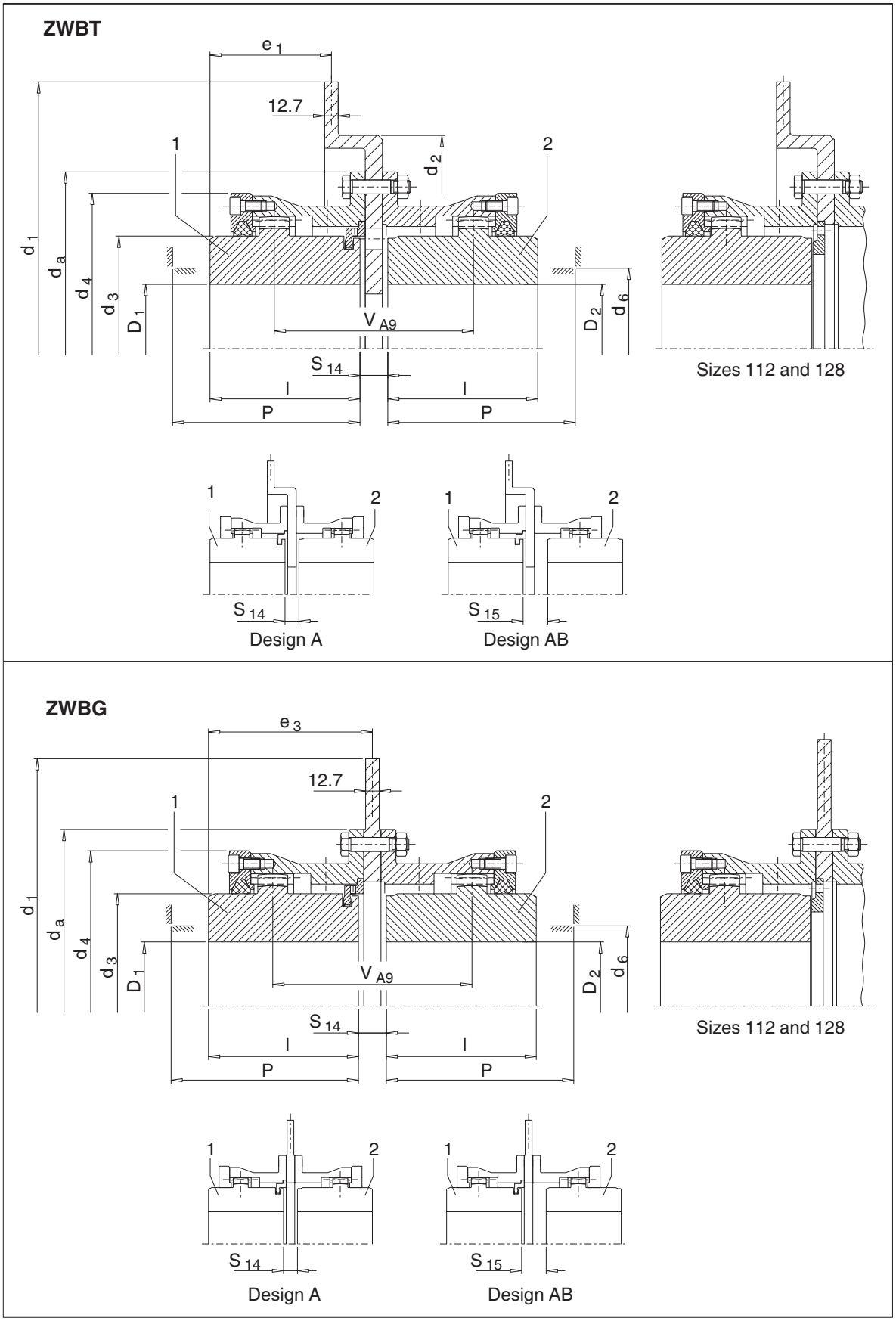
Flender GmbH
Alfred-Flender-Straße 77
46395 Bocholt
GERMANY

Document number: 3502 en
℗ 10/2017 Subject to alterations

Contents

1. Technical data

1.1 Types ZWBT and ZWBG



Size	Rated torque	Speed	Bore [2]												perm. misalignment	Brake disk				Weight	
	T_N [1]	$n_{max.}$		D_1	D_2	d_a	d_3	d_4	d_6 [3]	l	P [3]	V_{A9}	S_{14}	S_{15}	S_{14}, S_{15}	d_1	d_2	e_1	e_3	ZWBT [4]	ZWBG [4]
	Nm	1/min	from mm	up to mm	up to mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg
112	1300	3800	0	45	45	143	65	110	45	50	85	69	19	-	+0.5	300	181	36.35	64.5	14	14
112	1300	3200	0	45	45	143	65	110	45	50	85	72	22	-	+0.5	356	210	26.35	66	17.5	17
128	2500		0	55	55	157	80	128	60	60	105	89	22	29	+0.5			31.35	71	20.5	20
128	2500	2800	0	55	55	157	80	128	60	60	105	86	19	26	+0.5	406	260	28.35	69.5	23.5	22.5
146	4300		0	60	65	177	95	146	75	75	120	101	19	26	+0.5			43.35	84.5	28	27
175	7000		0	70	80	215	112	175	85	90	140	117	21	27	+0.5			59.35	100.5	39	38
146	4300	2500	0	60	65	177	95	146	75	75	120	104	22	29	+0.5	457	311	46.35	86	33	31
175	7000		0	70	80	215	112	175	85	90	140	120	24	30	+0.5			62.35	102	44	42
198	11600		0	85	95	237	135	198	110	100	150	135	24	35	+0.5			72.35	112	55	52
175	7000	2200	0	70	80	215	112	175	85	90	140	120	24	30	+0.5	514	368	62.35	102	49	46
198	11600		0	85	95	237	135	198	110	100	150	135	24	35	+0.5			72.35	112	60	57
230	19000		0	100	110	265	160	230	135	110	160	146	24	36	+0.5			82.35	122	77	72
255	27000		0	115	125	294	185	255	160	125	175	166	26	41	+0.8			98.35	138	98	93
230	19000	1850	0	100	110	265	160	230	135	110	160	146	24	36	+0.5	610	464	82.35	122	88	81
255	27000		0	115	125	294	185	255	160	125	175	166	26	41	+0.8			98.35	138	110	100
290	39000		70	130	145	330	210	290	180	140	200	186	26	46	+0.8			113.35	153	135	125
315	54000		80	145	160	366	230	315	200	160	220	206	26	46	+0.8			133.35	173	165	160
290	39000	1600	70	130	145	330	210	290	180	140	200	189	29	49	+0.8	711	565	116.35	154.5	150	140
315	54000		80	145	160	366	230	315	200	160	220	209	29	49	+0.8			136.35	174.5	180	170
342	69000		90	160	180	392	255	340	225	180	240	241	31	61	+0.8			157.35	195.5	225	205
375	98000		100	180	200	430	290	375	260	200	260	261	31	61	+0.8			177.35	215.5	285	270
415	130000	1400	120	200	220	478	320	415	285	220	300	319	37	99	+0.8	812	660	203.35	238.5	390	355
465	180000		140	225	250	528	360	465	325	240	320	361	41	121	+1.0			225.35	260.5	490	450

Table 1.1: Torques T_N, speeds $n_{max.}$, dimensions and weights

1) The specified torques relate to the teeth and **not** the shaft-hub connection. This must be checked separately.

2) Max. bore with keyway to DIN 6885/1.

3) Space required for alignment of the coupling parts and replacement of the sealing rings.

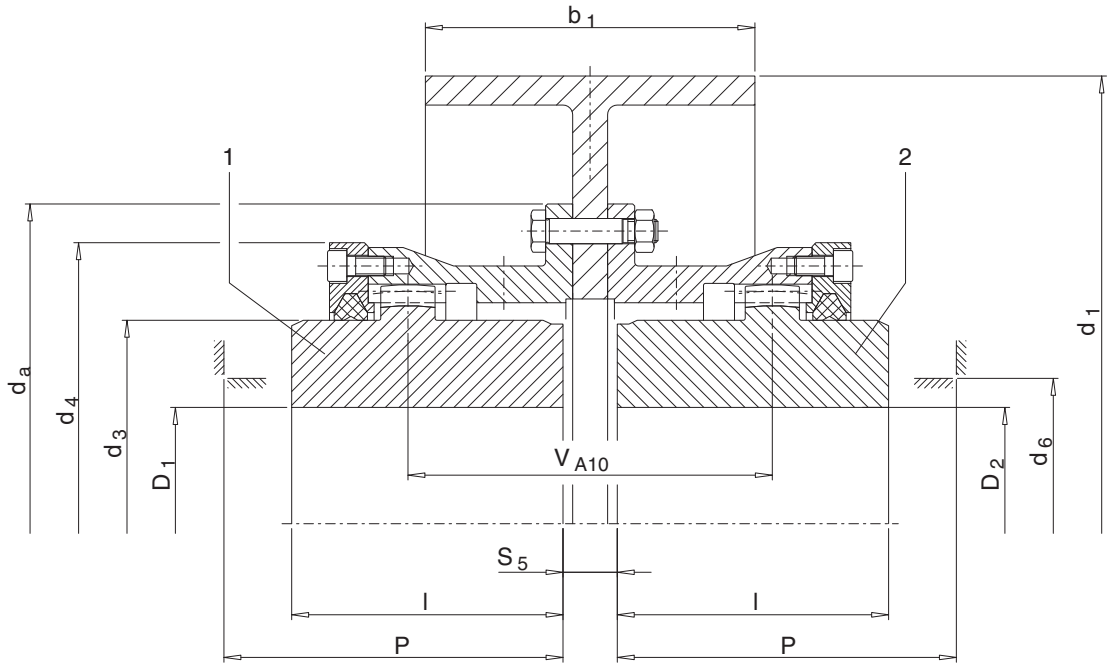
4) Weights apply to mean bores.

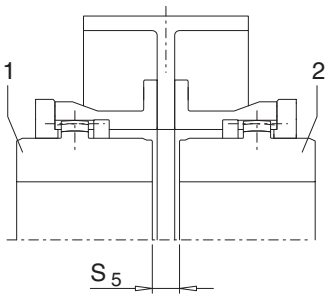
The rated torques T_N apply to:

- daily operating cycle of up to 24 h
- operation within the specified alignment
- operation over the temperature range of between - 30 °C and + 80 °C (ambient temperature and/or temperature of shaft ends).
- up to 25 starts per hour where double the torque is permissible during the start.

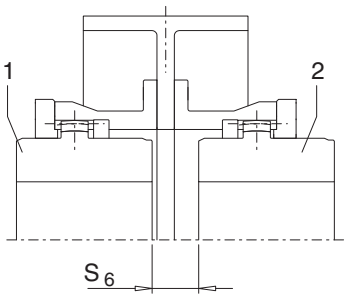
For sustained faultfree operation the coupling must be designed with an application factor appropriate to the application. In the event of a change in operating conditions (output, speed, changes to the prime mover and driven machine) the design must always be checked.

1.2 Type ZWB

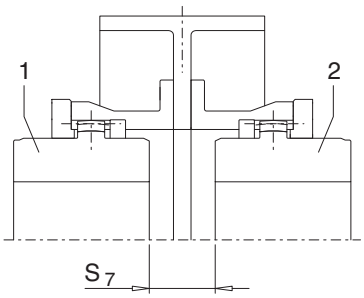




Design A



Design AB



Design B

Size	Rated torque	Speed	Bore[2]		d_a	d_3	d_4	d_6	l	P	V_{A10}	S_5	S_6	S_7	perm. misali-gnment	Brake disk		Weight
	T_N	n_{max}	D_1 / D_2												S_5, S_6, S_7	d_1	b_1	
	[1]		from	up to				[3]		[3]								[4]
	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
128	2500	2500	0	55	157	80	128	60	60	105	83	16	23	30	+1	200	75	14
128	2500	2000	0	55	157	80	128	60	60	105	83	16	23	30	+1	250	95	17.5
146	4300	2000	0	65	177	95	146	75	75	120	98	16	23	30	+1			22
146	4300	1600	0	65	177	95	146	75	75	120	100	18	25	32	+1			29
175	7000	1600	0	80	215	112	175	85	90	140	116	20	26	32	+1	315	118	40
198	11600	1600	0	95	237	135	198	110	100	150	131	20	31	42	+1			50
175	7000	1250	0	80	215	112	175	85	90	140	118	22	28	34	+1			52
198	11600	1250	0	95	237	135	198	110	100	150	133	22	33	44	+1	400	150	62
230	19000	1250	0	110	265	160	230	135	110	160	144	22	34	46	+1			78
230	19000	1000	0	110	265	160	230	135	110	160	145	23	35	47	+1	500	190	97
255	27000	1000	0	125	294	185	255	160	125	175	165	25	40	55	+1.5			115
255	27000	1000	0	125	294	185	255	160	125	175	168	28	43	58	+1.5	630	236	155
290	39000	1000	70	145	330	210	290	180	140	200	188	28	48	68	+1.5			180
290	39000	750	70	145	330	210	290	180	140	200	188	28	48	68	+1.5	710	265	210

Table 1.2: Torques T_N, speeds $n_{max.}$, dimensions and weights

1) The specified torques relate to the teeth and **not** the shaft-hub connection. This must be checked separately.

2) Max. bore with keyway to DIN 6885/1.

3) Space required for alignment of the coupling parts and replacement of the sealing rings.

4) Weights apply to mean bores.

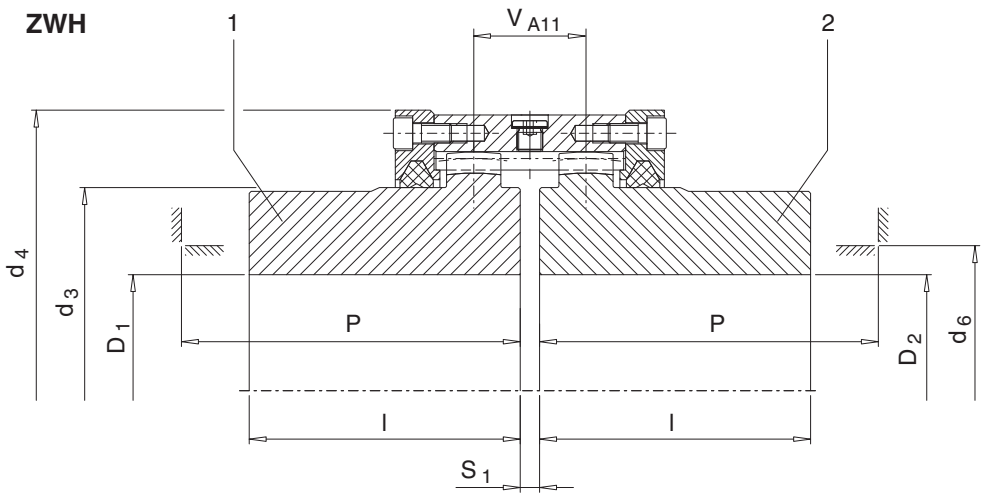
The rated torques T_N apply to:

- daily operating cycle of up to 24 h
- operation within the specified alignment
- operation over the temperature range of between - 30 °C and + 80 °C (ambient temperature and/or temperature of shaft ends).
- up to 25 starts per hour where double the torque is permissible during the start.

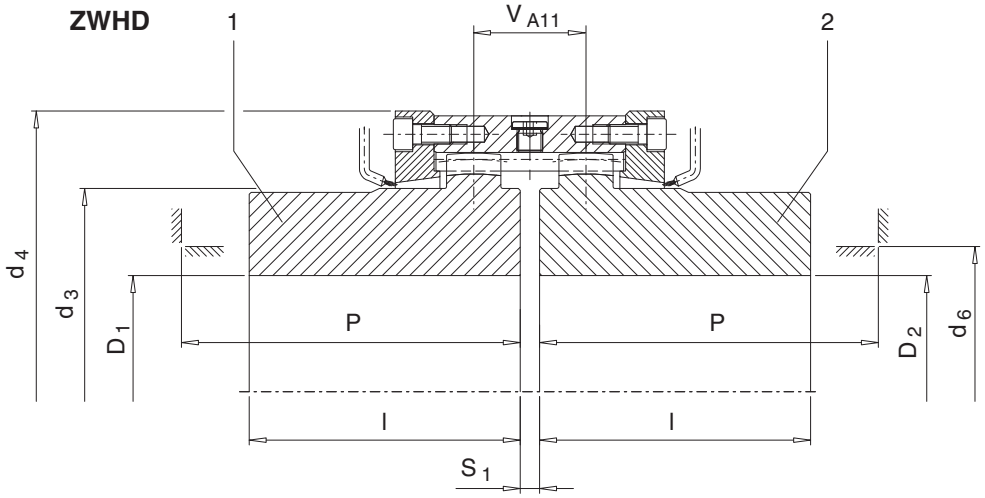
For sustained faultfree operation the coupling must be designed with an application factor appropriate to the application. In the event of a change in operating conditions (output, speed, changes to the prime mover and driven machine) the design must always be checked.

1.3 Types ZWH and ZWHD

ZWH



ZWHD



Size	Rated torque T_N [1]	Speed $n_{max.}$	Bore [2] D_1 / D_2 from	D_1 / D_2 up to	d_3	d_4	d_6 [3]	l	P [3]	V_{A11}	S_1	perm. misalignment S_1	Weight [4]
	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
112	1300	9400	0	45	65	110	45	50	85	28	6	+ 1	4.9
128	2500	8300	0	55	80	128	60	60	105	30	6	+ 1	7.4
146	4300	7300	0	65	95	146	75	75	120	33	6	+ 1	11.5
175	7000	6400	0	80	112	175	85	90	140	46	8	+ 1	21
198	11600	5500	0	95	135	198	110	100	150	48	8	+ 1	30
230	19000	4700	0	110	160	230	135	110	160	50	8	+ 1	45
255	27000	4100	0	125	185	255	160	125	175	55	10	+ 1.5	63
290	39000	3700	70	145	210	290	180	140	200	58	10	+ 1.5	83
315	54000	3300	80	160	230	315	200	160	220	62	10	+ 1.5	110
342	69000	3000	90	180	255	340	225	180	240	70	12	+ 1.5	140
375	98000	2700	100	200	290	375	260	200	260	72	12	+ 1.5	195
415	130000	2500	120	220	320	415	285	220	300	76	12	+ 1.5	255
465	180000	2200	140	250	360	465	325	240	320	90	16	+ 2	350
505	250000	2000	160	275	400	505	365	260	340	92	16	+ 2	450
545	320000	1800	180	300	440	545	405	280	360	96	16	+ 2	570
585	400000	1700	210	330	480	585	445	310	390	102	20	+ 2	710

Table 1.3: Torques T_N, speeds $n_{max.}$, dimensions and weights

1) The specified torques relate to the teeth and **not** the shaft-hub connection. This must be checked separately.

2) Max. bore with keyway to DIN 6885/1.

3) Space required for alignment of the coupling parts and replacement of the sealing rings.

4) Weights apply to mean bores.

The rated torques T_N apply to:

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- up to 25 starts per hour where double the torque is permissible during the start.

For sustained faultfree operation the coupling must be designed with an application factor appropriate to the application. In the event of a change in operating conditions (output, speed, changes to the prime mover and driven machine) the design must always be checked.

2. General notes

2.1 Introduction

These instructions are an integral part of the delivery of the coupling and must be kept in its vicinity for reference at all times.

All persons involved in the installation, operation, maintenance and repair of the coupling must have read and understood these operating instructions and must comply with them at all times. Flender accepts no responsibility for damage or disruption caused by disregard of these instructions.

The **"FLENDER coupling"** described in these instructions has been developed for stationary use in general engineering applications.

The coupling is designed only for the application described in section 1, "Technical data". Other operating conditions must be contractually agreed.

The coupling must be used and operated strictly in accordance with the conditions laid down in the contract governing performance and supply agreed by Flender and the customer.

The coupling described in these instructions reflects the state of technical development at the time these instructions went to print.

In the interest of technical progress we reserve the right to make changes to the individual assemblies and accessories which we regard as necessary to preserve their essential characteristics and improve their efficiency and safety.

2.2 Copyright

Technical enquiries should be addressed to the following works or to one of our customer services:

Flender GmbH
Schlavenhorst 100
46395 Bocholt

Tel.: +49 (0)2871 / 92-0
Fax: +49 (0)2871 / 92-2596

3. Safety instructions

Any changes on the part of the user are not permitted. This applies equally to safety features designed to prevent accidental contact.

3.1 Obligations of the user

- The operator must ensure that all persons involved in installation, operation, maintenance and repair have read and understood these operating instructions (BA) and comply with them at all times in order to:
  - avoid injury or damage,
  - ensure the safety and reliability of the coupling,
  - avoid disruptions and environmental damage through incorrect use.
- During transport, assembly, installation, dismantling, operation and maintenance of the unit, the relevant safety and environmental regulations must be complied with at all times.
- The coupling may only be operated, maintained and/or repaired by persons qualified for the work concerned (see "Qualified personnel" on page 3 of this manual).
- All work must be carried out with great care and with due regard to safety.
- All work on the coupling must be carried out only when it is at a standstill.
  The drive unit must be secured against being switched on accidentally (e.g. by locking the key switch or removing the fuses from the power supply). A notice should be attached to the ON switch stating clearly that work is in progress.
- The coupling must be fitted with suitable safeguards to prevent accidental contact. The operation of the coupling must not be impaired by the safeguard.
- The drive unit must be shut down as soon as changes to the coupling are detected during operation.
- If the coupling is intended for installation in plant or equipment, the manufacturer of such plant or equipment must ensure that the contents of the present operating instructions are incorporated in his own instructions.
- All spare parts must be obtained from Flender.

4. Transport and storage

Observe the instructions in section 3, "Safety instructions"!

4.1 Scope of supply

The products supplied are listed in the dispatch papers. Check on receipt to ensure that all the products listed have actually been delivered. Parts damaged during transport or missing parts must be reported in writing immediately.

The ZAPEX coupling is delivered in separate parts and/or subassemblies (for transport) ready for installation, but **without** oil or grease charge.

4.2 Transport

During transport, use only lifting and handling equipment of sufficient load-bearing capacity!

The coupling must be transported using suitable transport equipment only.

Different forms of packaging may be used depending on the size of the coupling and method of transport. Unless otherwise agreed, the packaging complies with the **HPE Packaging Guidelines.**

The symbols marked on the packing must be observed at all times. These have the following meanings:

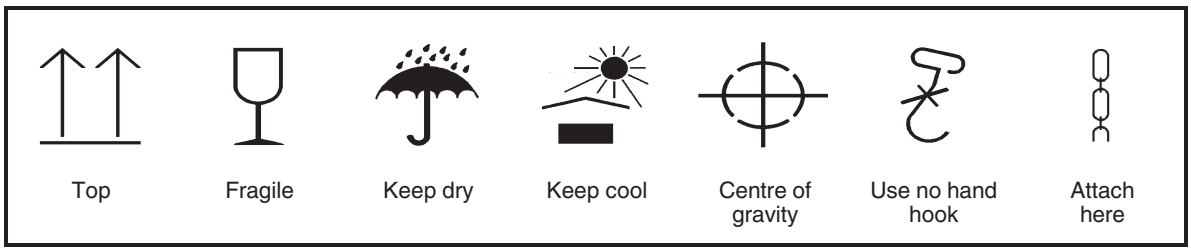


Fig. 1: Transport symbols

4.3 Storage of the coupling

4.3.1 Storage of the coupling parts

The coupling is delivered in a preserved condition and can be stored in a covered, dry place for up to 6 months. If the unit is to be stored for a longer period, it should be treated with a long-term preservative agent (Flender must be consulted).

4.3.2 Storage of the DUO sealing rings

4.3.2.1 General

Correct storage will preserve the service life of the DUO sealing rings (12). Unfavourable storage conditions and improper treatment will negatively affect the physical properties of the DUO sealing rings (12). Such negative effects may be caused by e.g. the action of ozone, extreme temperatures, light, moisture, or solvents.

STOP **The DUO sealing rings (12) must not be stored while still fastened on the coupling part (1, 2).**

4.3.2.2 Storage area

The storage area must be dry and free from dust. The DUO sealing rings (12) must not be stored with chemicals, solvents, motor fuels, acids, etc. Furthermore, they should be protected against light, in particular direct sunlight and bright artificial light with a high ultraviolet content.

STOP **The storage areas must not contain any ozone-generating equipment, e.g. fluorescent light sources, mercury vapour lamps, high-voltage electrical equipment. Damp storage areas are unsuitable. Ensure that no condensation occurs. The most favourable atmospheric humidity is below 65 %.**

5. Technical description

Observe the instructions in section 3, "Safety instructions"!

If a dimensioned drawing has been made out for the coupling, the data in this drawing must be given priority.

5.1 General description

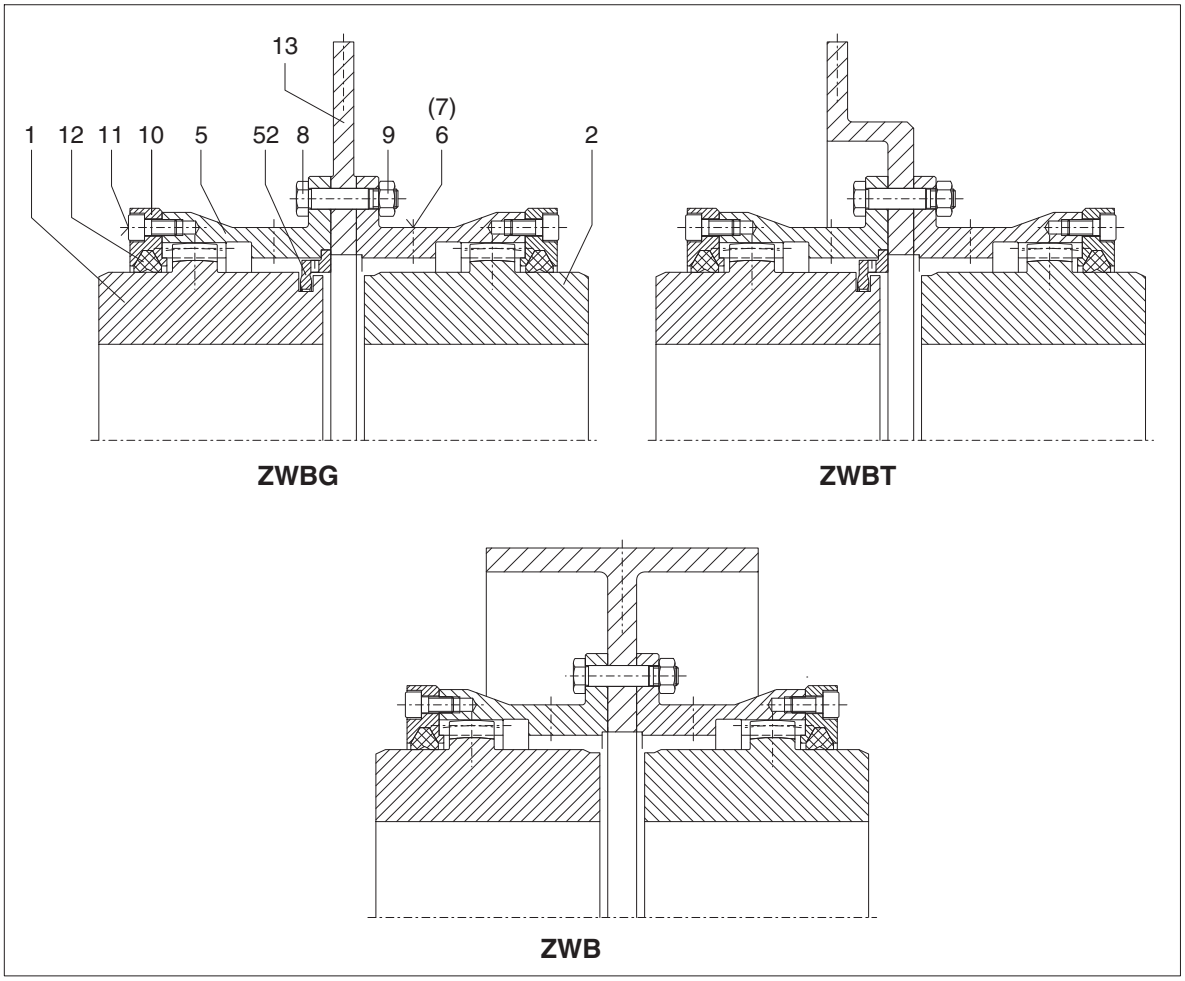
ZAPEX type ZWBT, ZWBG, ZWB, ZWH and ZWHD couplings are provided for connecting two shafts. The shaft ends to be connected must be supported immediately upstream of and downstream of the coupling.

ZAPEX couplings are suitable for clockwise and anticlockwise rotation and reversing operation.

The coupling parts (1, 2) with external teeth engage with the internal teeth of the flanged sleeves (5) and/or coupling sleeve (5).

For the types ZWBT, ZWB, ZWBG and ZWH, DUO sealing rings (12) are used on the outside for sealing the oil chambers.

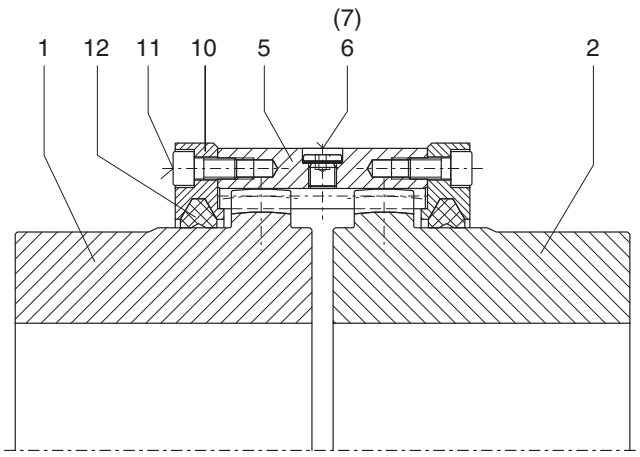
5.1.1 Types ZWBT, ZWBG, ZWB



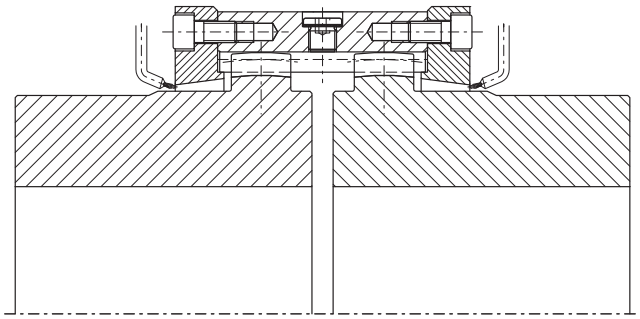
Torque transmission is effected from the shaft over parallel key, shrink fit or a comparable connection to the coupling part (1), then over the tooth system to the sleeve (5) and then via the fitting-screw connection (8, 9) to the second sleeve (5), over the tooth system to the coupling part (2) and then again via the parallel key, shrink fit or a comparable connection to the shaft. The brake disk (13) is located between the flanged sleeves (5).

In case of types ZWBT and ZWBG the axial backlash is restricted by the two-part retaining ring (52).

5.1.2 Types ZWH and ZWHD



ZWH



ZWHD

Torque is transmitted from the shaft over parallel key, shrink fit or a comparable connection to the coupling part (1), then over the tooth system to the coupling sleeve (5) and from here over the tooth system to the coupling part (2) and then again via the parallel key, shrink fit or a comparable connection to the shaft.

Type ZWHD is designed for flow-through lubrication and is thus not equipped with DUO sealing rings (12).

6. Fitting

Observe the instructions in section 3, "Safety instructions"!

If a dimensioned drawing has been made out for the coupling, the data in this drawing must be given priority.

6.1 Instructions for applying the finished bore and fitting the axial retaining means, set screws and balancing

According to the order placed, the coupling parts (1/2) for removal by oil-hydraulic shrinking off are delivered with finished bores.

6.1.1 Finished bore for parallel-key connection

- Depreserve coupling parts (1/2).

Note manufacturer's instructions for handling solvent.

For making the finished bore, the coupling parts must be clamped as shown in the following figure.

The clamping chuck must always be opposite the sealing surface.

The coupling part must be aligned carefully. For the permissible radial eccentricity see DIN ISO 286 degree of fundamental tolerance IT 6 (see table 6.1).

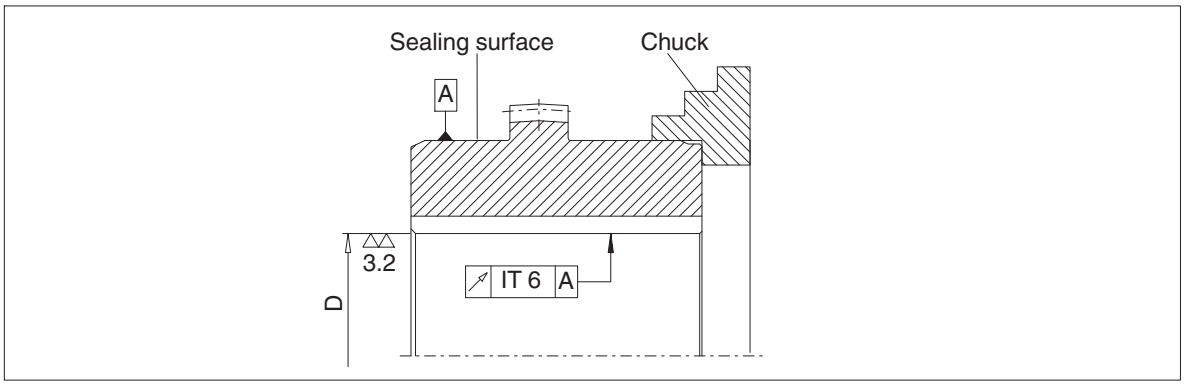
The maximum permissible bore diameters (see section 1) are designed for parallel-key connections without taper action to DIN 6885/1 and must not under any circumstances be exceeded.
When the keyway is to be designed deviating from DIN 6885/1 for a parallel-key connection, Flender should be consulted.

If other shaft-hub connections (e.g. spline bore hub profile, tapered or stepped bores, parallel-key connections with tightening) are to be used instead of the provided parallel-key connection, Flender should be consulted.

Failure to observe these instructions may result in breakage of the coupling.
Danger from flying fragments!

Diameter or nominal dimension range	> 18 up to 30	> 30 up to 50	> 50 up to 80	> 80 up to 120	> 120 up to 180	> 180 up to 250	> 250 up to 315	> 315 up to 330
Perm. deviation according to DIN ISO 286/1, IT6	0.013	0.016	0.019	0.022	0.025	0.029	0.032	0.036

Table 6.1: Permissible radial run-out



In case of a parallel-key connection the following is recommended for bore and shaft:

Shaft end tolerances	h6	k6	m6	n6	p6	s6
Bore tolerances	P7	M7	K7	J7	H7	F7

Table 6.2: Fit pairs

The tolerance field must be observed in order to restrict the hub tension resulting from the oversize to the permissible load. Failure to adhere to the assigned tolerance zones may impair the shaft-hub connection.

Failure to observe these instructions may result in breakage of the coupling. Danger from flying fragments!

6.1.1.1 Parallel keyway

With the parallel key connection to DIN 6885/1 and **a single keyway** the tolerance zone of the hub keyway width **ISO P9** is recommended.

With the parallel key connection to DIN 6885/1 and **two keyways** the tolerance zone of the hub keyway width **ISO JS9** is recommended.

6.1.2 Axial securing in case of parallel-key connection

A set screw or end plate must be provided to secure the coupling parts axially. If end plates are used, Flender must be consulted with regard to machining the recesses in the coupling parts.

6.1.3 Set screws in case of parallel-key connection

Hexagon socket set screws with cup points to DIN 916 must be used for set screws.

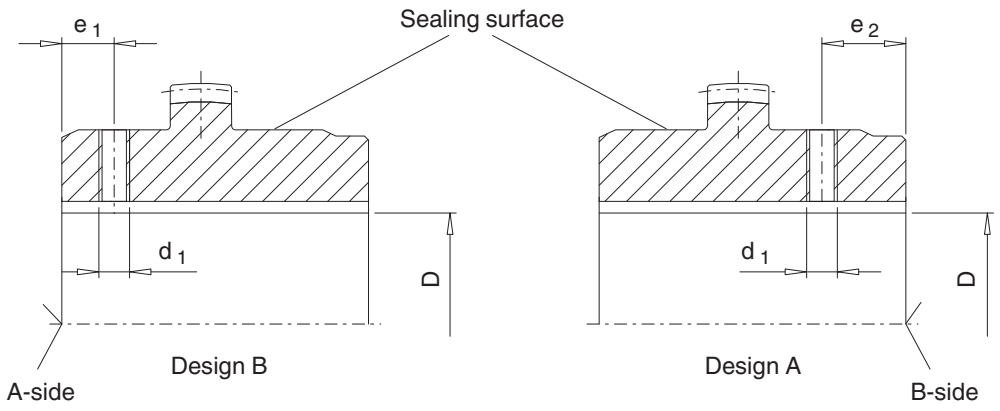
The following guidelines must be observed!

The length of the set screw must be selected so that it fills the threaded hole, but does not project from the hub ($L_{min.} = d_1$).

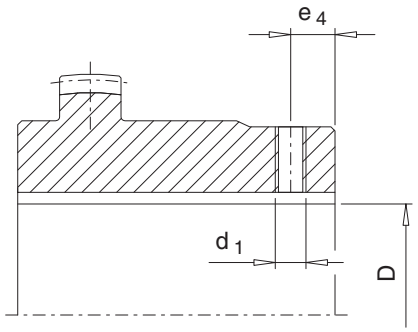
The set screws should generally be arranged on the parallel key. Check the length of the parallel key.

The threaded holes are to be arranged in accordance with the drawing considering the used version A or B for the coupling parts (1/2).
In case of size 112, the set screws must generally be arranged in the hub side which has not been ground.

Part 1/2



Part 1/2 for ZWH only



Size	Bore D_1 / D_2	Bore D_1 for ZWBT, ZWBG only	d_1	e_1	e_2	e_4
112	10 ... 17 17 ... 45	10 ... 17 17 ... 45	M 5 M 6	15	-	7
128	10 ... 17 17 ... 30 > 30 ... 55	10 ... 17 17 ... 30 > 30 ... 55	M 5 M 6 M 8	14	20	10
146	10 ... 17 17 ... 30 > 30 ... 38 > 38 ... 65	10 ... 17 17 ... 30 > 30 ... 38 > 38 ... 60	M 5 M 6 M 8 M10	16	26	16
175	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 80	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 70	M 5 M 6 M 8 M10	20	26	20
198	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 44 > 44 ... 95	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 44 > 44 ... 85	M 5 M 6 M 8 M10 M12	22	36	22
230	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 38 > 38 ... 58 > 58 ... 110	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 38 > 38 ... 58 > 58 ... 100	M 5 M 6 M 8 M10 M12 M16	25	38	25
255	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 38 > 38 ... 50 > 50 ... 110 > 110 ... 125	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 38 > 38 ... 50 > 50 ... 110 > 110 ... 115	M 5 M 6 M 8 M10 M12 M16 M20	30	45	30
290	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 38 > 38 ... 50 > 50 ... 75 > 75 ... 145	10 ... 17 > 17 ... 22 > 22 ... 30 > 30 ... 38 > 38 ... 50 > 50 ... 75 > 75 ... 130	M 5 M 6 M 8 M10 M12 M16 M20	30	48	30
315	80 ... 160	80 ... 145	M20	40	55	40
342	90 ... 170 > 170 ... 180	90 ... 160	M20 M24	40	60	40
375	100 ... 110 > 110 ... 200	100 ... 110 > 110 ... 180	M20 M24	35	70	35
415	120 ... 220	120 ... 200	M24	40	90	40
465	140 ... 250	140 ... 225	M24	40	110	40
505	160 ... 275	160 ... 275	M24			45
545	180 ... 300	180 ... 300	M24			60
585	210 ... 330	210 ... 330	M24			70

Table 6.3: Set-screw assignment

6.1.4 Balancing

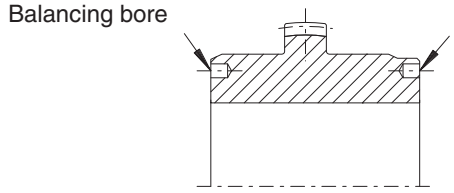
Prebored couplings and/or prebored coupling parts are delivered unbalanced. It is recommended that these parts are balanced to suit the application after finish-boring (see DIN ISO 1940 part 1).

Flender recommendation:
Balancing on two levels Q6.3 for velocities v = 36 m/s or higher, measured at d_4 according to section 1, "Technical Data".

Balancing is normally done by drilling material away. To keep the amount of material to be removed to a minimum, a largest possible balance radius must be selected. Material must be removed only at the points indicated (see illustration).

Under no circumstances may the tooth system be damaged.

If balancing is to be done after cutting the keyways, Flender must be consulted.



Part 1/2

Arrangement of the balancing bore with two-level balancing

Finish-bored couplings are only balanced if requested by the customer.

6.2 General information on fitting

During fitting, the "Safety Instructions" in section 3 must be observed.

Fitting work must be done with great care by trained and qualified personnel.

As early as during the planning phase it must be ensured that sufficient space is available for installation and subsequent care and maintenance work.

Adequate lifting equipment must be available before beginning the fitting work.

6.3 Fitting coupling parts (1/2) in case of shaft-hub connection with parallel key

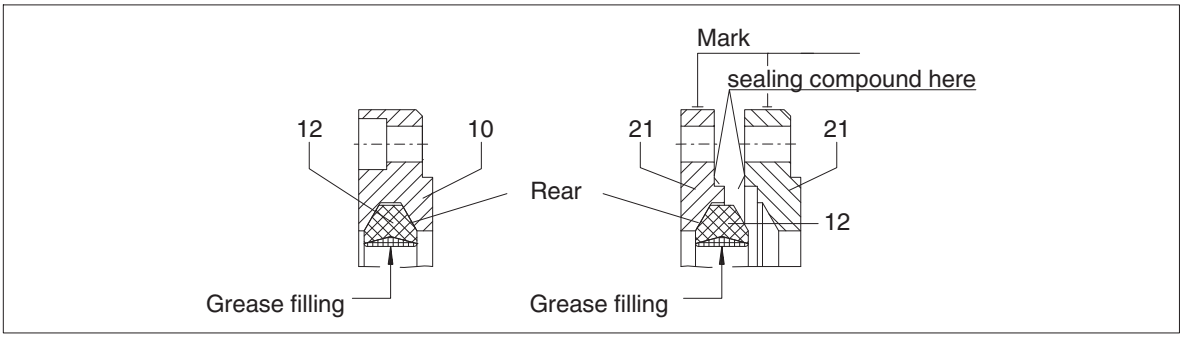
Before starting assembly all coupling parts and shaft ends must be carefully cleaned.

The DUO sealing rings (12) must not come into contact with solvents and cleansing agents.

Note manufacturer's instructions for handling the solvent.

Grease the back and/or the sides of the DUO sealing ring (12) and the groove in the cover (10) thoroughly and fit it in the cover (10 and/or 21) as shown in the figure. Insert a quantity of grease in the ring-shaped space between the seal lips. When using two-part covers (21) the connecting points must be sealed with sealing compound on one side.

Note marks.



Position the cover (10 and/or 21) with the fitted DUO sealing ring (12) on the shaft so that the DUO sealing ring (12) cannot be damaged by the coupling parts (1/2) to be fitted.

Check space requirement for inserting the cheese-head screws (11), and, if necessary, insert the screws (11) in the cover (10 and/or 21).

STOP **Unscrew set screws from the coupling parts (1/2).**
Protect DUO sealing ring (12) and seals for the input and output side against damage and heating to over + 80 °C.

STOP **Coupling parts (1/2) with tapered bore and parallel-key connection must be mounted in cold condition.**

Slightly heating (max. + 80 °C) the coupling parts (1/2) with cylindrical bore may facilitate the pulling-on process. Heating may be done inductively, in a stove or with a burner. If heating is done with a burner, it must be done along the length of the hub above the groove.

Take precautions to avoid burns from hot parts!

STOP **The coupling parts (1/2) should be fitted with the aid of suitable equipment to avoid possible damage to the shaft bearings through axial joining forces.**
Always use suitable lifting equipment.
Care must be taken that the hole and the sealing surface for the DUO sealing ring are not damaged by lifting gear, etc.

The coupling parts (1/2) with a tapered bore must be secured with suitable end plates. For this, smear the hub end face on the shaft end face with sealing compound and screw on the end plate.

On coupling parts (1/2) with keyway and set screw the threaded hole for the set screw 2/3 must be filled with sealing compound after cooling down to room temperature to prevent lubricant from escaping through the parallel keyway. Screw in the set screw (set screw must be above the parallel key).

STOP **The set screws should be tightened only with a hexagon socket spanner to DIN 911, without extension tube.**

6.4 Fitting coupling parts (1/2) in case of a cylindrical and tapered interference fit set up for removal by oil-hydraulic shrinking off

The information specified on the dimensioned drawing must be observed.

Before fitting, the screw plugs (22) must be unscrewed from the coupling parts (1/2) and all parts and the shaft ends carefully cleaned and dried. The oil channels and oil circulation grooves must also be free from dirt.

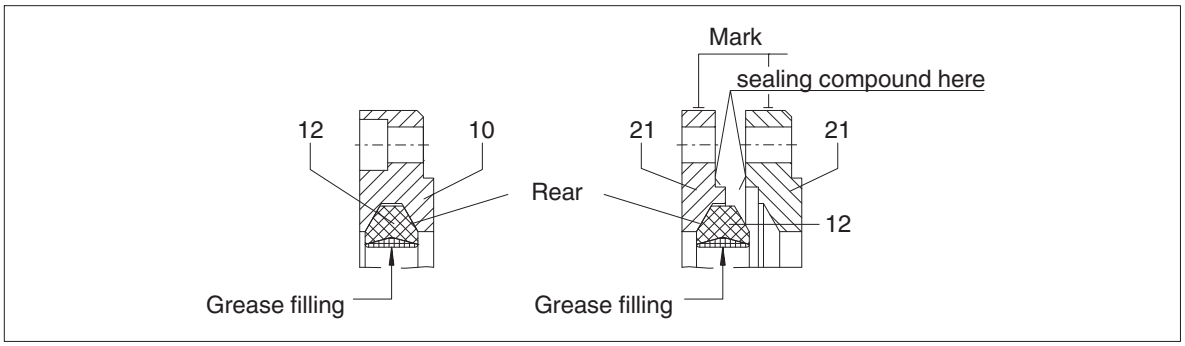
The DUO sealing rings (12) must not come into contact with solvents and cleansing agents.

Observe manufacturer's instructions for handling solvents.

Under no circumstances must the fitting surfaces be lubricated with grease containing molybdenum sulphite (Molykote, etc.).

Grease the back and/or the sides of the DUO sealing ring (12) and the groove in the cover (10) thoroughly and fit it in the cover (10 and/or 21) as shown in the figure. Insert a quantity of grease in the ring-shaped space between the seal lips. When using two-part covers (21) the connecting points must be sealed with sealing compound on one side.

Note marks.



Position the cover (10 and/or 21) with the fitted DUO sealing ring (12) on the shaft so that the DUO sealing ring (12) cannot be damaged by the coupling parts (1/2) to be fitted.

Check space requirement for inserting the cheese head screws (11), and, if necessary, insert the screws (11) in the cover (10 and/or 21).

Protect DUO sealing ring (12) and seals for the input and output side against damage and heating to over + 80 °C.
(Use heat shields to protect against radiant heat.)

The coupling parts (1/2) must be mounted in hot condition and, depending on the shrink dimension, heated to the temperature indicated on the dimensioned drawing.

Heating may be done inductively, with a burner or in a stove.

Take precautions to avoid burns from hot parts!

Before mounting, the bore size of the heated coupling parts (1/2) must be checked, e.g. with a bore hole gauge.

The heated coupling parts (1/2) should be fitted with the aid of suitable equipment to avoid possible damage to the shaft bearings through axial joining forces.
Always use suitable lifting equipment.
Care must be taken that the hole and the sealing surface for the DUO sealing ring are not damaged by lifting gear, etc.

The coupling parts (1/2) should be pushed smartly onto the shaft up to the position specified in the order-specific dimensioned drawing.

The coupling parts (1/2) must be held in position on the shaft with the aid of a suitable retaining device, until they cool down and seat firmly.

After the coupling parts (1/2) have cooled down to ambient temperature the oil channels must be filled with clean forcing oil, e.g. ISO VG 150, and re-sealed with the screw plugs (22) (rust protection).

6.5 Fitting the coupling

Oil the teeth of the coupling parts (1/2) and of the flanged sleeves (5) and/or the coupling sleeve (5) and the hub circumferences of the parts (1/2) (sealing surfaces).

Push the flanged sleeves (5) onto the teeth of the coupling parts (1/2) and hold and/or brace them in position. In case of types ZWH and ZWHD, push the coupling sleeve (5) onto the teeth of a coupling part (1/2) and hold and/or brace them in position. In case of types ZWBT and ZWBG place the axial-backlash limiting device (52) into the recess of part 1 and pull the flanged sleeve (5) over the in die axial-backlash limiting device (52). In case of types ZWBT, ZWBG and ZWB place the brake disk (13) between the two flanged sleeves (5) hold in position.

Move together the machines to be coupled. The dimensions S_1 to S_{15} (see section 1, "Technical data") are to be observed. Align the coupling as described in items 6.6 to 6.8.

In case of types ZWH and ZWHD, push the coupling sleeve (5) onto the teeth of both coupling parts (1/2).

Using suitable tools, pull the covers (10 and/or 21) onto the hub.

Smear the sealing surfaces of the cover(s) (10 and/or 21) with sealing compound (always apply sealing compound to one side only) and screw together with the flanged sleeves (5) and/or coupling sleeve (5) (for tightening torques, see item 6.9).

In case of types ZWBT, ZWBG and ZWB smear the sealing surfaces of the flanged sleeves (5) and/or the brake disk (13) with sealing compound. Align the fitting holes of the flanges, noting any marks. Insert close-fitting bolts (8) and tighten the nuts (9) (for tightening torques, see item 6.9).

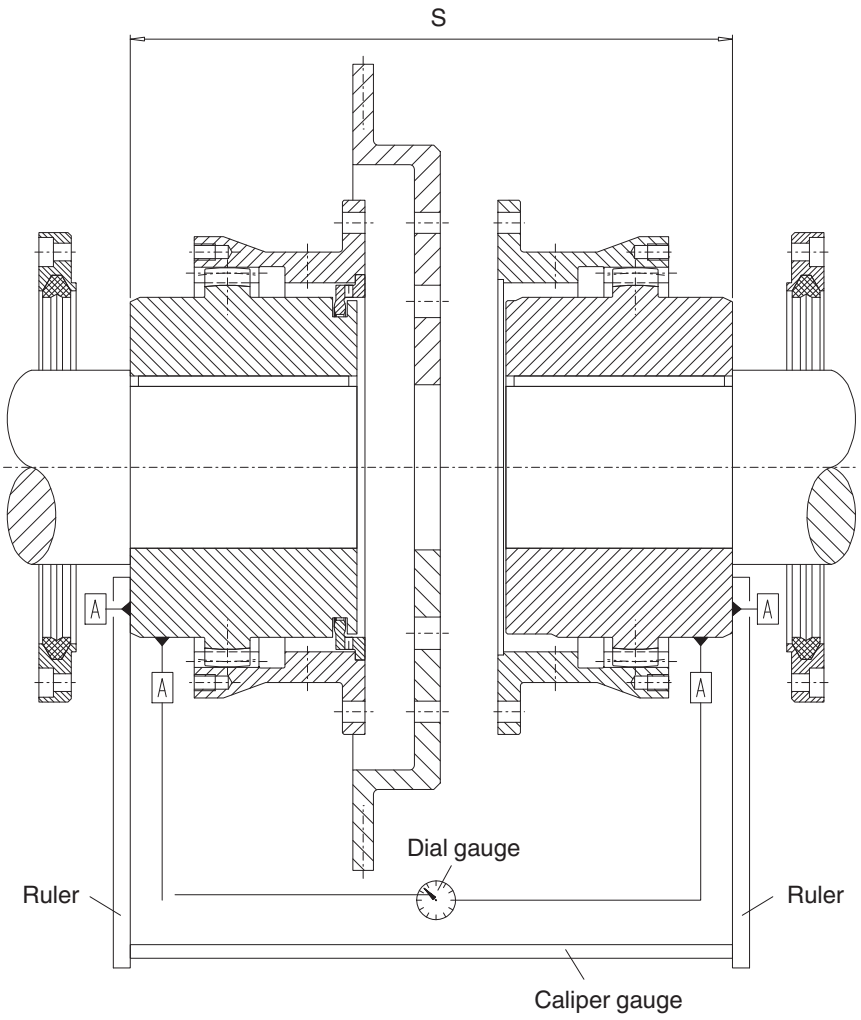
6.6 Alignment

The types ZWB, ZWH and ZWHD compensate for positional errors up to 1° of the shaft ends to be connected. Due to axial-backlash limitation types ZWBT and ZWBG compensate only for a positional error of up to 0.3°.

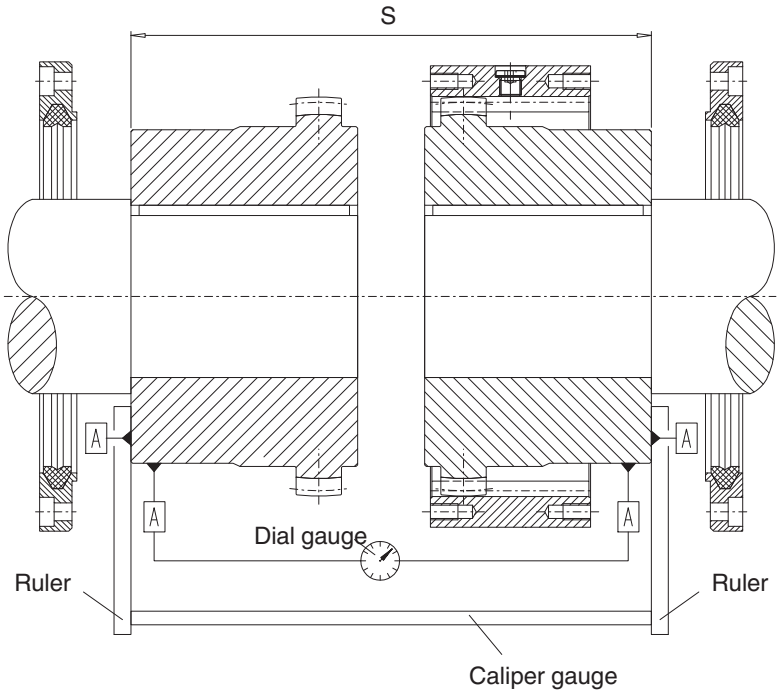
When aligning, the radial and angular misalignment of the shaft ends must be kept as small as possible, because, other conditions being equal, this increases the service life of the coupling. The angular misalignment must, however, be no less than 0.05°.

Alignment must be carried out using suitable measuring instruments. The following diagram shows alignment suggestions and points of alignment (A).

ZWBT, ZWBG, ZWB



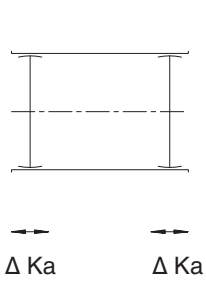
ZWH, ZWHD



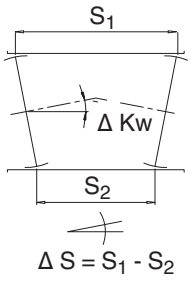
With small distances "S", a ruler and caliper gauge can be used instead of a micrometer and tape measure.

The max. permissible misalignments depend upon the duty factor, axial-backlash limitation and coupling speed. If the speed changes, a check must imperatively be carried out. Since misalignments (expansion due to heat, shaft deflection, settling of foundations, etc.) can occur during operation, a misalignment of 0.1° must be aimed for when aligning. Misalignments during alignment must, however, be no less than 0.05°. For alignment values, see item 6.8.

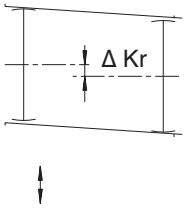
6.7 Possible misalignments



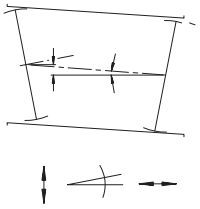
Axial misalignment Fig. 6.4



Angular misalignment Fig. 6.5



Radial misalignment Fig. 6.6



Axial, radial and angular misalignment Fig. 6.7

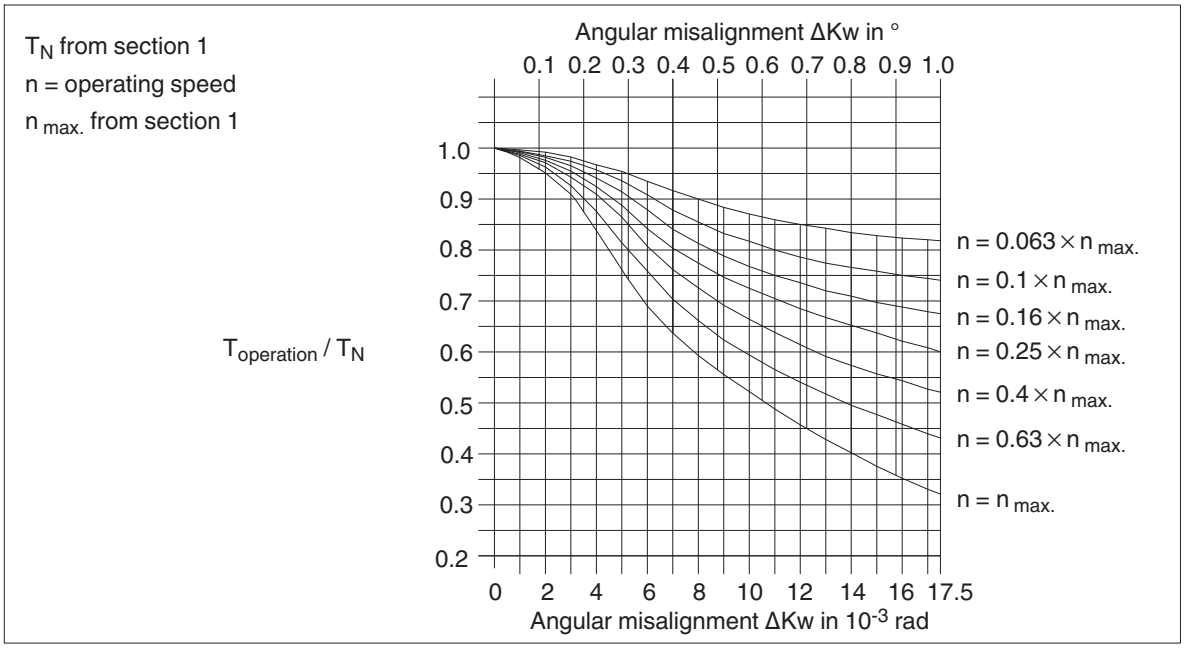
Misalignments of the coupling parts in relation to one another can be caused by inaccurate alignment during assembly, but also by actual operation of the equipment (expansion due to heat, shaft deflection, insufficiently rigid machine frames, etc.).

The following maximum permissible misalignments must by no means be exceeded during operation.

6.7.1 Axial misalignment

Axial misalignment ΔKa (figure 6.4) of the coupling parts relative to one another is possible within the "permissible error" for dimension "S" (see section 1).

6.7.2 Angular misalignment as a function of operating torque and operating speed



To simplify matters, the angular misalignment ΔKw (figure 6.5) is calculated as the difference (ΔS) of dimension "S" (for point of alignment A , see item 6.6). The measurement must be taken at several points on the circumference.

For permissible alignment values, see item 6.8.

6.7.3 Radial misalignment

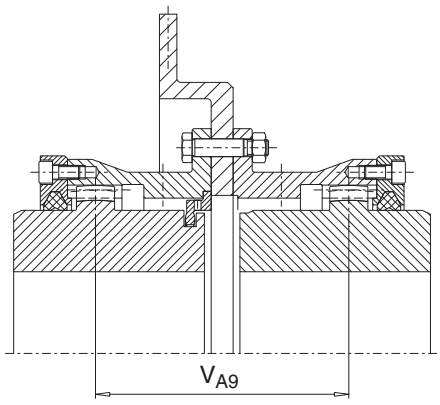
On types ZWB, ZWH and ZWHD the maximum possible radial misalignment $\Delta Kr_{max.}$ (figure 6.6) corresponds to a possible angular error per coupling half of $\Delta Kw_{max.} = 0.0175$ rad = 1°.

On types ZWBT and ZWBG the maximum possible radial misalignment $\Delta Kr_{max.}$ (figure 6.6) corresponds to a possible angular error per coupling half of $\Delta Kw_{max.} = 0.00525$ rad = 0.3°.

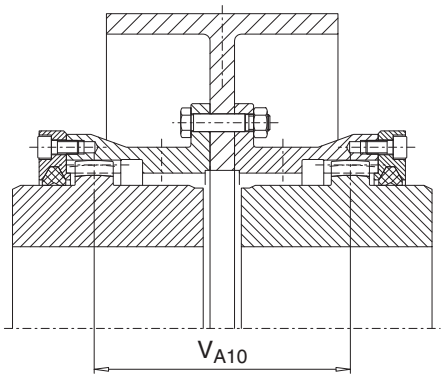
For permissible alignment value, see item 6.8.

STOP **Angular and radial misalignments (Fig. 6.7) may occur at the same time. The sum of the two misalignments must not exceed ΔKw or ΔKr.**

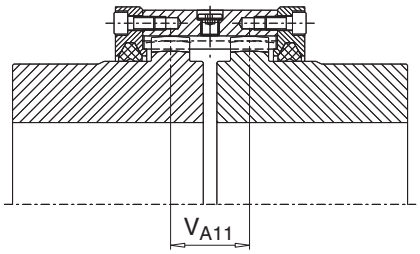
6.8 Alignment values



ZWBT, ZWBG



ZWB



ZWH, ZWHD

Angular misalignment ΔKw :

$\Delta S = S_1 - S_2 = d_3 \times \tan 0.1°$

For the hub diameter d_3, refer to section 1, "Technical Data".

Aadial misalignment ΔKr :

ZWBT, ZWBG: $\Delta Kr = V_{A\,9} \times \tan 0.1°$
ZWB: $\Delta Kr = V_{A10} \times \tan 0.1°$
ZWH, ZWHD: $\Delta Kr = V_{A11} \times \tan 0.1°$

For the teeth distances V_{A9}, V_{A10} and V_{A11} refer to section 1, "Technical data".

STOP **Angular and radial misalignments may occur at the same time. The sum of the two misalignments must not exceed ΔKw or ΔKr.**

STOP **On types ZWB, ZWH and ZWHD, up to 10 times the values are permitted during operation, taking into account the table in item 6.7.2.**
On types ZWBT and ZWBG, due to the axial-backlash limitation, only 3 times the values are permitted during operation, taking into account the table in item 6.7.2.

6.9 Correspondence of the tightening torques and wrench widths

Size	Tightening torques T_A (with μ = 0.14)		Wrench width SW		
	Part no. 9	Part no. 11	Part no. 6	Part no. 9	Part no. 11
			Hexagon socket	Hexagon head	Hexagon socket
	Nm	Nm	mm	mm	mm
112	25	10	3	13	5
128	25	10	3	13	5
146	25	10	5	13	5
175	49	25	5	17	6
198	49	25	6	17	6
230	49	25	6	17	6
255	86	25	8	19	6
290	86	49	8	19	8
315	210	49	8	24	8
342	210	49	8	24	8
375	210	49	10	24	8
415	410	86	10	30	10
465	410	86	10	30	10
505	410	86	10	30	10
545	710	86	10	36	10
585	710	86	10	36	10

Table 6.6: Tightening torques and wrench widths

Tightening torques apply to bolts with untreated surfaces which are not or only lightly oiled (coefficient of friction μ = 0.14). The use of lubricant paint or the like, which affects the coefficient of friction "μ", is not permitted.

7. Start-up

Observe the instructions in section 3, "Safety instructions"!

If a dimensioned drawing has been made out for the coupling, the data in this drawing must be given priority.

7.1 Recommended lubricants

The following recommended lubricants apply to the ZAPEX couplings described in these operating instructions.

Company	ARAL	BP	Castrol	DEA	ESSO	FLENDER
Oils	Degol BG 460/680	Energol GR-XP 460/680	Alpha SP / MW 460/680	Falcon CLP 460/680	Spartan EP 460/680	-
Liquefied greases	Aralub Fließfett ANO	Energrease LS-EP 00	CLS Grease	Orona FG EP 0	Fibrax EP 370	FLENDER Hoch-leistungsfett
NLGI class	0	00	00	0-00	0-1	0-00

Company	KLÜBER LUBRICATION	Mobil	Optimol	Shell	Tribol A BURMAH CASTROL COMPANY	FUCHS
Oils	Structovis BHD-MF	Mobilgear 634/636	Optigear BM 460/680	Omala 460/680	Tribol 1100 460/680	Renolin CLP 460/680 Plus
Liquefied greases	Grafloscon C-SG 500	Mobilux EP 004	Longtime PD 00	Alvania GL 00	Tribol 3020/1000-00	Renolit SO-D 6024
NLGI class	0-00	00	00	00	00	00

Table 7.1: Recommended lubricants

For normal operating conditions we recommend oil. This has the advantage of easy oil changing and good surface wetting.

The lubricants are suitable for operating temperatures of between - 10 °C and + 80 °C. If temperatures deviate from these, consult Flender.

Observe manufacturer's instructions for handling oils and greases!

7.2 Oil quantity, grease quantity

Size	Oil-filling quantity 1)			Size	Oil-filling quantity 1)		
	ZWBT, ZWBG	ZWB	ZWH		ZWBT, ZWBG	ZWB	ZWH
	dm^3	dm^3	dm^3		dm^3	dm^3	dm^3
112	0.02	-	0.02	**315**	0.4	-	0.25
128	0.03	0.05	0.02	**342**	0.5	-	0.3
146	0.05	0.1	0.03	**375**	0.6	-	0.35
175	0.1	0.2	0.07	**415**	0.9	-	0.35
198	0.1	0.2	0.07	**465**	1.4	-	0.6
230	0.15	0.3	0.1	**505**	-	-	0.75
255	0.15	0.35	0.1	**545**	-	-	0.7
290	0.3	0.6	0.2	**585**	-	-	0.9

Table 7.2: Oil quantities

1) In case of types ZWBT and ZWBG the oil-filling quantities apply to one coupling side.

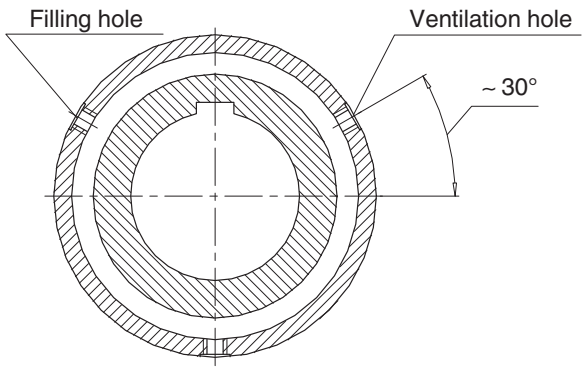
If liquefied grease is used, 1.3 times the quantity of the specified oil-filling quantity must be specified.

STOP **For the oil-flow quantities with type ZWHD, refer to the dimensioned drawing.**

For easier filling, proceed as follows:

Rotate coupling until the screw plugs (6) are in the position shown in the diagram opposite.

Remove the two top screw plugs (6) and put in oil/grease. Measure the correct oil/grease quantity with the measuring beaker.



Screw in again the screw plugs (6) with fitted/vulcanised sealing rings.

STOP **Any oil and grease spillage must be completely collected and disposed of in accordance with the regulations applying.**

7.3 Procedure before start-up

Before starting up, the unit must be checked for correct assembly, alignment and oil and/or grease filling, any errors remedied and all screw connections checked for correct tightening torques.

STOP **Then fit the coupling guard to prevent unintentional contact.**

8. Operation

Observe the instructions in section 3, "Safety instructions"!

If a dimensioned drawing has been made out for the coupling, the data in this drawing must be given priority.

8.1 General operating data

During operation of the coupling watch for:

– changes in running noise

– leaks (escaping oil/grease)

If any irregularities are noticed during operation, switch the drive assembly off at once. Determine the cause of the fault, using the table in section 9.

The trouble-shooting table contains a list of possible faults, their causes and suggested remedies.

If the cause cannot be identified and/or the unit cannot be repaired with the facilities available, you are advised to contact one of the Flender customer-service offices for specialist assistance (see section 2).

9. Faults, causes and remedy

Observe the instructions in section 3, "Safety instructions"!

If a dimensioned drawing has been made out for the coupling, the data in this drawing must be given priority.

9.1 General information on faults and malfunctions

The following irregularities can serve as a guide for fault tracing.

Where the system is a complex one, all the other component units must be included when tracing faults.

The coupling must run with little noise and without vibration in all operating phases. Irregular behaviour must be treated as a fault requiring immediate remedy.

Faults and malfunctions occurring during the guarantee period and requiring repair work on the coupling must be carried out only by the Flender Customer Service.
In case of faults and malfunctions occurring after the guarantee period and whose cause cannot be precisely identified we advise our customers to contact our customer service.

Flender will not be bound by the terms of the guarantee or otherwise be responsible in cases of improper use of the coupling, modifications carried out without the agreement of Flender, or use of spare parts not supplied by Flender.

When remedying faults and malfunctions, the coupling must always be taken out of service.
Secure the drive unit to prevent it from being started up unintentionally.
Attach a warning notice to the start switch!

9.2 Possible faults

Faults	Causes	Remedy
Sudden changes in the noise level and/or sudden vibrations.	Exceeding the permissible misalignment values.	Stop the installation. If necessary, re-align as described in section 6.
	Insufficient lubricant.	Stop the installation. Change the lubricant as described in section 7, making sure to check the teeth and the seals at the same time. If necessary, replace the seals as described in section 10.

Table 9.1: Faults, causes and remedy

10. Maintenance and repair

Observe the instructions in section 3, "Safety instructions"!

If a dimensioned drawing has been made out for the coupling, the data in this drawing must be given priority.

10.1 General

The coupling must be checked for leaks and heating, and any change in the noise level, at general maintenance intervals or at least every three months.

The coupling must run with little noise and without vibration in all operating phases. Irregular behaviour must be treated as a fault requiring immediate remedy.

The space required for changing the DUO sealing rings (12) in the cover (10) is given in the dimension tables in section 1, "Technical data", with letter ”P” and d_6.

10.2 Oil change and/or grease change

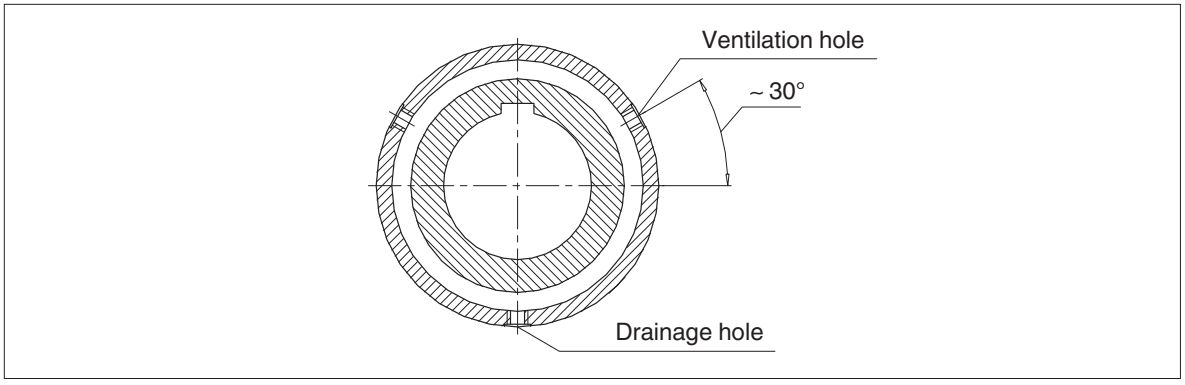
During regular inspections the coupling must be checked for leaks, and the lubricant level checked and, if necessary, topped up.

Lubricant change approx. every 8000 operating hours or at latest every 2 years in case of operation at up to 70 °C; in case of operation at over 70 °C approx. every 3000 operating hours or at the latest at yearly intervals.

10.3 Replacement of wearing parts

Unscrew screw plugs (6) and drain off the oil/grease into a suitable vessel, as shown in the diagram (to simplify matters, in the case of grease, add light-bodied oil to the used grease and mix).

All the oil and grease must be completely collected and disposed of in accordance with the regulations applying.



The DUO sealing rings (12) can, if the dimensions d_6 and ”P” are adhered to (see section 1, "Technical data") without having to detach the coupling, be replaced with open-ended (cut) DUO sealing rings (12).

For this, undo the cover screw connection (11) and push the cover (10 and/or 21) away from the hub until the DUO sealing ring (12) can be removed.

Cut the new DUO sealing ring (12) radially at one point. Before fitting the DUO sealing rings (12), grease the groove.

DUO sealing rings (12) with trapezium-shaped back section can be fitted without adhesive. For this, place the cut ends together in the V-shaped groove and then, working outwards from the cut ends, insert the DUO sealing ring (12) on both sides.

Re-fit the cover (10 and/or 21) as instructed in section 6, "Assembly". Fill with oil or grease as described in section 7. "Start-up".

10.4 Demounting the coupling parts (1/2) in case of shaft-hub connection with parallel key

Unscrew the screw plugs (6) and drain off the oil or grease into a suitable vessel, as shown in the diagram above (to simplify matters, in case of grease, add light-bodied oil to the used grease and mix).

All the oil or grease must be completely collected and disposed of in accordance with the regulations applying.

Undo the close-fitting bolt connection (8; 9) and the screw connection of the cover (11). Pull off the cover(s) (10 and/or 21) and support them over the shafts. Move the coupled machines apart. Remove the flanged sleeves (5) / coupling sleeve (5), the axial-backlash limiting device (52) and the brake disk (13).

Always use suitable lifting equipment!

Check the teeth, the seals (12) and the sealing surfaces for damage. Damaged parts must be replaced.

Remove set screw and/or axial retaining means. Mount suitable detaching device. Using a burner, heat coupling part (to max. + 80 °C) along its length and above the parallel keyway.

Protect DUO sealing rings (12) and seals for the input and output side against damage and heating to over + 80 °C.

Take precautions to avoid burns from hot parts!

Pull off coupling parts (1/2) smartly.
Always use suitable lifting equipment and detaching devices. The shaft bearings must not be overloaded.
Care must be taken that the hole and the sealing surface for the DUO sealing ring are not damaged by lifting gear, etc.

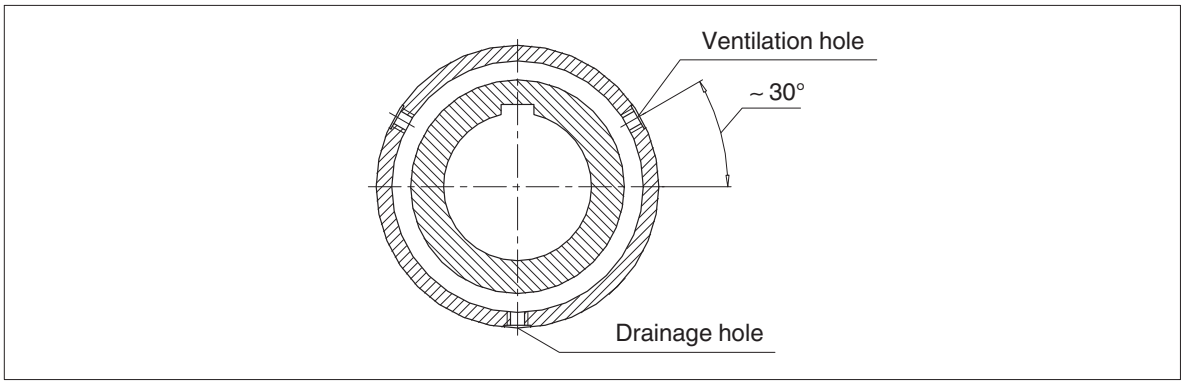
For re-fitting, the instructions in section 6, "Assembly", and section 7, "Start-up", must be carefully observed.

10.5 Demounting coupling parts (1/2) in case of cylindrical and tapered interference fit set up for hydraulic shrinking off

The disassembly of the coupling must be carried out considering all precautions.

Unscrew-the screw plugs (6) and drain off the oil or grease into a suitable vessel, as shown in the diagram (to simplify matters, in case of grease, add light-bodied oil to the used grease and mix).

All the oil or grease must be completely collected and disposed of in accordance with the regulations applying.



Undo the close-fitting bolt connection (8; 9) and the screw connection of the cover (11). Pull off the cover(s) (10 and/or 21) and support them over the shafts. Move the coupled machines apart. Remove the flanged sleeves (5) / coupling sleeves (5), the axial-backlash limiting device (52) and the brake disk (13).

Always use suitable lifting equipment!

Danger of squeezing!

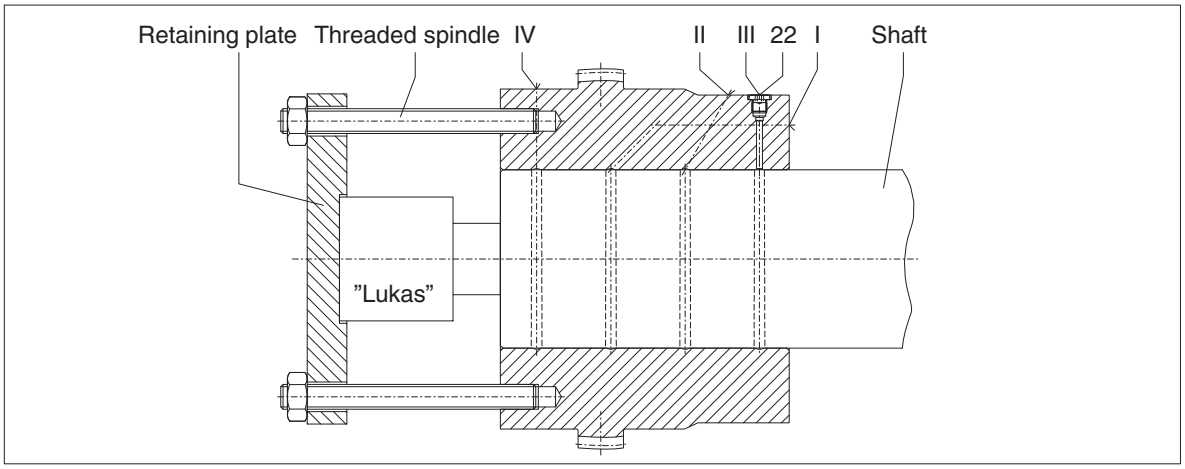
Check the teeth, the seals (12) and the sealing surfaces for damage. Damaged parts must be replaced.

For demounting, the following tools are needed:

- For each oil channel (for number, see the dimensioned drawing) an oil pump with pressure gauge (min. 2 500 bar) and/or motor pump with corresponding number of independently closable connections
- Suitable connections and pipes.
- 1 detaching device and/or retaining plate with retaining screws and/or threaded spindles with nuts (material of screws and spindles min. 10.9, material of nuts identical to that of the screws).
- 1 hydraulic cylinder ("Lukas") with oil pump. Note displacement and pressure of the hydraulic cylinder (”Lukas”) (for axial force, consult Flender and/or refer to dimensioned drawing).

Observe manufacturer's instructions for using forcing-off/detaching device and pumps.

Before detaching the coupling hub the detaching device must be fitted as shown in diagrams, illustrations, etc.



Using suitable tools, secure coupling parts (1/2) and retaining device!
In case of coupling parts with conical bore, an axial locking must be provided to prevent the coupling parts from suddenly coming off!

The screw plugs (22) must be removed from the oil channels. An oil pump must be bled and connected to the middle oil channel (here oil channel I).

Then the pump must be operated at the pressure specified on the dimensioned drawing until oil emerges from the adjacent connections (oil channels IV and II).

The max. pressure specified on the dimensioned drawing must not be exceeded.

Bleed the next oil pump, connect it to oil channel II and operate it at the pressure specified on the dimensioned drawing until the oil emerges at oil channel III.

Bleed the next oil pump, connect it to oil channel IV and operate it at the pressure specified on the dimensioned drawing until a ring of oil emerges at the end face.

Bleed the next oil pump, connect it to oil channel III and operate it at the pressure specified on the dimensioned drawing until a ring of oil emerges at the end face.

Carefully note the order!

During the entire operation the pressure must be maintained at a constant level on all the oil channels to which pressure is applied.

If, when pressure is applied, oil emerges to the extent that pressure cannot be maintained, a thicker oil must be specified.

Only when an unbroken ring of oil emerges from both end faces and after a subsequent waiting period of approx. 30 minutes can pressure be applied to the hydraulic cylinder (”Lukas”) to slide the coupling hub smartly off the shaft.

All the oil must be completely collected and disposed of in accordance with the regulations applying.

Note the stroke of hydraulic cylinder. If re-adjustment is necessary, the end face of the hydraulic cylinder (”Lukas”) must stop between two oil channels.

After detaching, the oil pumps and retaining device must be removed from the coupling hub.

The hub bore and the shaft should be examined for damage and protected against rust. Damaged parts must be replaced.

For re-fitting, the instructions in section 6, "Assembly", and section 7, "Start-up", must be carefully observed.

10.6 Demounting the coupling parts with stepped bore for removal by oil-hydraulic shrinking off

Demounting is done as described in item 10.5, except that a motor-driven pump is connected to the oil channel located at the point of transition from the smaller bore to the larger, as a large quantity of oil per unit of time is needed here.

For re-fitting, the instructions in section 6, "Assembly", and section 7, "Start-up", must be carefully observed.

11. Spare parts, customer service

By stocking the most important spare and wearing parts on site you can ensure that the coupling is ready for use at any time.

When ordering spare parts, always state the following:

– Original order number

– Part number (see section 5)

– Description, size

– Quantity

We guarantee only the original spare parts supplied by us.

Please note that spare parts and accessories not supplied by us have not been tested or approved by us. The installation and/or use of such products may therefore impair essential characteristics of the coupling under certain circumstances and so pose an active or passive hazard. Flender will assume no liability or guarantee for damage caused by non-genuine spare parts and accessories.

Please note that certain components often have special production and supply specifications and that we supply you with spare parts which comply fully with the current state of technical development as well as current legislation.

11.1 Spare parts and customer-service addresses

When ordering spare parts or requesting a service specialist, please contact Flender first (see section 2, "General notes").

FLENDER COUPLINGS

ZAPEX
Operating instructions 3502 en
Edition 10/2017

Flender GmbH
Alfred-Flender-Straße 77
46395 Bocholt
GERMANY

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A Siemens Company