

FLENDER ELPEX® couplings

Types ENG, ENGS and EFG, EFGS

Operating instructions
BA 3300 en 06/2012

FLENDER couplings

SIEMENS

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Translation of the original operating instructions

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Notes and symbols in these operating instructions

Note: The term "operating instructions" will in the following also be shortened to "instructions" or "manual".

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 94/9/EC), 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 or system to which these instructions relate may be handled only by persons qualified for the work concerned and in accordance with the instructions relating to the work concerned, particularly the safety and warning notes contained in those instructions. Qualified personnel must be specially trained and have the experience necessary to recognise risks associated with these products or systems and to avoid possible hazards.

Intended use of Siemens products

Observe also the following:



Siemens 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 Siemens. 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.

Trademarks

All designations indicated with the registered industrial property mark ® are registered trademarks of Siemens AG. Other designations used in these instructions 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 instructions 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 these instructions is regularly checked, and any necessary corrections are included in subsequent editions.

Note on the EC Machinery Directive 2006/42/EC

Siemens couplings in the "FLENDER couplings" product range must be treated as "components" in the sense of the EC Machinery Directive 2006/42/EC.

Therefore, Siemens needs not issue a declaration of incorporation.

Information on safe fitting, safe startup and safe operation can be found in this instructions manual; in addition the "warning-note concept" therein must be observed.

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1. Technical data

The instructions describe the coupling in horizontal mounting position with shaft-to-hub connection by cylindrical or conical bore with parallel key and/or a bolted flange. If other shaft-hub connections, such as shrink fit or splines to standard "DIN 5480", are to be used, or if the coupling must be used in a vertical or inclined position, Siemens must be consulted.

If a dimensioned drawing has been made out for the coupling, the data in this drawing must be given priority. The dimensioned drawing including any other documents should be made available to the user of the system.

Part numbers and part designations of the spare-parts drawing and spare-parts list can be found in section 7, "Spare-parts stockage" or on the dimensioned drawing.

1.1 Description of the fail-safe device in case of types ENGS and EFGS

Types ENGS and EFGS are fitted with a fail-safe device. The stop rings (21; 22) are provided with cams engaging in one another which come into contact with one another only if a maximum torque is well exceeded or if the elastic rings (5) are irreparably damaged. This fail-safe device enables emergency operation with a limited torque.

1.2 Elastic rings

- Elastic rings may be stored for up to 5 years.
- Elastic rings (part 5 in fig.10) must be protected against direct sunlight, artificial light with an ultraviolet content and extreme temperatures.
- Elastic rings must not come into contact with aggressive media.
- Elastic rings must not be heated up to impermissible temperatures during fitting work (see table 1).
- The elastic rings must be laid flat with the bead pointing upwards. The matching parts must not be separated.

Table 1: ELPEX elastic rings

Material	Hardness	Mark	Temperature range
Natural rubber in which double-thread inlays have been vulcanised	70 ° Shore A	Size	- 40 °C up to + 80 °C

ELPEX couplings up to size 220 are provided with single-part and from size 270 to size 690 with two-part elastic rings (5). These are arranged with the part surfaces offset by 90° relative to one another. From size 840 up the elastic rings (5) are in four parts (4 x 90°).

1.3 Dimensions, geometric data and weights of types ENG and ENGS

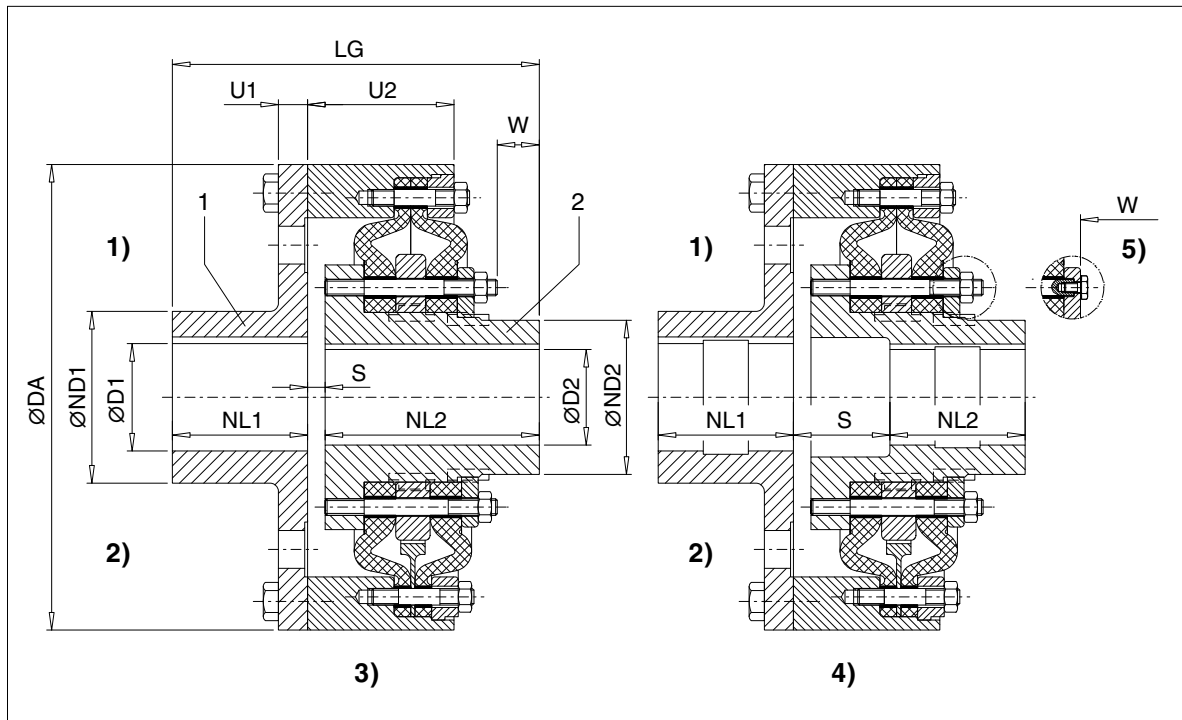


Fig. 1: Types ENG and ENGS

- 1) Type ENG
- 2) Type ENGS
- 3) Sizes 270 to 430
- 4) Sizes 500 to 970
- 5) Screw connection and sizes "W" in case of sizes 840 and 970

Table 2: Types ENG and ENGS

Size	Maximum speed		Hole 1)				DA	ND1	ND2	NL1	NL2	S	U1	U2	LG	W	Weight 2)
	Cast iron 1/min	Steel 1/min	D1		D2												
270	3000	4250	45	80	45	70	270	128	94	80	155	10	14	86	245	42	29
320	2500	3600	55	100	55	85	320	160	115	100	180	6	16	97.5	286	48	50
375	2100	3100	65	115	65	105	375	184	143	120	205	10	18	111.8	335	62	80
430	1900	2650	75	130	75	120	430	208	165	140	235	8	22	126	383	68	113
500	1600	2300	90	150	90	150	500	240	202	160	160	112	25	139.7	432	80	174
590	1360	2000	100 140	140 180	100	170	590	224 288	230	190	190	130	28	162.7	510	95	254 284
690	1200	1650	110 140 180	140 180 210	110	200	690	224 288 336	278	220	220	140	32	175.6	580	102	350 370 385
840	1000	1350	140 180	180 220	140	240	840	288 352	342	280	280	125	42	231	685	105	700 725
970	850	1180	160 200 240 280	200 240 280 320	160	280	970	320 384 448 512	390	350	350	167	70	290	867	137	1265 1310 1350 1410

1) Maximum bore with keyway to standard "DIN 6885/1".

2) Weights apply to type ENG in cast-iron version with maximum hole.

1.4 Speeds, geometric data and weights of types EFG and EFGS

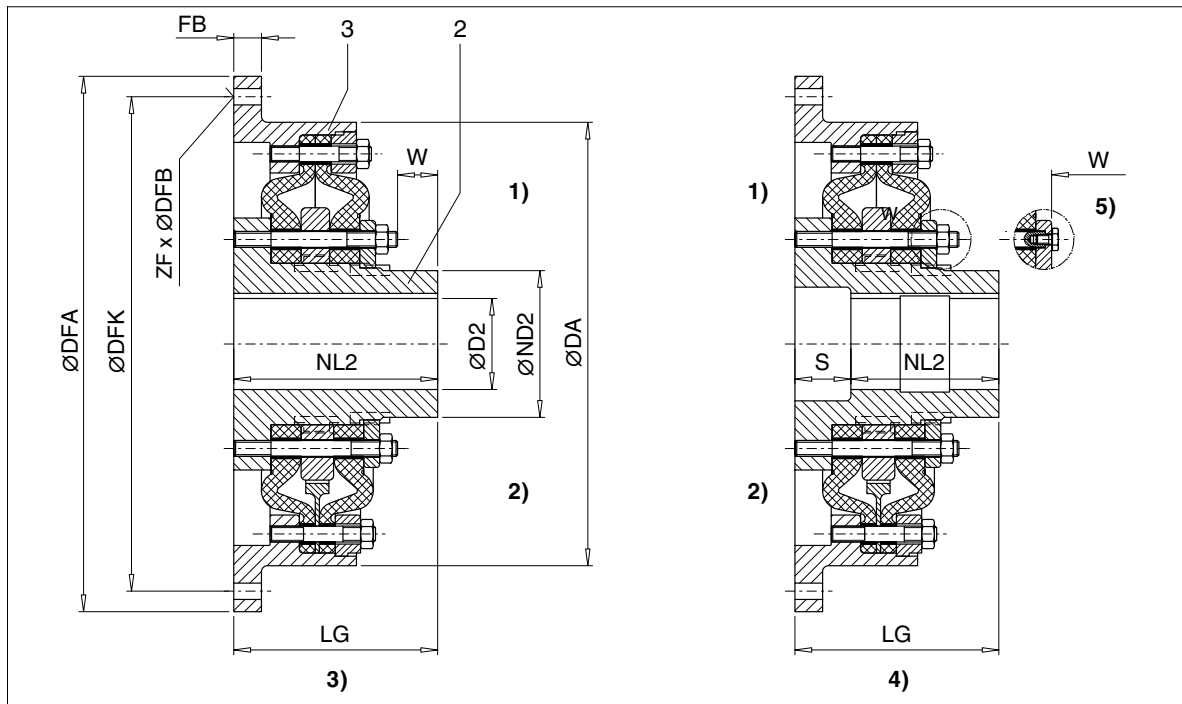


Fig. 2: Types EFG and EFGS

- 1) Type EFG
- 2) Type EFGS
- 3) Sizes 270 to 430
- 4) Sizes 500 to 970
- 5) Screw connection and sizes "W" in case of sizes 840 and 970

Table 3: Types EFG and EFGS

Size	Maximum speed		Bore 1)		DA	ND2	NL2	S	LG	W	Flange-connection dimensions 2)					Weight 3)
	Cast iron 1/min	Steel 1/min	D2								DFA	DFK	FB	ZF	DFB	
			min.	max.												
270	3000	4250	45	70	270	94	155	-	155	42	466.7 g7 2) 325 j6	438.2 2) 300	12	8 8	13 14	27 19
320	2500	3600	55	85	320	115	180	-	180	48	517.5 g7 2) 392 j6	489 2) 360	14	8 8	13 18	42 33.5
375	2100	3100	65	105	375	143	205	-	205	62	571.5 g7 2) 448 j6	542.9 2) 415	16	6 8	17 18	65 53
430	1900	2650	75	120	430	165	235	-	235	68	673.5 g7 2) 515 j6	641.4 2) 475	20	12 8	17 22	100 78
500	1600	2300	90	150	500	202	160	100	260	80	673.5 g7 2) 585 j6	641.4 2) 545	20	12 10	17 22	150 140
590	1350	2000	100	170	590	230	190	120	310	95	733.5 g7 2) 692 j6	692.2 2) 645	24	12 10	21 26	200 190
690	1200	1650	110	200	690	278	220	130	350	102	890 g7 2) 800 j6	850 2) 750	24	32 12	17 26	270 250
840	1000	1350	140	240	840	342	280	115	395	105	1105 g7 2) 960 j6	1060 2) 908	30	32 16	21 30	530 470
970	850	1180	160	280	970	390	350	155	505	137	1385 g7 2) 1112 j6	1320 2) 1051	35	24 16	31 35	1050 920

1) Maximum bore with keyway to standard "DIN 6885/1".
 2) The values in the upper line of the flange-connection dimensions are in accordance with those in standard "SAE J620d" or standard "DIN 6288".
 3) Weights apply to type EFG in cast-iron version with maximum hole.

1.5 Connecting dimensions for flanges, brake disks

ELPEX couplings of types ENG and ENGS can also be ordered without coupling part 1.

Flanges, brake disks etc. can then be screwed directly on the coupling ring using existing threaded bores. The design of the screw connection must be checked by the customer. Siemens recommends the use of screws of minimum quality class 8.8.

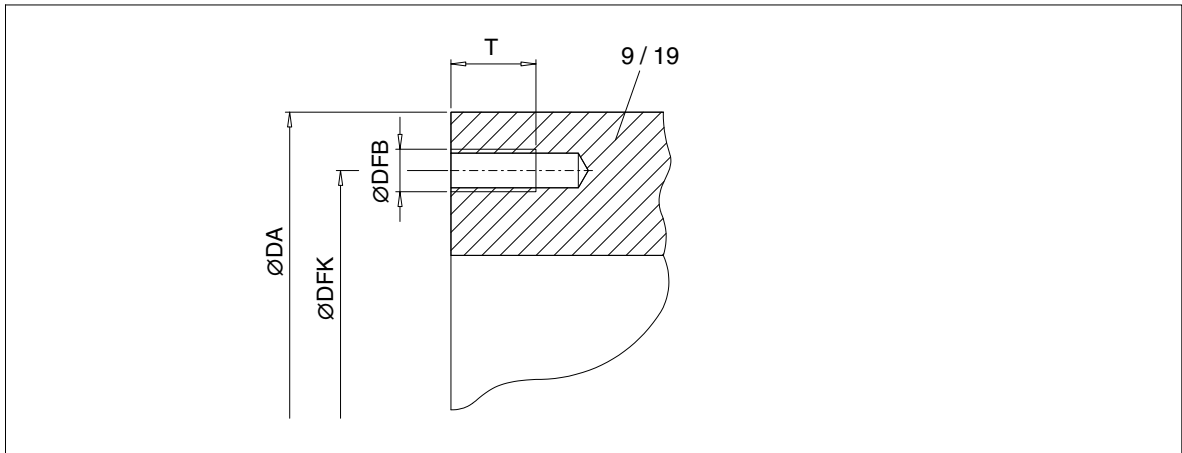


Fig. 3: Connection sizes for flanges, brake disks etc. with coupling ring (9 / 19)

Table 4: Connecting dimensions for flanges, brake disks etc.

Size	DA h8 mm	DFK mm	DFB	T mm	Number threaded bores
270	270	244	M 12	18	8
320	320	288	M 16	24	8
375	375	342	M 16	24	8
430	430	390	M 20	30	8
500	500	460	M 20	30	10
590	590	542	M 24	36	10
690	690	642	M 24	36	12
840	840	780	M 30	46	12
970	970	880	M 36	53	15

2. Notes

2.1 Safety instructions and general notes



All persons involved in the installation, operation, maintenance and repair of the coupling or clutch must have read and understood these instructions and must comply with them at all times. Disregarding these instructions may cause damage to the product and material and/or injury to persons. Damage caused by disregard of these instructions will result in exclusion of liability.

During transport, installation, dismantling, operation and maintenance of the unit, the relevant safety and environmental regulations must be complied.



Lifting gears and load equipment for handling the components must be suitable for the weight of the coupling.

The coupling must be stored in a dry environment. Adequate preservation must be ensured.

Operators and users must not make any changes to the coupling themselves over and above the treatment specified in these instructions.



If there is any visible damage the coupling must not be fitted and not be put into operation.

The coupling must not be operated unless housed in a suitable enclosure in accordance with the standards applying. This also applies to test runs and when checking the direction of rotation.

All work on the coupling must be carried out only when it is at a standstill. Secure the drive unit to prevent unintentional switch-on! A notice should be attached to the ON switch stating clearly that work on the coupling is in progress.

In addition to any generally prescribed personal safety equipment (such as safety shoes, safety clothing, helmet) wear **suitable safety gloves** and **suitable safety glasses** when handling the coupling!

Dispose of coupling in accordance with national regulations or separate them for recycling.

Only spare parts made by the manufacturer Siemens must be used.

Any enquiries should be addressed to:

Siemens AG
Schlavenhorst 100
46395 Bocholt

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

3. Fitting

ELPEX couplings are supplied in accordance with the order with finished bore and in pre-assembled condition.

3.1 Axial securing

Axial securing of the coupling parts is effected by means of set screws or end plates.

A set screw with cup point to standard "DIN 916" must be used when replacing the set screw.

The set screw should fill out the screw thread as much as possible and must not project beyond the hub.

Table 5: Set-screw size and tightening torques

Set-screw size	M 5	M 6	M 8	M 10	M 12	M 16	M 20	M 24	M 30
Tightening torque T_A in Nm	3	4	8	15	25	70	130	230	470

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

The specified tightening torques " T_A " must be complied with, applying standard "DIN 25202", screw-connection class "C", with an output-torque scatter of $\pm 5\%$.

3.2 Balancing after machining the finished bore

ELPEX coupling are executed to customer specifications or in accordance with half parallel keyway agreement (DIN ISO 8821) with balancing quality G16 (DIN ISO 1940).

3.3 Mounting the coupling parts

ELPEX coupling are pre-assembled. Separate the coupling halves of types ENG and ENGS after removing bolts (14) and pins (13).

Remove the wooden parts fitted for supporting the elastic rings (5).

Unscrew the set screw.

Clean the holes and shaft ends.

Coat the bores of the coupling parts (1; 2) and the shafts with MoS₂ mounting paste (e.g. Microgleit LP 405).



Coupling parts (1; 2) with tapered bore and parallel-key connection must be fitted in cold condition and secured with suitable end disks, without drawing the coupling parts (1; 2) further onto the taper (fitting dimension = 0).

Place coupling part (1; 2). Heat coupling part 1 (1) with cylindrical bore up to maximum 150 °C, if necessary. Coupling part 2 (2) with cylindrical bore may only be heated up to a maximum temperature of + 80 °C due to the elastic ring (5) screwed on it.

After mounting, have the coupling parts cool down to a temperature of ≤ 30 °C.

Axial securing is effected by means of the set screw or end disk. The end disk must not project from the inner sides of the hub. When securing by set screw the shaft must not project from the inner side of the hub and should fill out the complete bore length (NL1 / NL2).

Fit the set screw or end disk (for tightening torque of the set screw see table 5).



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

3.4 Fitting the coupling

Move together the machines to be coupled.

The axial reference dimension "b" must be adhered to (see item 3.6.4).



In case of types ENG / ENGS the markings on the coupling part (1) and on the coupling ring (9 / 19) must be observed.

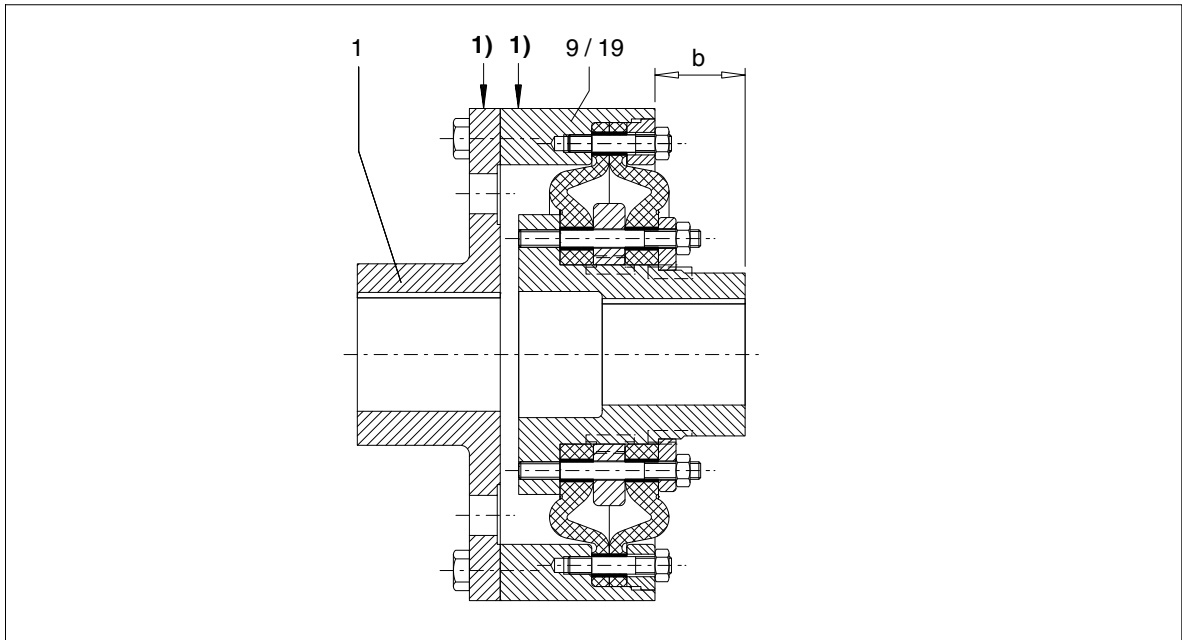


Fig. 4: The axial reference dimension "b"

1) Mark

Place the screws (14) and tighten slightly. Knock in the cylindrical pins (13) displaced relative to one another by 180° and tighten the screws (14) (for tightening torque, see table 7).

Align the coupling as described in item 3.6.

3.5 Possible misalignments

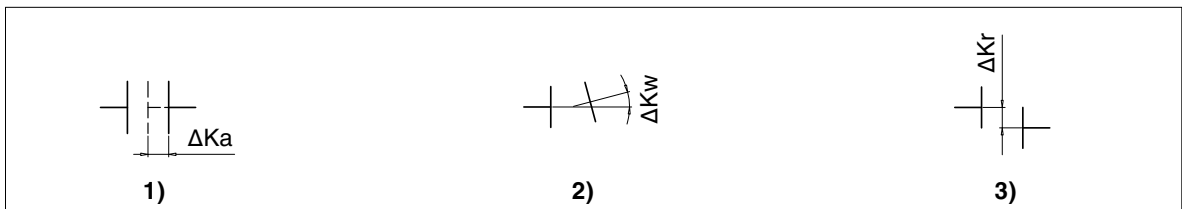


Fig. 5: Possible misalignments

1) Axial misalignment (ΔK_a) 2) Angular misalignment (ΔK_w) 3) Radial misalignment (ΔK_r)

3.5.1 Axial misalignment

The gap dimension ΔK_a should be set within the deviation permitted for the dimension "b" (see table 6).

3.5.2 Angular misalignment

The permissible angular misalignment $\Delta K_{w_{perm}}$ can be found in table 6.

3.5.3 Radial misalignment

The permissible radial misalignment $\Delta K_{r_{perm}}$ can be found in table 6.

3.6 Alignment



When aligning, the angular and radial misalignment should be kept as low as possible.

Misalignment values specified in table 6 are maximum permissible overall values in operation, resulting from mispositioning through imprecision during alignment and misalignment through operation (e.g. deformation through load, heat expansion).

Reduced misalignment in the coupling minimises expected wear of the elastic ring. Misalignment in the coupling gives rise to restorative forces which may impose inadmissible stress on adjacent machine parts (e.g. bearings).

Alignment is best done in the following order:

1. angular alignment
2. radial alignment
3. axial alignment

3.6.1 Angular misalignment

- Measure dimension "b" (see illustration) on several circumferential points.
- Record the maximum and minimum values " $b_{max.}$ " and " $b_{min.}$ ".
- In accordance with item 3.6.4 applies: $\Delta b \geq b_{max.} - b_{min.}$

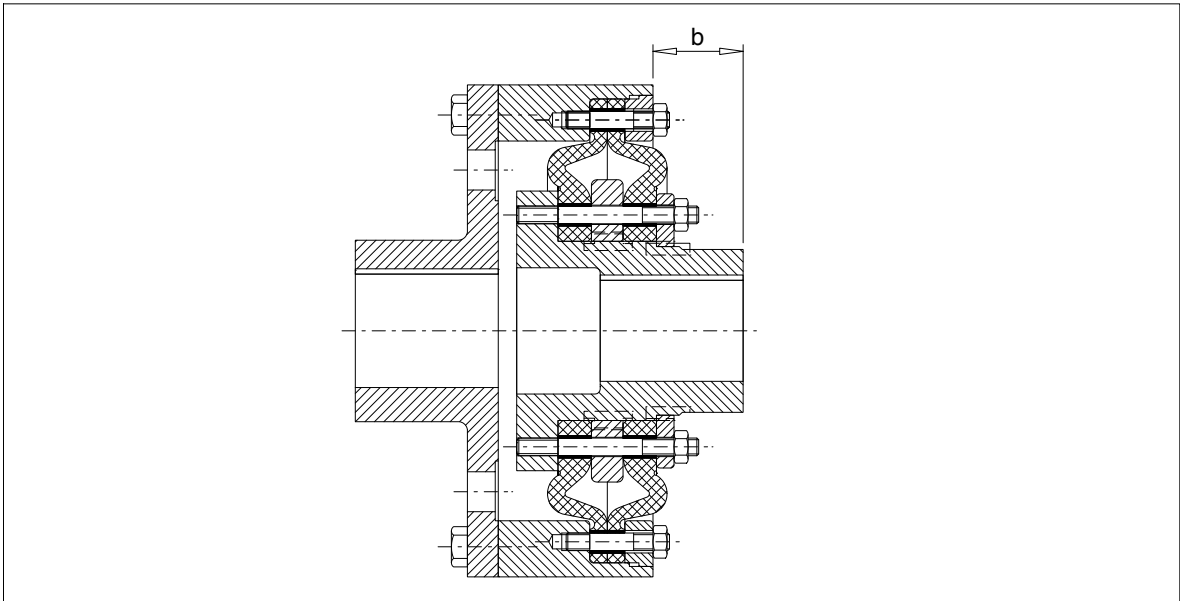


Fig. 6: Angular misalignment

3.6.2 Radial misalignment

- Measure dimension "a" (see figure) on several circumferential points.
- Record the maximum and minimum values " $a_{max.}$ " and " $a_{min.}$ ".
- In accordance with item 3.6.4 applies: $\Delta Kr_{perm.} \geq (a_{max.} - a_{min.}) / 2$

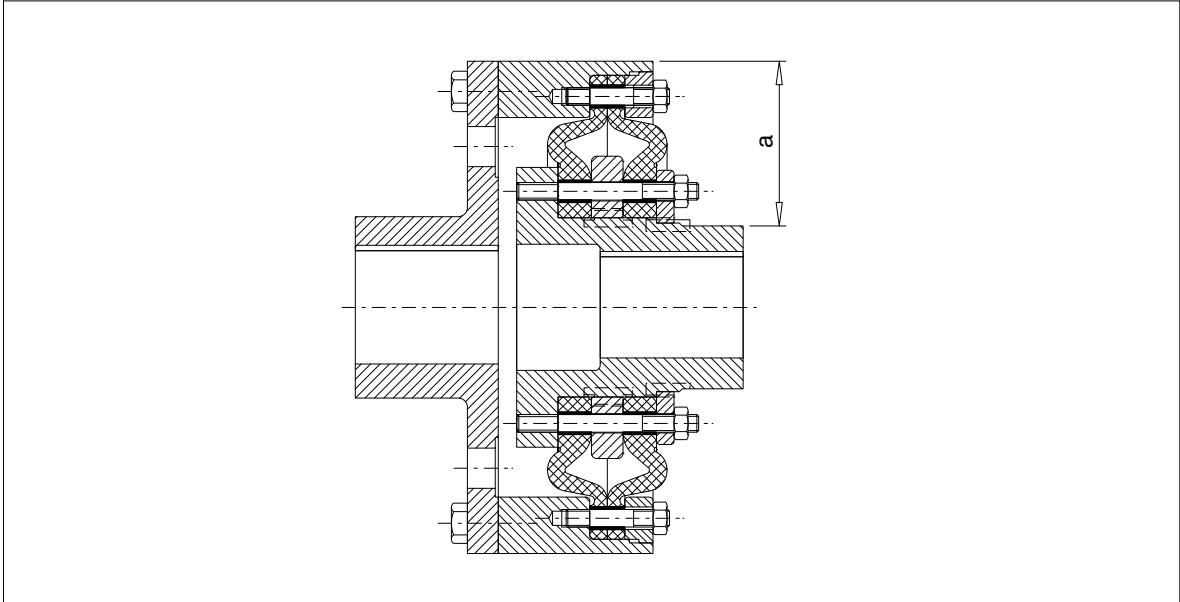


Fig. 7: Radial misalignment

3.6.3 Axial misalignment

- Measure dimension "b" (see figure) on several circumferential points.
- Record the maximum and minimum values " $b_{max.}$ " and " $b_{min.}$ ".
- In accordance with item 3.6.4 applies: $b_{min.} \geq b_{min. perm.}$
 $b_{max.} \leq b_{max. perm.}$

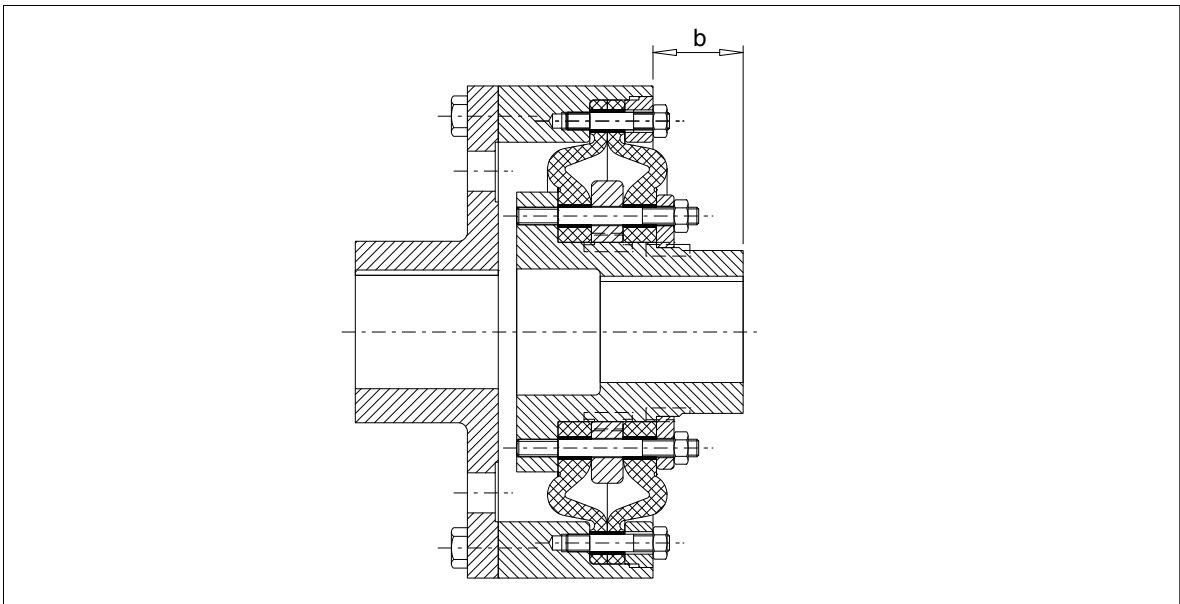


Fig. 8: Axial misalignment

3.6.4 Shaft-misalignment values during operation



The following maximum permissible misalignment values must by no means be exceeded during operation.
When aligning, the angular and radial misalignment should be kept appreciably smaller (tending towards zero).

Table 6: Shaft-misalignment values $\Delta S_{perm.}$ and $\Delta K_{perm.}$, maximum permissible during operation, stated in mm (rounded)

Size	maximum permissible shaft misalignment							Reference dimension "b" ENG, ENGS, EFG, EFGS mm
	radial		angular		ΔK_a mm	axial ENG, ENGS, EFG, EFGS		
	$\Delta K_{r_{perm.}}$ continuous mm	¹⁾ $\Delta K_{r_{max. perm.}}$ short-time mm	ΔK_w °	Δb mm		$b_{min. perm.}$ $b - \Delta K_a$ mm	$b_{max. perm.}$ $b + \Delta K_a$ mm	
		Reference dimension "b" ENG, ENGS, EFG, EFGS mm						
270	2.2	4.5	0.2	0.9	2.2	76.8	81.2	79.0
320	2.6	5.0	0.2	1.1	2.6	85.9	91.1	88.5
375	3.0	6.0	0.2	1.3	3.0	100.2	106.2	103.2
430	3.4	7.0	0.2	1.5	3.4	113.6	120.4	117.0
500	3.8	7.5	0.2	1.7	3.8	128.5	136.1	132.3
590	4.2	8.5	0.2	2.0	4.2	153.1	161.5	157.3
690	4.6	9	0.2	2.4	4.6	179.8	189.0	184.4
840	5.0	10	0.2	2.9	5.0	169	179	174
970	5.5	11	0.2	3.4	5.5	221.5	232.5	227

1) e.g. during starting and switch-off processes

3.7 Assignment of the tightening torques and wrench widths



The use of impact screwdrivers is not permissible.

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

The specified tightening torques " T_A " must be complied with, applying standard "DIN 25202", screw-connection class "C", with an output-torque scatter of $\pm 5\%$.

The tightening torques and wrench widths of the set screws are specified in table 5.

Table 7: Tightening torques for parts 8, 12, 14, 26, 27

Size	Tightening torque T_A and wrench width SW									
	Hexagon head						Hexagon socket			
	Part 8		Part 12		Part 14		Part 26		Part 27	
	T_A Nm	SW mm	T_A Nm	SW mm	T_A Nm	SW mm	T_A Nm	SW mm	T_A Nm	SW mm
270	35	17	18	13	86	19	25	6	49	8
320	35	17	35	17	210	24	25	6	49	8
375	55	19	55	19	210	24	49	8	86	10
430	55	19	55	19	410	30	86	10	210	14
500	130	24	55	19	410	30	86	10	210	14
590	130	24	130	24	710	36	210	14	410	17
690	250	30	130	24	710	36	210	14	710	19
840	250	30	250	30	1450	46	710	19	710	19
970	435	36	435	36	2530	55	1450	22	1450	22

4. Start-up and operation



Check bolt-tightening torques for the coupling and tightening torques for the foundation bolts of the coupled machine before start-up. Enclosures (coupling protection, contact prevention at least IP2X) must be fitted. Overload conditions during start-up cannot be excluded. If the coupling breaks through overload, metal parts may fly off and cause personal injury and/or material damage.

The coupling must run with little noise and without vibration. Irregular behaviour must be treated as a fault requiring immediate remedy. In case of fault the drive must be stopped at once. The necessary measures for repair must be taken in accordance with the safety regulations applying.

5. Faults, causes and remedy

Table 8: Faults, dangers and measures

Faults	Dangers	Measures
Changes in running noise; vibrations	Flying fragments,	Trouble-shooting in accordance with item 5.1 and item 5.2 and remedy the cause
Premature wear of the elastic ring; alteration in the characteristics of the elastic ring	Sparking, Damage to the coupling, Failure of the installation	Check all parts of the coupling for any damage. Replace damaged parts. For re-assembly, the instructions in sections 3 and 4 must be observed.
Break		

5.1 Possible cause of fault

Change in alignment:

- Rectify the cause of the change in alignment (e.g. loose foundation bolts).
- Align the coupling.
- Check axial securing; adjust as necessary.
- Check wear as described in section 6, "Maintenance and repair".

Elastic rings (5) worn:

- Check wear of the elastic rings (5) as described in section 6, "Maintenance and repair", if necessary replace the elastic rings (5). Use only matching parts.

5.2 Incorrect use



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

5.2.1 Frequent faults when selecting the coupling and/or coupling size

- Important information describing the drive and the environment are not communicated.
- System torque too high.
- System speed too high.
- Application factor not correctly selected.
- Chemically aggressive environment is not taken into consideration.
- The ambient temperature is not permissible.
- Finished bore with inadmissible diameter and/or inadmissible assigned fits.
- Machining of parallel keyways of which the width across corners is greater than the width across corners of the parallel keyways to standard "DIN 6885/1" with a maximum permissible bore.
- The transmission capacity of the shaft-hub connection is not appropriate to the operating conditions.
- Maximum load or overload conditions are not being taken into consideration.
- Dynamic load conditions are not being taken into consideration.
- Shaft-hub connection resulting in impermissible material stress on the coupling.
- Operating conditions are being changed without authorisation.
- Coupling and machine or drive train form a critical torsional, axial or bending vibration system.
- Fatigue torque load too high.

5.2.2 Frequent faults when fitting the coupling

- Components with transport or other damage are being fitted.
- When mounting coupling parts in a heated condition, already fitted ELPEX elastic rings (5) are being inadmissibly heated.
- The shaft diameter is beyond the specified tolerance range.
- Coupling parts are being interchanged, i.e. their assignment to the specified shaft is incorrect.
- Specified axial securing means are not fitted.
- Specified tightening torques are not being adhered to.
- Bolts are inserted dry or greased.
- Flange surfaces of screwed connections have not been cleaned.
- Alignment and/or shaft-misalignment values do not match the specifications in the instructions manual.
- The coupled machines are not correctly fastened to the foundation, and as a result shifting of the machines e.g. through loosening of the foundation-screw connection is causing excessive displacement of the coupling parts.
- The coupled machines are not sufficiently earthed.
- ELPEX elastic rings (5) are not being correctly positioned.
- The coupling guard used is not suitable.

5.2.3 Frequent faults in maintenance

- Maintenance intervals are not being adhered to.
- No genuine ELPEX spare parts are being used.
- Old or damaged ELPEX spare parts are being used.
- Elastic-ring parts are being used, which do not match.
- Leakage in the vicinity of the coupling is not being identified and as a result chemically aggressive media are damaging the coupling.
- Fault indications (noise, vibrations, etc.) are not being observed.
- Specified tightening torques are not being adhered to.
- Alignment and/or shaft-misalignment values do not match the specifications in the instructions manual.

6. Maintenance and repair

6.1 Maintenance interval

In all cases inspection of the coupling should be carried out simultaneously with inspection of the whole system. Inspections are limited to a visual assessment of the condition of the coupling. Dismounting is not necessary to this purpose.

Check for tightness of the screws and any damage caused by force.

6.2 Wear check

Cracks in the rubber surface do not affect the functionality and service life of the elastic ring (5), as the torque is mostly transmitted by the embedded double-thread inlays.

The functionality of the ELPEX coupling can be checked only by the torsional displacement between the in- and output side. Check that three triangles have been applied to the elastic ring (5) (see figure 9). If the inner triangle is inside the zone enclosed by the two outer triangles, the coupling is fully functional. As soon as the inner triangle is to the right or left of this zone, the elastic rings (5) must be replaced.

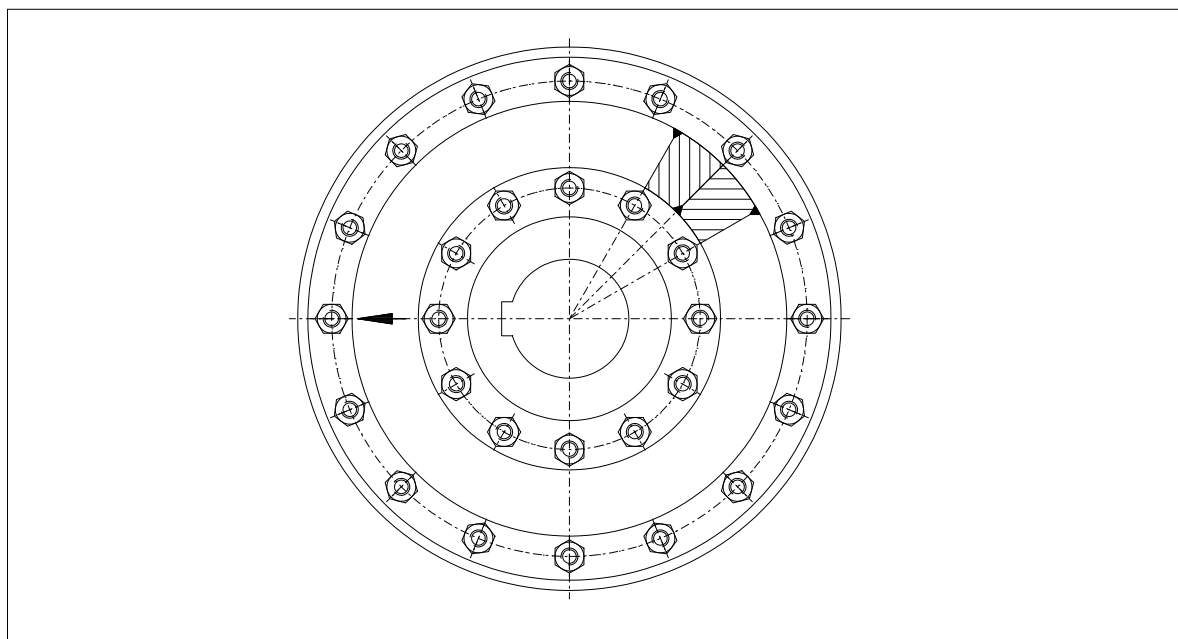


Fig. 9: Wear check



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

6.3 Replacement of the elastic rings

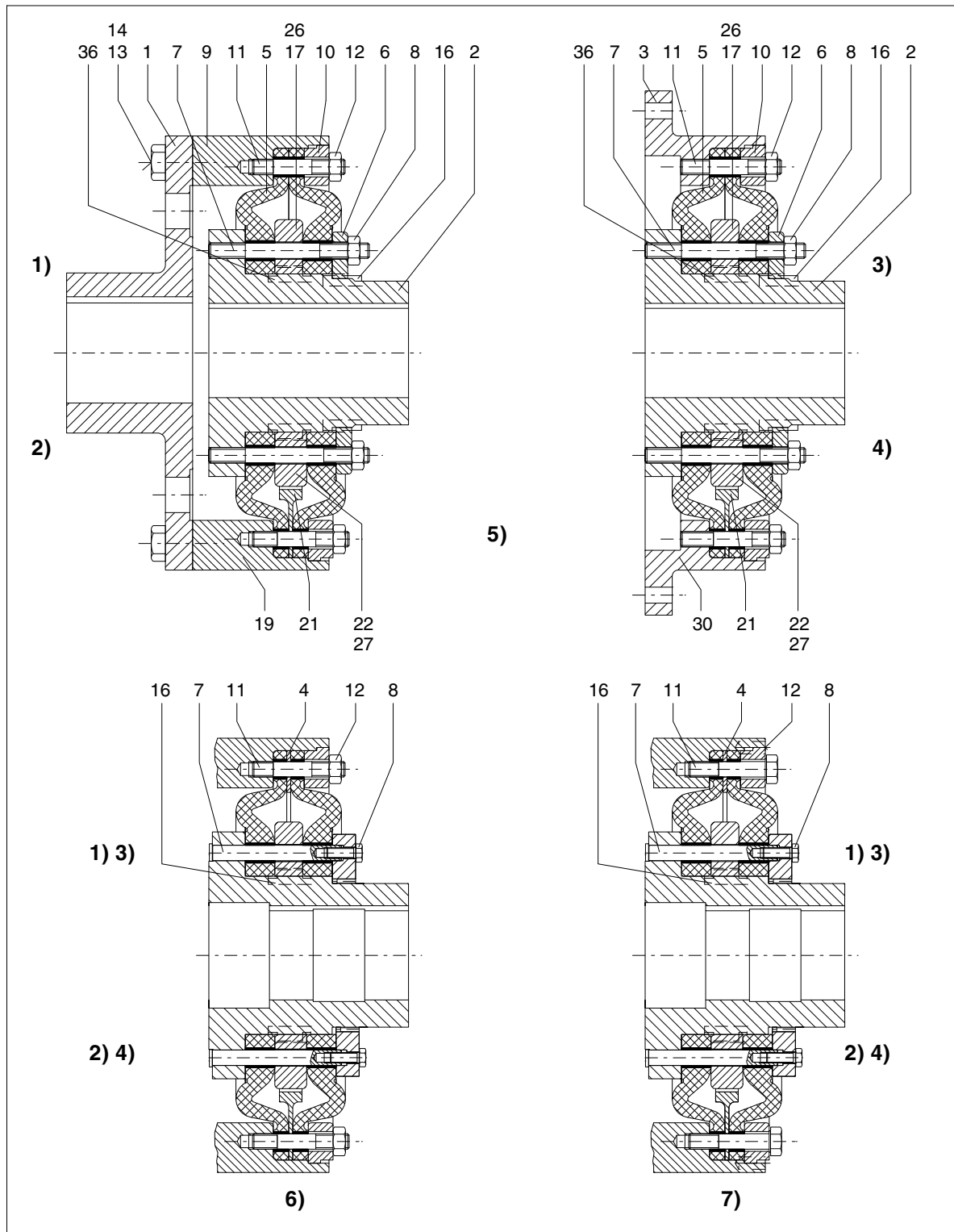


Fig. 10: Spare-parts drawing

- | | |
|---------------|---------------------|
| 1) Type ENG | 5) Sizes 270 to 690 |
| 2) Type ENG S | 6) Size 840 |
| 3) Type EFG | 7) Size 970 |
| 4) Type EFG S | |



The elastic rings (part 5 in fig. 10) can be replaced without the need of moving the coupled machines.

Remove the pins (12) on parts in size 970.

Remove the screw connection of the elastic rings:

Up to size 690: Nuts (8; 12)

Size 840 : Screws (8) and nuts (12)

Size 970 : Screws (8; 11)

Shift retaining rings (6; 10) towards end of hub (if possible even further).

Pull back and remove the free elastic ring (5).

Demount the two-piece retaining ring (17) from types ENG or EFG. On sizes 840 and 970 remove the adaptor ring (4) and place it with the retaining rings (6; 10).

Demount the two-piece stop ring (22) from types ENGS or EFGS. Pull out the stop ring (21) and place it with the retaining rings (6; 10).

Remove parallel key (16 or 36).

Remove the second elastic ring (5).

Before reassembly clean the area for mounting the elastic rings (5).

Check tightness of the screw connection (7; 11). Secure the studs (7; 11) again, if necessary, using LOCTITE (e.g. LOCTITE 242).

Clean and degrease screws, bolts and nuts carefully. Allow grease solvent to evaporate.

Assembly takes place with the new elastic rings (5) in reverse order and by observing the following points.



Before fitting the other parts of the elastic ring (5) care must be taken that the two arrows marking the hole on each outer fixing point, are located one above the other (see item 6.1).

Check the screw connection of the two-piece retaining ring (17) / stop ring (22) (for tightening torques of screws 26 or 27, see table 7).

On types ENGS and EFGS care must be taken that the cams on the outer stop ring (21) are centred precisely between the cams on the inner stop ring (22).

Insert the pins (12) on parts in size 970.

Both on the inner and on the outer fixing point first screw on as far as possible by hand only two screw connections (8; 11/12), displaced at approx. 180° relative to one another. Then screw on all the other screw connections (8; 11/12) likewise as far as possible by hand..

Screw connection of elastic rings:

Up to size 690: Nuts (8; 12)

Size 840 : Screws (8) and nuts (12)

Size 970 : Screws (8; 11)

Tighten the screw connections (8, 11/12) in turn (not crosswise) with the spanner. Each individual nut (8; 12) / screw (8; 11) must not be turned further than a quarter-turn. If the force to be applied is sensibly greater, bring the retaining rings (6; 10) into contact with the offset ring surfaces. Now tighten all the nuts (8; 12) / screws (8; 11) to the corresponding tightening torques (see item 3.7).

Knock the pins (12) on parts in size 970.



After 24 hours the elastic rings (5) will have bedded down. At the end of this time undo one nut (8; 12) / screw (8; 11), apply Loctite 242 at one point on the stud bolt and retighten this screw connection to the prescribed tightening torque (see item 3.7). Repeat this procedure for the complete screw connection of the elastic rings.

For re-assembly, the instructions in sections 3, "Fitting", and 4, "Start-up and operation", must be observed.

6.4 Demounting the coupling parts 1 and 2

Undo the screw connection (14) and pin fastening (13) in case of types ENG and ENGS.

Move the coupled machines apart.

Undo the inner fixing point of the elastic rings (5). To do so remove the nuts / screws (8).

Pull the elastic rings (5) with the bolted coupling ring (9 / 19) from coupling part (2) and shift them onto the shaft.

Remove the axial securing means (set screw, end disk). Mount a suitable detaching device. Using a burner, heat coupling part (1; 2) along its length and above the parallel keyway (maximum + 80 °C).

Pull the coupling part off. Examine the hub bore and the shaft for damage, and protect against rust. Replace damaged parts.

For re-assembly, the instructions in sections 3, "Fitting", and 4, "Start-up and operation", must be observed.

7. Spare-parts stockage

7.1 Spare parts

For ordering spare parts state the following data, as far as possible:

- Siemens order number and position
- Siemens drawing number
- Coupling type and coupling size
- Part number (see spare-parts list)
- Bore, bore tolerance, keyway and balancing as well as particular characteristics such as flange-connection dimensions, spacer length, brake-drum dimensions.
- Any special details such as temperature, electrically insulating.

Table 9: Spare-parts list

Part number	Designation	ENG	ENGS	EFG	EFGS
1	Coupling part 1	x	x		
2	Coupling part 2	x	x	x	x
3	Coupling part 3			x	
4	Adaptor ring ¹⁾	x		x	
5	Elastic ring	x	x	x	x
6	Retaining ring	x	x	x	x
7	Stud / bolt ²⁾	x	x	x	x
8	Hexagon nut / hexagon bolt ²⁾	x	x	x	x
9	Coupling ring	x			
10	Retaining ring	x	x	x	x
11	Stud / hexagon bolt ³⁾	x	x	x	x
12	Hexagon nut / parallel pin ³⁾	x	x	x	x
13	Parallel pin	x	x		
14	Hexagon-head bolt	x	x		
16	Keyway ⁴⁾	x	x	x	x
17	Split retaining ring	x		x	
19	Coupling ring		x		
21	Stop ring		x		x
22	Split stop ring		x		x
26	Cheese-head bolt	x		x	
27	Cheese-head bolt		x		x
30	Coupling part 30				x
36	Keyway ⁴⁾	x	x	x	x

1) Only on sizes 840 and 970 of types ENG and EFG.

2) Up to size 690: studs (7) and hexagon nuts (8)
 Sizes 840 and 970: bolts (7) and hexagon bolts (8)

3) Up to size 840: studs (11) and hexagon nuts (12)
 Size 970 : hexagon bolts (11) and parallel pins (12)

4) Up to size 690: Keyway (36)
 Sizes 840 and 970: Keyway (16)

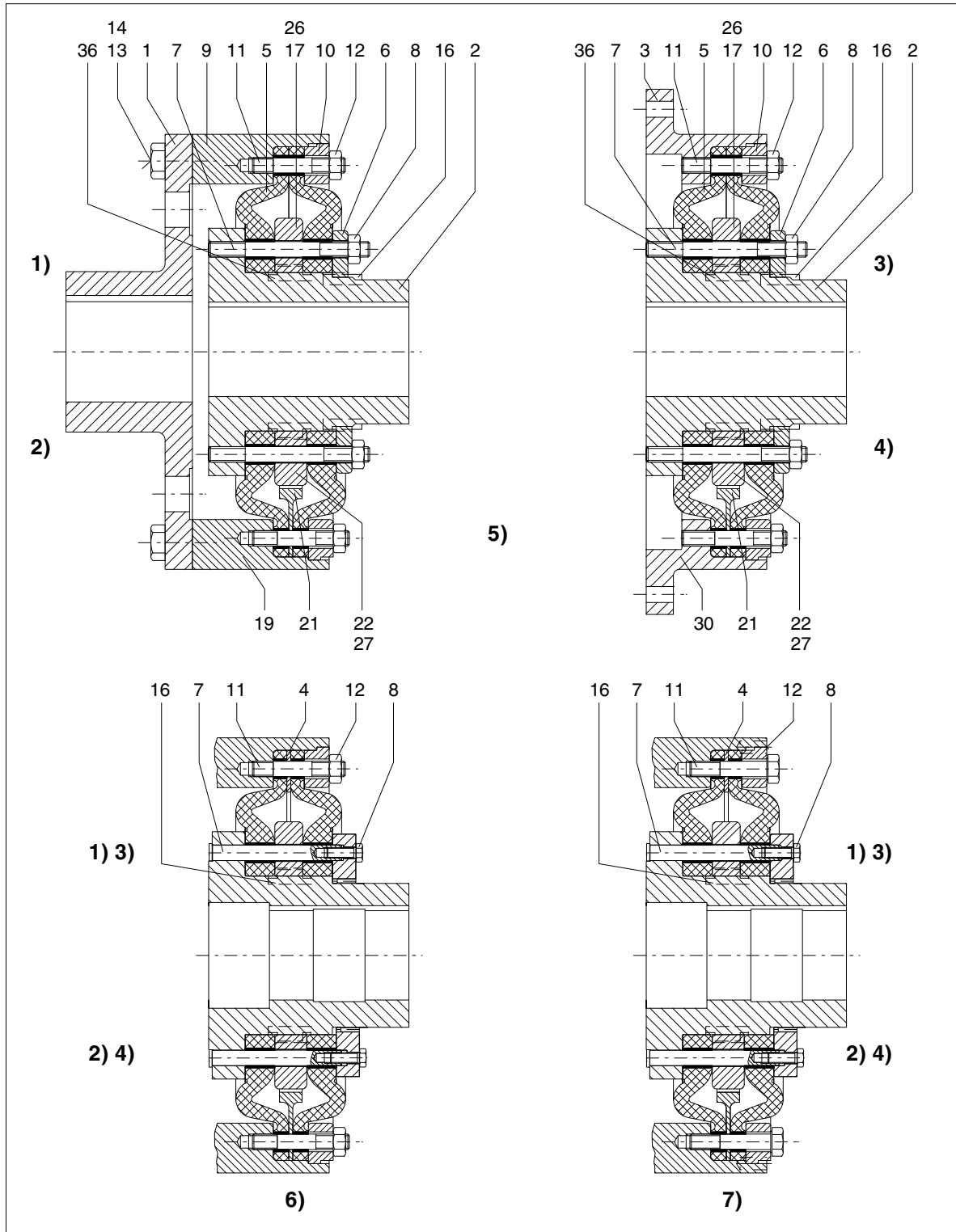


Fig. 11: Spare-parts drawing

- 1) Type ENG
- 2) Type ENGS
- 3) Type EFG
- 4) Type EFGS

- 5) Sizes 270 to 690
- 6) Size 840
- 7) Size 970

Further Information:

"FLENDER gear units" on the Internet

www.siemens.com/gearunits

"FLENDER couplings" on the Internet

www.siemens.com/couplings

Service & Support:

<http://support.automation.siemens.com/WW/view/en/10803928/133300>

Lubricants:

<http://support.automation.siemens.com/WW/view/en/42961591/133000>

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