

FLENDER RUPEX® couplings

Types RWN, RWS, RWB, RBS
and RFN, RFS

Operating instructions
BA 3600 en 02/2012



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-hub connection by cylindrical or conical bores with parallel key or with shrink fit. If a vertical or inclined arrangement or other shaft-hub connections, such as splines to DIN 5480, are to be used, Siemens must be consulted.

The coupling described below may be used in potentially explosible areas. The couplings must have a CE marking (for marking, see item 2.3).



Couplings which do not have a CE marking must not be used in potentially explosive areas.

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.

For part numbers and part designations, see the corresponding spare-parts drawing in section 7 or the dimensioned drawing.

1.1 Speeds, geometric data and weights

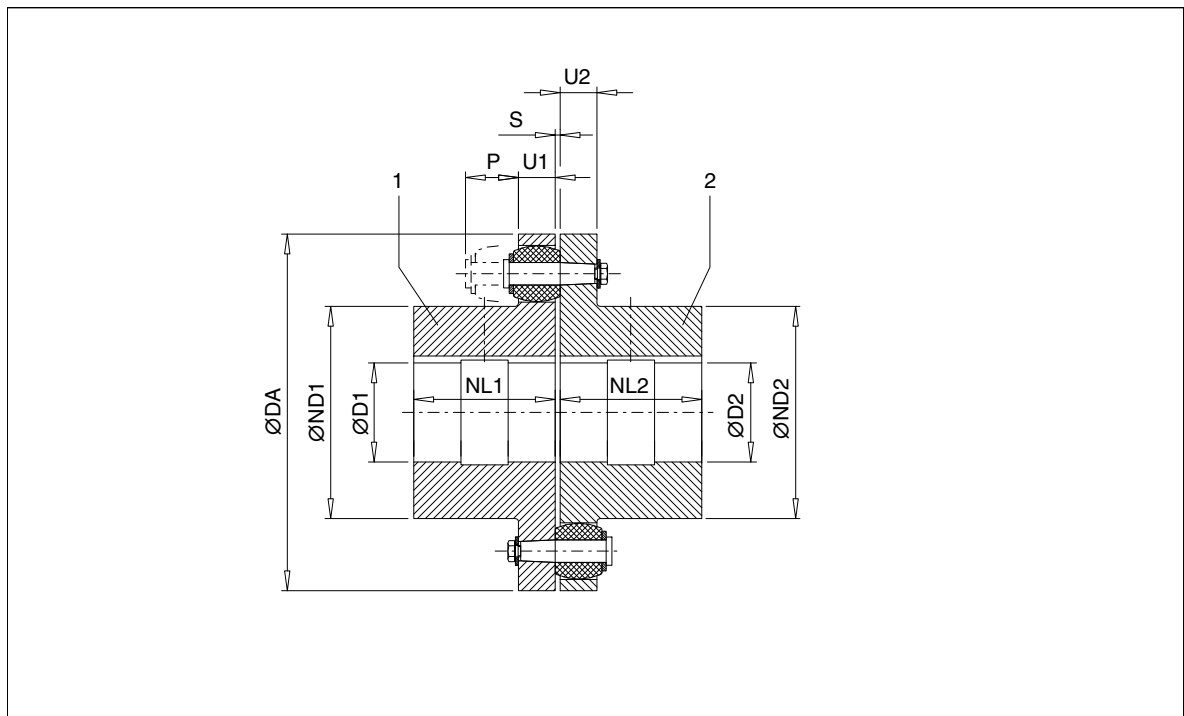


Fig. 1: Types RWN and RWS

Table 1: Types RWN and RWS

Size	Speed		Maximum bore ¹⁾				DA	ND1	ND2	ND1	ND2	NL1 NL2	P	S	U1	U2	Weight ²⁾	
	n _{max.}		D1	D2	D1	D2											m	m
	RWN	RWS	RWN		RWS													
	1/min	1/min	mm	mm	mm	mm											kg	kg
105	7000	10000	32	38	32	38	105	53	59	53	59	45	30	2 ... 4	13	12	1.9	1.9
125	6000	9000	40	48	42	48	125	65	68	65	68	50	35	2 ... 4	16	15	3.2	3.2
144	5250	7800	45	55	50	60	144	76	84	76	84	55	35	2 ... 4	16	15	4.5	4.5
162	4650	6900	50	60	55	65	162	85	92	85	92	60	40	2 ... 5	20	18	6.7	6.7
178	4200	6300	60	70	70	75	178	102	108	102	108	70	40	2 ... 5	20	18	9.7	9.7
198	3750	5600	70	80	80	85	198	120	128	120	128	80	40	2 ... 5	20	18	12.9	12.9
228	3300	4900	80	90	85	95	228	129	140	129	140	90	50	2 ... 5	26	24	19	19
252	3000	4400	90	100	100	110	252	150	160	150	160	100	50	2 ... 5	26	24	26.3	26.3
285	2650	3900	100	110	110	120	285	164	175	164	175	110	60	3 ... 6	32	30	39	39
320	2350	3500	110	120	125	130	320	180	192	180	192	125	60	3 ... 6	32	30	53	53
360	2100	3100	120	130	135	140	360	200	210	200	210	140	75	3 ... 6	42	42	78	78
400	2050	2800	140	140	150	150	400	230	230	230	230	160	75	3 ... 6	42	42	105	110
450	1800	2500	160	160	170	170	450	260	260	260	260	180	90	4 ... 7	52	52	156	163
500	1600	2200	180	180	190	190	500	290	290	290	290	200	90	4 ... 7	52	52	200	217
560	1450	2000	140	140	165	165	560	250	250	250	250	220	120	4 ... 8	68	68	280	274
			180	180	200	200		300	300	300	300						290	292
			200	200	210	210		320	320	320	320						295	305
630	1280	1800	140	140	165	165	630	250	250	250	250	240	120	4 ... 8	68	68	345	352
			180	180	200	200		300	300	300	300						370	370
			220	220	235	235		355	355	355	355						400	400
710	1150	1600	160	160	190	190	710	290	290	290	290	260	140	5 ... 9	80	80	510	507
			200	200	220	220		330	330	330	330						515	530
			240	240	250	250		385	385	385	385						540	560
800	1000	1400	180	180	210	210	800	320	320	320	320	290	140	5 ... 9	80	80	670	683
			220	220	240	240		360	360	360	360						690	715
			260	260	280	280		420	420	420	420						730	762
900	900	1250	220	220	210	210	900	360	360	320	320	320	160	5...10	90	90	940	907
			260	260	240	240		425	425	360	360						960	933
			290	290	280	280		465	465	425	425						1030	1000
1000	810	1100	240	240	230	230	1000	395	395	355	355	350	160	5...10	90	90	1200	1170
			280	280	260	260		460	460	395	395						1250	1208
			320	320	300	300		515	515	460	460						1310	1290
1120	700	1000	200	200	240	240	1120	360	360	360	360	380	180	6...11	100	100	1470	1560
			250	250	270	270		410	410	410	410						1510	1660
			300	300	330	330		495	495	495	495						1600	1730
1250	650	900	230	230	270	270	1250	410	410	410	410	420	180	6...11	100	100	1850	2000
			280	280	300	300		460	460	460	460						1900	2150
			330	330	360	360		540	540	540	540						2025	2200
1400	570	800	260	260	310	310	1400	465	465	465	465	480	210	6...12	120	120	2820	3020
			320	320	350	350		525	525	525	525						2900	3120
			380	380	410	410		620	620	620	620						3180	3350
1600	500	700	440	440	460	460	1600	700	700	700	700	540	210	6...12	120	120	3260	3570
			320	320	370	370		565	565	565	565						3780	3890
			380	380	410	410		625	625	625	625						3870	4270
1800	450	600	440	440	480	480	1800	720	720	720	720	600	240	8...16	140	140	4150	4300
			480	480	510	510		770	770	770	770						4290	4630
			500	500	540	540		820	820	820	820						5550	6230
2000	400	550	440	440	500	500	2000	760	760	760	760	660	240	8...16	140	140	5630	6460
			500	500	540	540		820	820	820	820						6000	6770
			560	560	610	610		870	870	870	870						6250	7030
2000	400	550	440	440	500	500	2000	760	760	760	760	660	240	8...16	140	140	6800	8140
			500	500	540	540		820	820	820	820						7000	8430
			560	560	610	610		870	870	870	870						7350	8860
2000	400	550	600	600	640	640	2000	920	920	920	920	660	240	8...16	140	140	7620	9050
			600	600	640	640		960	960	960	960						7620	9050

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

2) Weights are valid for maximum bores.

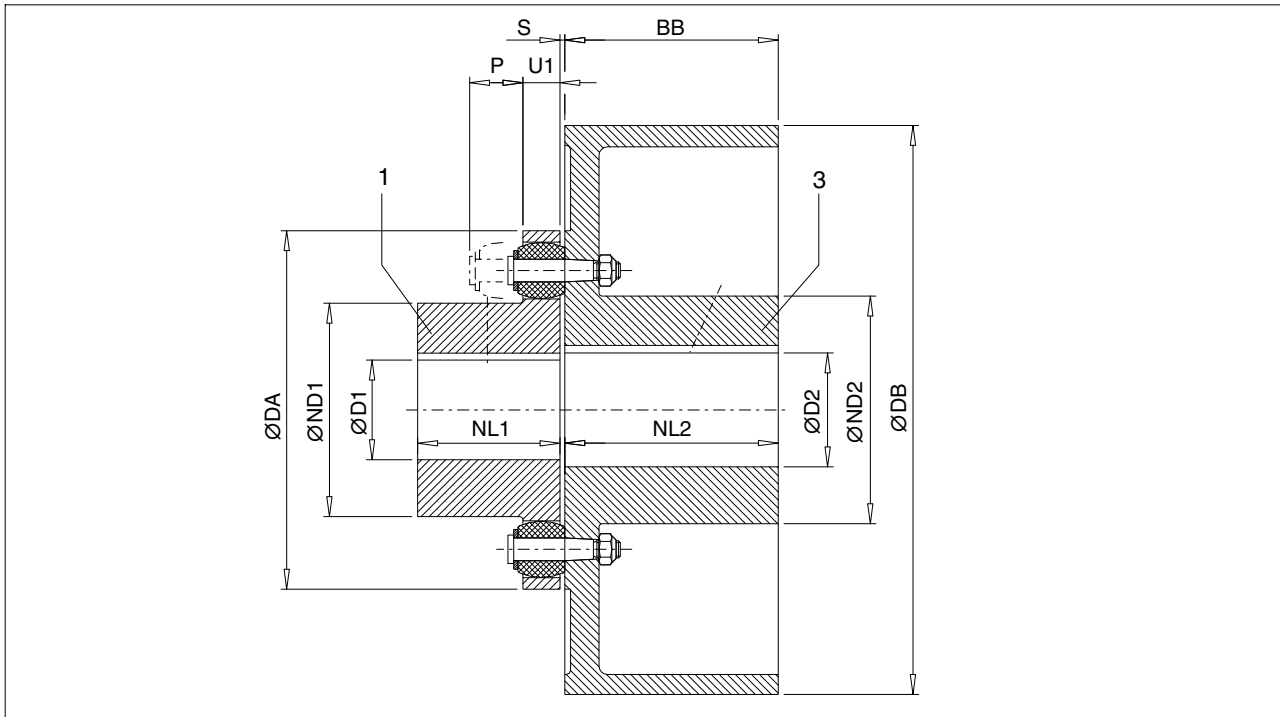


Fig. 2: Types RWB and RBS with brake drum to DIN 15431

Table 2: Types RWB and RBS with brake drum to DIN 15431

Size	Speed		Maximum bore ¹⁾										Weight ²⁾				
	$n_{max.}$		D1	D2	D1	D2	DA	ND1	ND2	NL1	P	S	U1	DB	BB NL2	m	m
	RWB 1/min	RBS 1/min	RWB mm	RBS mm	RWB mm	RBS mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	RWB kg	RBS kg
144	3400	5000	45	55	50	60	144	76	84	55	35	2 ... 4	16	200	75	9.5	10
162	2750	5000	50	60	55	65	162	85	92	60	40	2 ... 5	20	250	95	17	18
178	2750	4900	60	70	70	75	178	102	108	70	40	2 ... 5	20	250	95	20	22
	2150	4350												315	118	28	30
198	2750	4600	70	80	80	85	198	120	128	80	40	2 ... 5	20	250	95	24	26
	2150	4350												315	118	32	35
228	1700	3400	80	90	85	95	228	129	140	90	50	2 ... 5	26	400	150	54	60
252	1700	3400	90	100	100	110	252	150	160	100	50	2 ... 5	26	400	150	63	68
	1400	2750												500	190	93	103
285	1400	2750	100	110	110	120	285	164	175	110	60	3 ... 6	32	500	190	104	115
	1100	2150												630	236	157	171
320	1100	2150	110	120	125	130	320	180	192	125	60	3 ... 6	32	630	236	172	185
	950	1900												710	265	217	230
360	1100	2150	120	130	135	140	360	200	210	140	75	3 ... 6	42	630	236	191	210
	950	1900												710	265	236	255

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

2) Weights are valid for maximum bores.

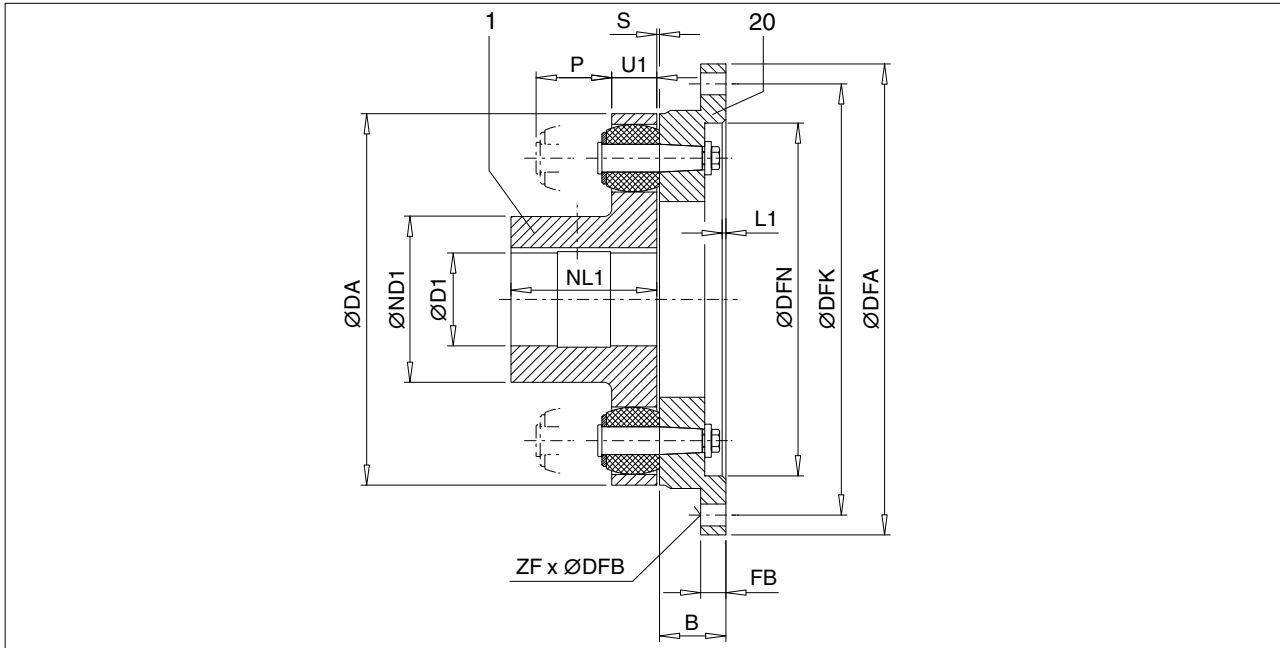


Fig. 3: Types RFN and RFS

Table 3: Types RFN and RFS

Size	Speed		Maximum bore 1)		DA	ND1	NL1	P	S	U1	DFA	B	FB	DFN H7	L1	DFK	ZF	DFB	Weight 2)	
	n _{max.}		D1																m	m
	RFN 1/min	RFS 1/min	RFN mm	RFS mm															RFN kg	RFS kg
105	7000	10000	32	32	105	53	45	30	2...4	13	158	23	10			142	6	9	2.3	2.3
125	6000	9000	40	42	125	65	50	35	2...4	16	180	28	13			160	6	11	4.2	4.2
144	5250	7800	45	50	144	76	55	35	2...4	16	200	28	13			180	7	11	5	5
162	4650	6900	50	55	162	85	60	40	2...5	20	220	34	13			200	8	11	7.3	7.3
178	4200	6300	60	70	178	102	70	40	2...5	20	248	34	16			224	8	14	10	10
198	3750	5600	70	80	198	120	80	40	2...5	20	274	34	16			250	8	14	13	13
228	3300	4900	80	85	228	129	90	50	2...5	26	314	42	20			282	8	18	20	20
252	3000	4400	90	100	252	150	100	50	2...5	26	344	42	20			312	8	18	25	25
285	2650	3900	100	110	285	164	110	60	3...6	32	380	51	22			348	9	18	38	38
320	2350	3500	110	125	320	180	125	60	3...6	32	430	51	25			390	9	22	50	50
360	2100	3100	120	135	360	200	140	75	3...6	42	480	66	25			440	10	22	76	76
400	2050	2800	140	150	400	230	160	75	3...6	42	520	70	50	380	4	480	10	22	125	125
450	1800	2500	160	170	450	260	180	90	4...7	52	575	80	45	428	6	528	12	26	170	175
500	1600	2200	180	190	500	290	200	90	4...7	52	620	80	45	475	6	570	12	26	205	210
560	1450	2000	140	165	560	250	220	120	4...8	68	700	100	65	532	8	650	16	26	330	330
			180	200		300													330	340
			200	210		320													340	340
630	1280	1800	140	165	630	250	240	120	4...8	68	785	100	60	602	8	725	16	33	390	390
			180	200		300													400	400
			220	235		355													420	420
710	1150	1600	160	190	710	290	260	140	5...9	80	875	120	80	675	10	815	18	33	550	550
			200	220		330													550	560
			240	250		385													570	580
800	1000	1400	180	210	800	320	290	140	5...9	80	1000	120	70	765	10	930	16	39	680	690
			220	240		360													690	710
			260	280		420													710	730

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

2) Weights are valid for maximum bores.

1.2 Buffers (5)

- Buffers may be stored for up to 5 years.
- Buffers must be protected against direct sunlight, artificial light with a high ultraviolet content and extreme temperatures.
- Buffers must not come into contact with aggressive media.
- Buffers must not be heated up to impermissible temperatures during fitting work (see table 4).
- Buffers must be replaced in sets; only identical buffers may be used in one coupling.

Table 4: RUPEX buffer

Material	Hardness	Hardness	Mark	Temperature range
NBR	80 Shore A	Standard	black buffer	- 30 °C to + 80 °C
NBR	60 Shore A	Special, soft, shift of rotary resonance speed, nominal torque reduced	black buffer with a green dot on the end face	- 30 °C to + 80 °C
NBR	90 Shore A	Special, hard, shift of rotary resonance speed	black buffer with a magenta dot on the end face	- 30 °C to + 80 °C
NBR 639	80 Shore A	Special, electrically insulating	green buffer	- 30 °C to + 80 °C
NR	80 Shore A	Special, use at low temperature	black buffer with a white dot on the end face	- 50 °C to + 50 °C
HNBR	80 Shore A	Special, use at high temperature	black buffer with a red dot on the end face	- 10 °C to + 100 °C



Electrically insulating buffers (green) are approved for explosion groups IIA and IIB.

High-temperature buffers (red marking) are not approved for use in potentially explosive areas.

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 with at all times.



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

Depending on national regulations, coupling and clutch components may have to be disposed of separately or separated for recycling.

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

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 or clutch must not be fitted or 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 is in progress.

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

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

2.2 Marking of the coupling parts for use in potentially explosive zones

Couplings which are ordered in Atex configuration, have the following marking on the outer circumference of coupling part 1:

Siemens AG   II 2G T4 / T5 / T6 D120 °C
46393 Bocholt - Germany (- 50 °C) - 30 °C ≤ T_a ≤ + 80 °C / + 50 °C / + 40 °C
FLENDER couplings RUPEX <year built>   I M2

Coupling part 2 bears the marking  .

Coupling part 3 is manufactured without a marking. Coupling part 3 is part of the Brake module and must be certified by the manufacturer of the brake.

The marking is in one or two lines.

If, in addition to the CE mark, the letter "U" together with the Siemens order number has been stamped on, the coupling part has been delivered by Siemens un- or prebored.



Siemens supplies unbored and prebored couplings with CE marking only under the condition that the customer assumes the responsibility and liability for correct refinishing in a declaration of exemption.

When using electrically insulating buffers, the marking of the explosion group IIA, IIB is added.

2.3 Service conditions

The coupling is suited for service conditions in accordance with Directive 94/9/EC:

- Equipment group II (use above ground) of categories 2 and 3 for areas where there are explosible gas, vapour, mist, air mixtures as well as for areas where dust can form explosible atmospheres.
- The permissible temperature classes and/or maximum surface temperatures are assigned as a function of the maximum ambient temperature occurring in the immediate vicinity of the coupling (see table 5).

Table 5: Temperature classes

Ambient temperature	Temperature class	maximum surface temperature
maximum 80 °C	T4	< 108 °C
maximum 50 °C	T5	< 80 °C
maximum 40 °C	T6	< 68 °C

- Equipment group I (underground applications) of the category M2.
- Explosion group IIA or IIB in case of electrically insulating flexible elements.



In the case of types with brake drum (RWB and RBS) the module supplier is responsible for conformity of the brake drum and/or brake with applicable directives. To be noted are, amongst other things, hazards from electrostatic charging and hot surfaces.

If they are to be used below ground in potentially explosive areas the couplings must only be used with drive motors, which can be switched off on occurring of an explosible atmosphere.

The machines connected by the coupling must be earthed by an earth leakage resistance < 10⁶ Ω.

If coated couplings are used in potentially explosive areas, the requirements made of the conductivity of the coating and the limitation on the thickness of the coat applied must be observed in accordance with DIN EN 13463-1. Where coatings have a thickness < 200 µm, no electrostatic charge is to be expected.

3. Fitting

Coupling parts set up for removal by oil-hydraulic shrinking-off are delivered in a finish-machined state according to the order,

3.1 Machining the finished bore

Remove bolt (4) and buffer (5)

Depreserve and clean coupling parts (1; 2; 3).

Clamp on surfaces marked with , and align.

Machine the finished bore, observe maximum bore described in section 1.

Check finished bore as described in section 4.

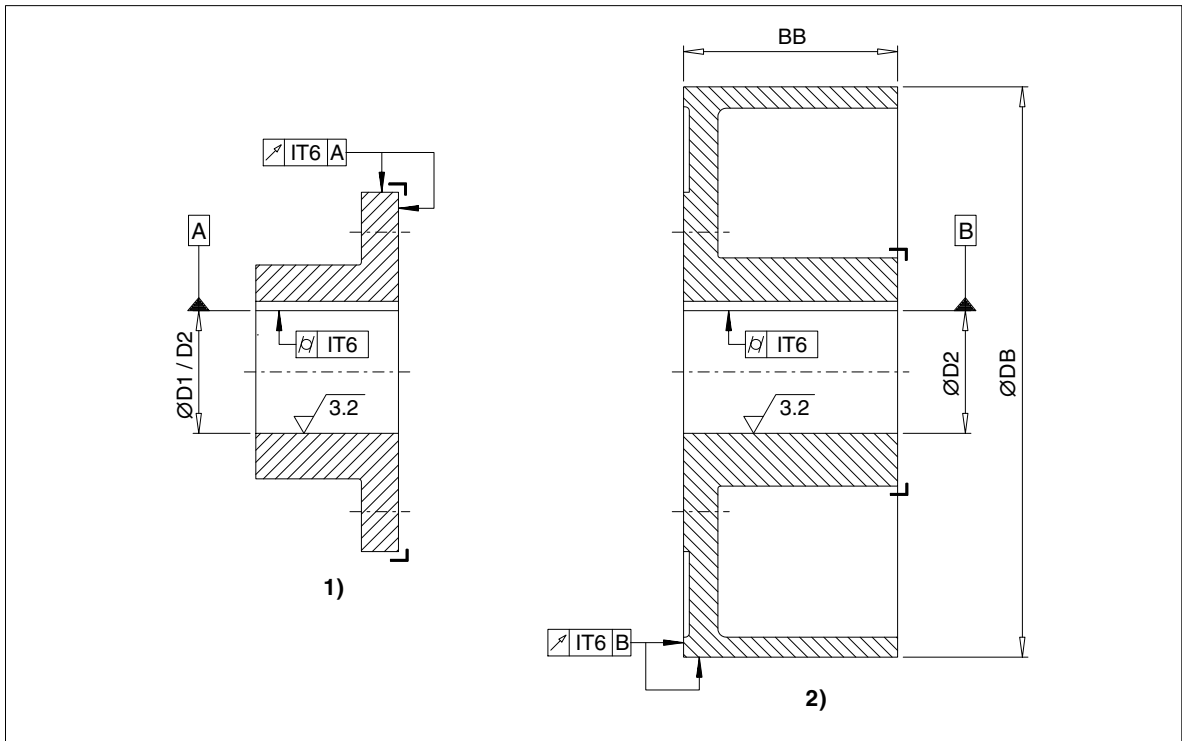


Fig. 4: Machining the finished bore

1) Coupling part 1 and coupling part 2

2) Coupling part 3

Table 6: Fit recommendation for bores with parallel-key connection

Description	Push fit not suitable for reversing operation		Press fit		Interference fit suitable for reversing operation		
	j6	h6	h6	k6	m6	n6	h6
Shaft tolerance	j6	h6	h6	k6	m6	n6	h6
Bore tolerance	H7	J7	K7	H7	H7	H7	M7

The fit assignment m6 / H7 is particularly suitable for many applications.



**Failure to observe these instructions may result in breakage of the coupling.
Danger from flying fragments!
The coupling then becomes an explosion hazard.**

3.2 Machining the parallel keyway

Arrangement of the parallel keyway centrally between buffer bores or bolt bores.

- Parallel keyway to DIN 6885/1 **ISO JS9** with usual operating conditions.
- Width of parallel keyway **ISO P9** with reversing operation.
- Width of parallel keyway **ISO P9** with coupling part (3).

3.3 Axial fastening

Arrange set screw on the parallel keyway. Only in case of sizes 105 and 125 place the set screw offset 180° to the parallel keyway.

Position of the set screw approximately in the middle of the hub, on coupling part 3 under angle of 25° (see figure 8).

Use threaded studs to DIN 916 with cup points as set screws (set-screw size to table 7).

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

Alternatively use end plate; as regards recess contact Siemens.

Table 7: Set-screw assignment and tightening torques

Type RWN, RWB, RFN					Type RWS, RBS, RFS				
Bore range		Set-screw size d ₁	Tightening torque T _A	Wrench width Hexagon socket mm	Bore range		Set-screw size d ₁	Tightening torque T _A	Wrench width Hexagon socket mm
over	up to				over	up to			
mm	mm	mm	Nm	mm	mm	mm	Nm	mm	
8	30	M 6	4	3	8	30	M 6	4	3
30	38	M 8	8	4	30	75	M 8	8	4
38	65	M 10	15	5	75	95	M 12	25	6
65	95	M 12	25	6	95	110	M 16	70	8
95	110	M 16	70	8	110	150	M 20	130	10
110	150	M 20	130	10	150	230	M 24	230	12
150	230	M 24	230	12	230	640	M 30	470	14
230	600	M 30	470	14					

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 DIN 25202 Screw-Connection Class "C", with an output-torque scatter of $\pm 5\%$.

3.4 Balancing after machining the finished bore

The balancing quality is to be specified in accordance with the specific application (however at least G16 to DIN ISO 1940).

Balancing prescription to DIN ISO 8821 of the shaft must be observed.



Balancing bores must not affect the load-bearing capacity of the coupling parts.

The balancing bores must be applied on a large radius with sufficient distance to the buffer bores, bolt bores and the outer circumference.



The flange must not be completely drilled through. The braking surface of the coupling part (3) must not be damaged.

3.5 Placing the coupling parts with cylindrical and conical bore with parallel key

Unscrew the set screw.

Clean the holes and shaft ends.

Coat the bores of the coupling parts (1; 2; 3) and the shafts with MoS₂ mounting paste (e.g. Microgleit LP 405).



Coupling parts (1; 2; 3) with tapered bore and parallel-key connection must be fitted in cold condition and secured with suitable end plates, without drawing the coupling parts (1; 2; 3) further onto the taper (fitting dimension = 0).

Place the coupling parts (1; 2; 3); in case of cylindrical bore, heat up to max. + 150 °C, if necessary. When heating up observe the temperature range of the buffers (5) (see table 5); if necessary demount the buffers (5).



Heated coupling parts form an explosion hazard, therefore there must not be an explosible atmosphere when fitting the coupling parts.

Axial securing is effected by means of the set screw or end plate. When securing by set screw the shaft must not project or be set back from the inner sides of the hub.

Fit the set screw or end plate (tightening torques of the set screw to table 7).



Failure to observe these instructions may result in breakage of the coupling. Danger from flying fragments! The coupling then becomes an explosion hazard.

3.6 Fitting of coupling parts 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 should be observed with priority.

Unscrew screw plugs (101 / 201 / 301) from the coupling parts (1; 2; 3). Clean and dry holes and shaft ends. The oil channels and oil-circulation grooves must also be free from dirt.



The machine shaft and the bore of the coupling part (1; 2; 3) must be absolutely clean and free of grease and oil!

Demount buffers (5).

Protect 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; 3) must be fitted in hot condition and, depending on the shrink dimension, heated to the temperature indicated on the dimensioned drawing.

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



Burner an heated coupling parts form an explosion hazard, therefore there must not be an explosible atmosphere when fitting the coupling parts.

Before fitting, the bore size of the heated coupling parts (1; 2; 3) must be checked, e.g. with a bore-hole gauge.

The coupling parts (1; 2; 3) should be pushed smartly onto the shaft up to the position specified in the dimensioned drawing.



The coupling parts (1; 2; 3) must be held in position on the shaft with the aid of a suitable retaining device, until they cool down and seat firmly.

In case of tapered interference fit and non self-locking connection, the axial securing takes place by an end plate.

After the coupling parts (1; 2; 3) 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 (101 / 201 / 301) (rust protection).

3.7 Fitting the coupling

In the case of types RFN and RFS, bolt the coupling part 20 (20) to the counterpart (tightening torques in accordance with table 10).

If necessary, fit buffer (5) and bolt (4). Observe the temperature range (see table 4).

Bolt and tapered bore must be absolutely clean and free of grease!

Compose balancing groups in accordance with the marking.

Tighten hexagon nuts (7) or bolts (11) using a torque wrench (tightening torques in accordance with table 9) and secure them with thread-locking medium "medium-firm" (e.g. Loctite 243). Apply just a small quantity of Loctite to the bolt (11), otherwise there is a risk that the Loctite may seal the transverse bore.

Align the coupling as described in item 3.8.

3.8 Possible misalignments

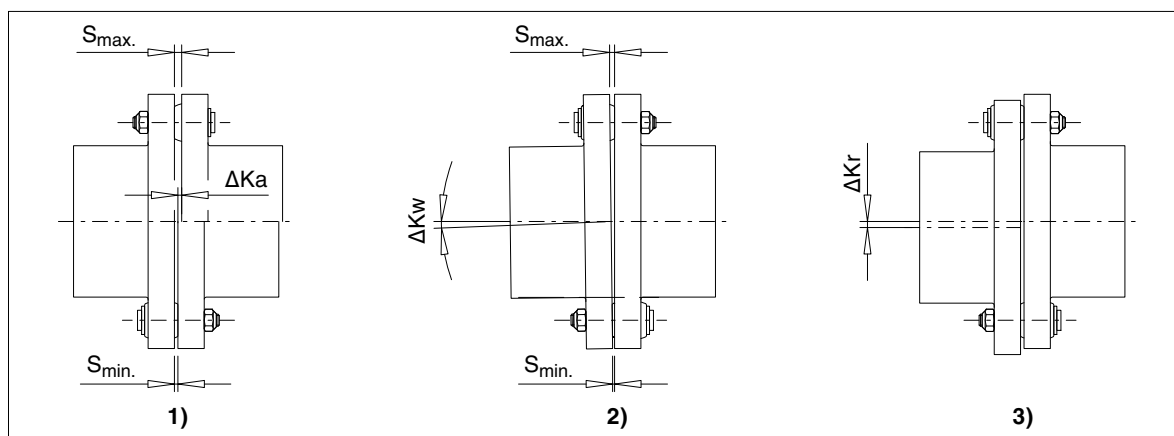


Fig. 5: Possible misalignments

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

3.8.1 Axial misalignment

The gap dimension ΔK_a should be set within the deviation permitted for the dimension "S" (see section 1).

3.8.2 Angular misalignment

The angular misalignment ΔK_w can be measured as difference of the gap dimension ($\Delta S = S_{max.} - S_{min.}$) $\Delta S_{perm.}$, see table 8.

If required, the permissible angular misalignment ΔK_w can be calculated as follows:

$$\Delta K_{w_{perm.}} \text{ in RAD} = \Delta S_{perm.} / DA \quad \Delta S_{perm.}, \text{ see table 8.}$$

$$\Delta K_{w_{perm.}} \text{ in GRAD} = \Delta S_{perm.} / DA \times 180 / \pi \quad \text{"DA" in mm, see section 1.}$$

3.8.3 Radial misalignment

The permissible radial misalignment $\Delta K_{r_{perm.}}$ can be found in table 8 (depending on the operating speed).

3.9 Alignment



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

Misalignment values specified in table 8 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 on the flexible elements. Misalignment in the coupling gives rise to restorative forces which may impose inadmissible stress on adjacent machine parts (e.g. bearings).

3.10 Shaft-misalignment values during operation



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

Table 8: Shaft- misalignment values $\Delta S_{perm.}$ and $\Delta K r_{perm.}$, maximum permissible during operation, stated in mm (rounded)

Size	Coupling speed in 1/min								
	250	500	750	1000	1500	2000	3000	4000	5000
105	0.5	0.35	0.3	0.25	0.2	0.15	0.15	0.1	0.1
125	0.55	0.4	0.3	0.25	0.2	0.2	0.15	0.1	0.1
144	0.6	0.4	0.35	0.3	0.25	0.2	0.15	0.15	0.1
162	0.65	0.45	0.35	0.3	0.25	0.2	0.15	0.15	0.15
178	0.7	0.5	0.4	0.35	0.25	0.25	0.2	0.15	
198	0.75	0.5	0.4	0.35	0.3	0.25	0.2	0.15	
228	0.8	0.55	0.45	0.4	0.3	0.25	0.2	0.2	
252	0.85	0.6	0.5	0.45	0.35	0.3	0.25	0.2	
285	0.95	0.65	0.55	0.45	0.4	0.3	0.25		
320	1.05	0.75	0.6	0.5	0.4	0.35	0.3		
360	1.15	0.8	0.65	0.55	0.45	0.4	0.3		
400	1.25	0.85	0.7	0.6	0.5	0.45			
450	1.35	0.95	0.8	0.7	0.55	0.45			
500	1.5	1.05	0.85	0.75	0.6	0.5			
560	1.65	1.15	0.95	0.8	0.65	0.55			
630	1.85	1.3	1.05	0.9	0.75				
710	2.05	1.45	1.15	1	0.8				
800	2.25	1.6	1.3	1.1					
900	2.5	1.75	1.45	1.25					
1000	2.75	1.95	1.6	1.35					
1120	3.05	2.15	1.75	1.5					
1250	3.4	2.4	1.95						
1400	3.75	2.65	2.15						
1600	4.3	3							
1800	4.8	3.4							
2000	5.3	3.75							

The numerical values of the table, as well as the intermediate values, can be calculated as follows:

$$\Delta K r_{perm.} = \Delta S_{perm.} = (0.1 + DA / 1000) \times 40 / \sqrt{n}$$

Coupling speed "n" in 1/min
 "DA" in mm, see section 1.
 Radial misalignment $\Delta K r_{perm.}$ in mm

For speeds < 250 1/min the values in the colon "250 1/min" in table 8 apply.

3.11 Assignment of the tightening torques and wrench widths



The use of an impact screwdriver 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 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 7.

Table 9: Tightening torques and wrench widths of the screw connection with bolts

Size	105	125 144	162 178 198	228 252	285 320	360 400	450 500	560 630	710 800	900 1000	1120 1250 1400 1600	1800 2000
Tightening torque T_A	8	15	30	55	100	170	180	340	580	600	1150	2000
Wrench width SW Hexagon head	10	13	17	19	24	27	24	30	36	36	46	55

Table 10: Tightening torques for bolting coupling part 20 to the counterpart

Size	105	125 144 162	178 198	228 252 285	320 360 400	450 500 560	630 710	800
Bolt size	M8	M10	M12	M16	M20	M24	M30	M36
Tightening torque T_A	24.6	48	84	206	415	714	1428	2482

Bolts of strength class 8.8 with a shim to DIN 125 must be used.

4. Start-up and operation



Bolt-tightening torques for the coupling and tightening torques for the foundation bolts of the coupled machine must be checked before start-up. Enclosures (coupling protection, contact guard) 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.



If it is to be used below ground in potentially explosive areas, the coupling, which is made of cast iron or steel, must be provided with a robust casing to preclude the risk of ignition from e.g. friction, impact or friction sparks.
The depositing of heavy metal oxides (rust) on the coupling must be precluded by the casing or other suitable precautions.

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

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 the axial fastening and, if necessary, adjust.
- Wear check, procedure as described in section 6.

Buffers (5) worn:

- Check wear of the buffers (5) as described in section 6; if necessary replace the buffers (5).

5.2 Incorrect use



**Failure to observe these instructions may result in breakage of the coupling.
Danger from flying fragments!
Through incorrect use the coupling may become an explosion hazard.**

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

- Important information for 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 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 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 / drive train form a critical torsional, axial and 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 fitting coupling parts in a heated condition, already fitted RUPEX buffers (5) are being excessively 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 fastenings 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 / shaft-misalignment values do not match those 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.
- RUPEX buffers are not fitted.
- The coupling guard used is not suitable.

5.2.3 Frequent faults in maintenance

- Maintenance intervals are not being adhered to.
- No genuine RUPEX spare parts are being used.
- Old or damaged RUPEX spare parts are being used.
- The fitted buffers (5) are different.
- 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, vibration, etc.) are not being observed.
- Specified tightening torques are not being adhered to.
- Alignment / shaft-misalignment values do not match those in the instructions manual.

6. Maintenance and repair

6.1 Maintenance interval



The torsional backlash between the two coupling parts must be checked after three months, then at least once a year.

The buffers (5) must be replaced, when the torsional backlash exceeds the value stated in table 11.

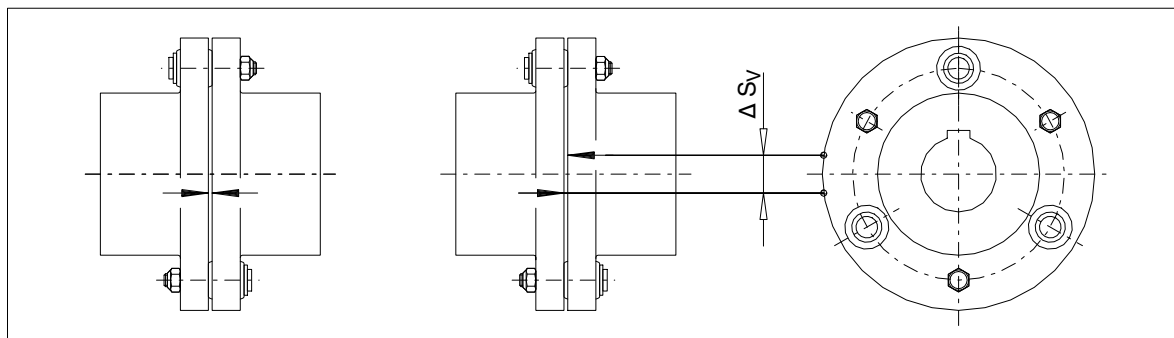


Fig. 6: Wear mark

Table 11: Wear mark for the torsional backlash

Size	105	125	162	228	285	360	450	560	710	900	1120	1400	1800
		144	198	252	320	400	500	630	800	1000	1250	1600	2000
Wear mark ΔS_v in mm	3.0	3.5	4.0	4.5	6.0	7.0	8.5	10.0	12.0	13.5	15.0	18.0	20.0



If the above specified maintenance instructions are not adhered to, a correct operation within the meaning of the explosion-prevention requirements and/or Directive 94/9/EC can no longer be guaranteed.
Use in potentially explosive areas is then not permitted.



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

6.2 Replacement of wearing parts

Loosen and remove the hexagon-head nuts (7) and demount bolts (4) and buffers (5) through the buffer bores (up to coupling size 400).

Loosen and remove the hexagon-head nuts (11) and demount bolts (4) and buffers (5) and disks (8) through the buffer bores (from coupling size 450 on).

After removing the locking ring (12) and the washer (6) the buffers (5) can be removed through the buffer holes (from coupling size 710 upwards without removing the bolts).

Pull off the buffers (5) and carefully clean the bolts (4) and fitting holes.

The buffers (5) must be replaced in sets. Only identical buffers (5) may be used.

After replacing the buffers (5), assembly is carried out in the reverse order, the screws (11) being resecured with thread-locking medium "medium-firm" (e.g. Loctite 243). The self-locking hexagon nuts (7) must be replaced with new hexagon nuts (7) of the same quality.

For re-assembly, the instructions in sections 3 and 4 must be observed.

6.2.1 Extracting the bolts in the case of coupling sizes 450 to 2000 with the demounting box

For demounting the bolts Siemens offers a hydraulic extracting device, which can be provided on request.



Observe instructions manual BA 3600.1, "Demounting box for extracting RUPEX bolts"!

6.2.2 Extracting the bolts in the case of coupling sizes 450 to 2000 with grease

Separate the coupling halves (1; 2; 3) and make them free of load. From coupling size 710 upwards the locking rings (12) and disks (6) can be removed and the buffers (5) pulled off the bolts (4), if a separation of the coupling halves (1; 2; 3) is not possible.

Unscrew bolt (11) and remove disk (8). Completely remove Loctite residue from the tapped hole.

Fill the tapped hole of the RUPEX bolt to 90 % with commercially available machine grease (e.g. Fuchs Renolit H443-HD-88).

Wind Teflon strip or Teflon sealing cord around the bolt (11) and screw it together with the fitted washer (8) by your fingers some 2 to 3 threads into the bolt (4).



Wear protective glasses!

For axial securing, disk (8) must imperatively be positioned at bolt (11).

Danger of getting caught by the sudden movement of the bolt (11), disk (8) and by a sudden release of the bolt (4)!

Sudden release of the bolt is accompanied by a loud noise.

Using a spanner, screw the bolt (11) slowly further into the thread. In this manner the grease is pressed through the transverse bore between the bolt and bolt bore in the coupling part (1; 2; 3). Screw in slowly, to enable the grease to spread evenly on the bolt (4). If it is not possible to generate enough pressure, a longer bolt (minimum strength class 8.8) should be used or, if necessary, grease should be re-filled. Grease must not escape; if it does, the bolt (11) must be re-sealed.

The extraction operation has finished as soon as the bolt (4) is released from the hole.

Demount all the bolts (4) one after the other in this way.

If reusing the old bolts (4), clean them carefully. No grease or Loctite must be left in the tapped or transverse bores in the bolts (4).

Apply just a small quantity of Loctite to the screw (11), otherwise there is a risk that the Loctite may seal the transverse hole.

For re-assembly, the instructions in sections 3 and 4 must be observed.

6.3 Demounting the coupling parts in case of shaft-hub connection with parallel key

Move the coupled machines apart.

Remove the axial fastening (set screw, end plate). Mount a suitable detaching device. Using a burner, heat coupling part (1; 2; 3) along its length and above the parallel keyway (max. + 80 °C). When heating up observe the temperature range of the buffers (5) (see table 5); if necessary demount the buffers (5).



Burner and heated coupling parts (1; 2; 3) form an explosion hazard, therefore there must not be an explosible atmosphere when fitting the coupling parts.

Pull off coupling part (1; 2; 3). Examine the hub bore and the shaft for damage, and protect against rust. Damaged parts must be replaced.

For re-assembly, the instructions in sections 3 and 4 must be observed.

6.4 Demounting the coupling parts in case of a cylindrical and tapered interference fit set up for removal by oil-hydraulic shrinking-off

Move the coupled machines apart.

Demount buffers (5).

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) or a motor pump with corresponding number of independently closable connections. In case of coupling parts (1; 2; 3) with stepped bore, a motor-driven pump must be connected up 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.
- Suitable connections and pipes.
- 1 detaching device or retaining plate with retaining screws 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 with oil pump. Note displacement and pressure of the hydraulic cylinder (for axial force, consult Siemens or refer to the dimensioned drawing).



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

Fit the detaching device.



Secure coupling part (1; 2; 3) and detaching device, using suitable lifting equipment!

In case of tapered interference fit, to prevent the coupling part (1; 2; 3) from suddenly coming off, it must be secured axially.

The screw plugs (101 / 201 / 301) must be removed from the oil channels. One oil pump must be bled and connected up to middle oil channel.

Then apply the pressure specified on the dimensioned drawing to the pump until oil emerges from the adjacent connections or at the end faces.



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

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

Bleed the next oil pump, connect it up to the adjacent oil channel and operate it at the pressure specified on the dimensioned drawing, until oil emerges from the adjacent connections or at the end faces.

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 can pressure be applied to the hydraulic cylinder to slide the coupling part (1; 2; 3) smartly off the shaft.

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



Note stroke of hydraulic cylinder. If re-adjustment is necessary, the end face of the hydraulic cylinder must stop between 2 oil channels.

After detaching, the oil pumps and the detaching device must be removed from the coupling part (1; 2; 3).

Examine the hub bore and the shaft for damage, and protect against rust. Damaged parts must be replaced.

For re-assembly, the instructions in sections 3 and 4 must be observed.

7. Stocking spare parts

7.1 Spare parts

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

- Siemens order number and position
- 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, intermediate-shaft length, brake-drum dimensions.
- Any special details such as temperature, electrically insulating.

Table 12: Spare-parts list

Type RWN, RWS		Type RWB, RBS		Type RFN, RFS	
Part number	Designation	Part number	Designation	Part number	Designation
1	Coupling part 1	1	Coupling part 1	1	Coupling part 1
2	Coupling part 2	3	Coupling part 3	4	Bolt
4	Bolt	4	Bolt	5	Buffer
5	Buffer	5	Buffer	6	Washer
6	Washer	6	Washer	7	Hexagon nut, self-locking
7	Hexagon nut, self-locking	7	Hexagon nut, self-locking	8	Washer
8	Washer	101	Screw plug ¹⁾	11	Hexagon-head bolt
11	Hexagon-head bolt	301	Screw plug ¹⁾	12	Locking ring
12	Locking ring			20	Coupling part 20
101	Screw plug ¹⁾			101	Screw plug ¹⁾
201	Screw plug ¹⁾				

¹⁾ The screw plugs (101 / 201 / 301; see fig. 7) are used only with an oil-hydraulic interference fit (see item 3.6).

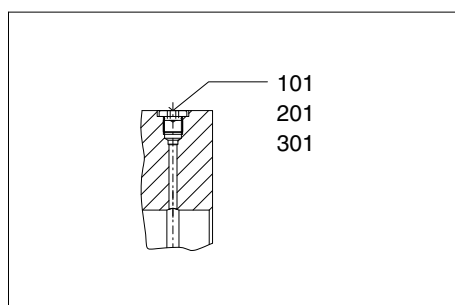


Fig. 7: Screw plug

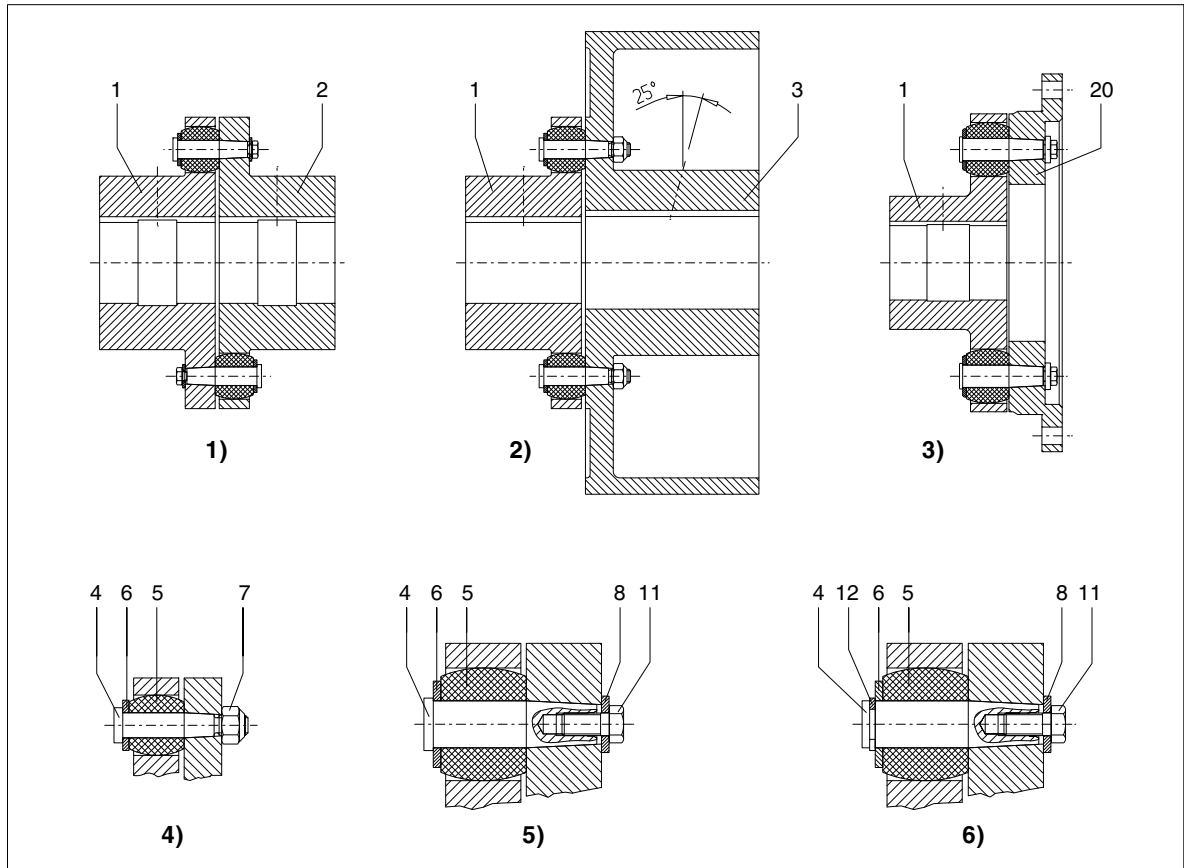


Fig. 8: Spare-parts drawing

- 1) Types RWN, RWS
- 2) Types RWB, RBS
- 3) Types RFN, RFS
- 4) Screw connection with bolts in case of sizes 105 to 400
- 5) Screw connection with bolts in case of sizes 450 to 630
- 6) Screw connection with bolts in case of sizes 710 to 2000



Up to size 360 the buffers are arranged on one side in coupling part 1. From size 400 onwards the buffers are located within coupling parts 1 and 2.

8. Declarations

8.1 EC declaration of conformity



EC declaration of conformity

within the meaning of EC Directive 94/9/EC of 23.03.1994 and the legal requirements laid down for its implementation

The manufacturer, Siemens AG, 46395 Bocholt, Germany, declares that the equipment described in these operating instructions:

FLENDER RUPEX®
couplings
Types RWN, RWS, RWB, RBS
and RFN, RFS

is in conformity with Article 1 and Article 8, Paragraph 1 b) ii) of Directive 94/9/EC and complies with the requirements of Directive 94/9/EC and the following standards:

DIN EN 1127-1 : 02-2008
DIN EN 13463-1 : 07-2009

The technical documentation has been delivered to the body named below:

DEKRA EXAM GmbH, 44727 Bochum, Germany, code number: 0158.

Bocholt, 2012-02-22

A handwritten signature in black ink that reads 'Jansen'.

Andre Jansen (Director Engineering KUE)

Bocholt, 2012-02-22

A handwritten signature in black ink that reads 'N. Warning'.

Nicola Warning (Director Business Subsegment KU)

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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