FLENDER RUPEX®
Couplings
Types RWN and RWS
with axial backlash limitation

Operating instructions
BA 3601 en 06/2012
FLENDER RUPEX® Couplings

Types RWN and RWS with axial backlash limitation

Operating instructions
Translation of the original operating instructions
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 tapered bore with parallel key or press-fit seat. If other shaft-to-hub connections are used (e. g. involute splines according to the standard “DIN 5480”) or if the coupling is installed in a vertical or tilted alignment, 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.

Parts numbers and parts descriptions in the spare parts drawing can be found in section 7. “Stocking spare parts” or the dimensioned drawing.

1.1 Buffer (5)

- Buffers may be stored for up to 5 years.
- Buffers must be protected from direct sunlight, artificial light with 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 1).
- Replace buffers by sets. Only identical buffers may be used.

<table>
<thead>
<tr>
<th>Material</th>
<th>Hardness</th>
<th>Remark</th>
<th>Mark</th>
<th>Temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR</td>
<td>80 Shore A</td>
<td>Standard</td>
<td>black buffer</td>
<td>- 30 °C to + 80 °C</td>
</tr>
<tr>
<td>NBR</td>
<td>65 Shore A</td>
<td>Special, soft Shift of the rotary resonance speed Nominal rotary speed reduced</td>
<td>black buffer with a green dot on the front face</td>
<td>- 30 °C to + 80 °C</td>
</tr>
<tr>
<td>NBR</td>
<td>90 Shore A</td>
<td>Special, solid Shift of the rotary resonance speed</td>
<td>black buffer with a magenta dot on the front face</td>
<td>- 30 °C to + 80 °C</td>
</tr>
<tr>
<td>NBR 639</td>
<td>80 Shore A</td>
<td>Special, electrically insulating</td>
<td>green buffer</td>
<td>- 30 °C to + 80 °C</td>
</tr>
<tr>
<td>NR</td>
<td>80 Shore A</td>
<td>Special, low-temperature use</td>
<td>black buffer with a white dot on the front face</td>
<td>- 50 °C to + 50 °C</td>
</tr>
<tr>
<td>HNBR</td>
<td>80 Shore A</td>
<td>Special, high-temperature use</td>
<td>black buffer with a red dot on the front face</td>
<td>- 10 °C to + 100 °C</td>
</tr>
</tbody>
</table>
Table 2: Types RWN and RWS with axial backlash limitation

<table>
<thead>
<tr>
<th>Size</th>
<th>Speed n&lt;sub&gt;max&lt;/sub&gt; 1)&lt;sub&gt;1/min&lt;/sub&gt;</th>
<th>Maximum bore 1)&lt;sub&gt;1/min&lt;/sub&gt;</th>
<th>Weight 2)&lt;sub&gt;m&lt;/sub&gt;</th>
<th>RWN kg</th>
<th>RWS kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D1 RWN</td>
<td>D2 RWN</td>
<td>D1 RWS</td>
<td>D2 RWS</td>
<td>DA RWN</td>
</tr>
<tr>
<td>285</td>
<td>2650</td>
<td>3900</td>
<td>100</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>320</td>
<td>2350</td>
<td>3500</td>
<td>110</td>
<td>120</td>
<td>125</td>
</tr>
<tr>
<td>360</td>
<td>2100</td>
<td>3100</td>
<td>120</td>
<td>130</td>
<td>135</td>
</tr>
<tr>
<td>400</td>
<td>2050</td>
<td>2800</td>
<td>140</td>
<td>140</td>
<td>150</td>
</tr>
<tr>
<td>450</td>
<td>1800</td>
<td>2500</td>
<td>160</td>
<td>160</td>
<td>170</td>
</tr>
<tr>
<td>500</td>
<td>1600</td>
<td>2200</td>
<td>180</td>
<td>180</td>
<td>190</td>
</tr>
<tr>
<td>560</td>
<td>1450</td>
<td>2000</td>
<td>140</td>
<td>180</td>
<td>200</td>
</tr>
<tr>
<td>630</td>
<td>1280</td>
<td>1800</td>
<td>140</td>
<td>180</td>
<td>220</td>
</tr>
<tr>
<td>710</td>
<td>1150</td>
<td>1600</td>
<td>160</td>
<td>200</td>
<td>240</td>
</tr>
<tr>
<td>800</td>
<td>1000</td>
<td>1400</td>
<td>180</td>
<td>220</td>
<td>260</td>
</tr>
<tr>
<td>900</td>
<td>900</td>
<td>1250</td>
<td>220</td>
<td>220</td>
<td>260</td>
</tr>
<tr>
<td>1000</td>
<td>810</td>
<td>1100</td>
<td>240</td>
<td>240</td>
<td>280</td>
</tr>
<tr>
<td>1120</td>
<td>700</td>
<td>1000</td>
<td>250</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>1250</td>
<td>650</td>
<td>900</td>
<td>280</td>
<td>280</td>
<td>330</td>
</tr>
</tbody>
</table>

1) Maximum bore with groove according to the standard “DIN 6885/1”.
2) Weights are valid for maximum bores.
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, assembly, disassembly, operation and maintenance of the unit, the relevant safety and environmental regulations must be observed.

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

Store the coupling in a dry place. Apply adequate preservation.

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 on the coupling is in progress.

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

Dispose or recycle the coupling according to the valid national regulations.

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**

Coupling parts for oil-hydraulic shrinking are delivered in a finished 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).

Clamp on surfaces marked with \( \text{\textbullet} \) and align.

Insert finished bore. The maximum dimension of the bore according to section 1. "Technical data" must be observed.

Check finished bore as described in figure 2.

---

**Fig. 2:** Machining the finished bore

**Table 3:** Fit recommendation for bores with parallel-key connection

<table>
<thead>
<tr>
<th>Description</th>
<th>Push fit not suitable for reversing operation</th>
<th>Press fit suitable for reversing operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft tolerance</td>
<td>j6</td>
<td>h6</td>
</tr>
<tr>
<td>Bore tolerance</td>
<td>H7</td>
<td>J7</td>
</tr>
</tbody>
</table>

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

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

3.2 **Insertion of the parallel keyway**

Alignment of the parallel keyway is centred between buffer bores or bolt bores.

- Parallel keyway according to standard "DIN 6885/1 ISO JS9" in common operating conditions.
- Width of parallel keyway ISO P9 with reversing operation.
3.3 Axial fastening

Arrange set screw on the parallel keyway.

Position of the set screw is about in the centre of the hub.

Use threaded pins with journal according to standard "ISO 4028" as set screw (set screw size according to table 4).

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

In alternative, use end plate. Consult Siemens for the dimensions of the recess.

![Fig. 3: Position of the set screw](image)

**Table 4:** Set-screw assignment, set-screw position and tightening torques

<table>
<thead>
<tr>
<th>Bore range</th>
<th>Type RWN</th>
<th>Tightening torque</th>
<th>Width across flats</th>
</tr>
</thead>
<tbody>
<tr>
<td>over</td>
<td>up to</td>
<td>d1</td>
<td>mm</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>48</td>
<td>65</td>
<td>M10</td>
<td>7</td>
</tr>
<tr>
<td>65</td>
<td>95</td>
<td>M12</td>
<td>8.5</td>
</tr>
<tr>
<td>95</td>
<td>110</td>
<td>M16</td>
<td>12</td>
</tr>
<tr>
<td>110</td>
<td>150</td>
<td>M20</td>
<td>15</td>
</tr>
<tr>
<td>150</td>
<td>230</td>
<td>M24</td>
<td>18</td>
</tr>
<tr>
<td>230</td>
<td>600</td>
<td>M30</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bore range</th>
<th>Type RWS</th>
<th>Tightening torque</th>
<th>Width across flats</th>
</tr>
</thead>
<tbody>
<tr>
<td>over</td>
<td>up to</td>
<td>d1</td>
<td>mm</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>48</td>
<td>75</td>
<td>M8</td>
<td>5.5</td>
</tr>
<tr>
<td>75</td>
<td>95</td>
<td>M12</td>
<td>8.5</td>
</tr>
<tr>
<td>95</td>
<td>110</td>
<td>M16</td>
<td>12</td>
</tr>
<tr>
<td>110</td>
<td>150</td>
<td>M20</td>
<td>15</td>
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<tr>
<td>150</td>
<td>230</td>
<td>M24</td>
<td>18</td>
</tr>
<tr>
<td>230</td>
<td>600</td>
<td>M30</td>
<td>24</td>
</tr>
</tbody>
</table>

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

The specified tightening torques $T_A$ in application of standard "DIN 25202" screw-connection class "C" with a distribution of the specified torque at $\pm 5\%$ must be maintained.

3.4 Balancing after machining the finished bore

Select the balancing quality according to the specific application (however min. G16 to standard "DIN ISO 1940").

Observe the balancing requirement for the shaft according to the standard "DIN ISO 8821".

**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 outer diameter.

**The flange must not be drilled through completely.**
3.5 Mounting of the coupling parts with cylindrical and tapered bore with parallel key

Unscrew the set screw.

Clean the holes and shaft ends.

Coat the bores of the coupling parts (1; 2) and the shafts with MoS\textsubscript{2} 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 plates without drawing the coupling parts (1; 2) further onto the taper (fitting dimension = 0).**

Prior to fitting coupling part 1 onto the shaft, set the retaining ring (31) onto the hub of the coupling part 1.

Fit the coupling parts (1; 2) and with a cylindrical bore, heat up to maximally 150 °C if necessary. When heating up observe the temperature range of the buffer (5) (see table 1), if necessary demount the flexible elements (5).

Allow coupling parts (1; 2) to cool down to approx. + 30 °C.

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. Start drilling the parallel key in the motor shaft through the existing set screw bore as shown in item 3.3. Clean soiling from coupling parts.

Fit the set screw or end plate (tightening torque of the set screw according to table 4).

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

3.6 Fitting of coupling parts with a cylindrical and tapered interference fit set up for removal by oil-hydraulic shrinking-off

**The information specified in the dimensioned drawing must be observed with priority.**

Unscrew screw plugs (101; 201) from the coupling parts (1; 2). 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) must be absolutely clean and free of grease and oil.**

Demount buffer (5).

Prior to fitting coupling part 1 onto the shaft, apply the retaining ring (31) onto the hub of the coupling part 1.

Protect seals of the input and output side from damage and heating to over + 80 °C.
(Use heat shields to protect against radiant heat.)

The coupling parts (1; 2) must be fitted in warm 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.

Prior to fitting the bore dimension of the heated coupling parts (1; 2), check e. g. with bore hole gauge.

The coupling parts (1; 2) should be fitted swiftly onto the shaft up to the position required by the specifications of the dimensioned drawing.

**The coupling parts (1; 2) must be held in position on the shaft by means of a suitable retaining device until they cool down and sit firmly.**
For a tapered interference fit, the axial fastening is provided by means of an end plate if it is not a self-locking connection.

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 (101; 201) (rust protection).

3.7 Installation of the coupling

If necessary, install bolts (4) with a disk (6) and buffer (5) into the coupling part 1 and insert bolt (30) with disk (6) and buffer (5) into the coupling part 2.

**Bolts and tapered bore must be clean and free from grease!**

Compose balancing sets according to their identification.

Tighten hexagon nuts (7) or screws (11) with torque wrench (tightening torques according to table 6) and tension to medium thread locking (e. g. Loctite 243). Apply just a small quantity of Loctite to the screw (11), otherwise there is a risk that the Loctite might seal the oil hole.

In order to determine the position of the machines to be coupled, identify the axial clearance of the electrical motor. Half the measure of the actual clearance is the preliminary position of the motor shaft to the machine shaft and must be within the permissible deviation for the value “S” (see section 1. "Technical data").

Move the machines together that are to be coupled.

⚠️ **Pay attention to danger of squeezing.**

Mount restraining ring (31) and bolt (30) with the screws (32).

⚠️ **Take note of the identification marking.**

Secure screws (32) with a few drops of adhesive (e. g. Loctite type 242) (for tightening torques, see item 3.12).

Align the coupling as described in item 3.9.
3.8 Possible misalignments

1) Axial misalignment (ΔKa)
2) Angular misalignment (ΔKw)
3) Radial misalignment (ΔKr)

3.8.1 Axial misalignment

The gap dimension ΔKa must be set within the permissible deviation for the value “S” (see section 1. "Technical data").

3.8.2 Angular misalignment

The angular misalignment ΔKw can be measured as difference of the gap dimension (ΔS = S_{max} - S_{min}) ΔS_{perm.} see table 5.

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

ΔKw_{perm.} in RAD = ΔS_{perm.} / DA

ΔKw_{perm.} in DEGREES = ΔS_{perm.} / DA \times 180 / \pi

“DA” in mm see section 1.

3.8.3 Radial misalignment

The permissible radial misalignment ΔKr_{perm.} can be found in table 5 (depending on operating rotation speed).
3.9 Alignment

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

Misalignment values specified in table 5 are maximum permissible overall values in operation, resulting from false positioning due to imprecision during alignment and misalignment due to operation (e.g. deformation through load, heat expansion).

Reduced misalignment in the coupling minimises expected wear on the flexible elements. Misalignment in the coupling leads to restorative forces, which may impose unacceptable stress on adjacent machine parts (e.g. bearings).

3.10 Shaft-displacement 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 as low as possible.

Table 5: Shaft-displacement values $\Delta S_{\text{perm.}}$ and $\Delta K_{\text{r perm.}}$ stated in mm (rounded)

<table>
<thead>
<tr>
<th>Size</th>
<th>Coupling speed in 1/min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250</td>
</tr>
<tr>
<td>285</td>
<td>0.95</td>
</tr>
<tr>
<td>320</td>
<td>1.05</td>
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<tr>
<td>360</td>
<td>1.15</td>
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<td>400</td>
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<td>1.35</td>
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<td>630</td>
<td>1.85</td>
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<tr>
<td>710</td>
<td>2.05</td>
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<tr>
<td>800</td>
<td>2.25</td>
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<tr>
<td>900</td>
<td>2.5</td>
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<tr>
<td>1000</td>
<td>2.75</td>
</tr>
<tr>
<td>1120</td>
<td>3.05</td>
</tr>
<tr>
<td>1250</td>
<td>3.4</td>
</tr>
</tbody>
</table>

The numerical values in table 5, as well as the intermediate values, can be calculated as follows:

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

coupling torque "n" in 1/min

"DA" in mm (see section 1.)

Radial misalignment $\Delta K_{\text{r perm.}}$ in mm

For torques < 250 1/min, the values in column "250 1/min" of table 5 apply.
### 3.11 Setting the axial backlash

The axial backlash limitation on the RUPEX coupling must in every case be less than the determined axial backlash of the electric motor.

Using the set screws (33; 34), set the axial backlash of the RUPEX coupling to about half the determined motor axial backlash. The coupling backlash must be within the permissible values for “S”.

**Example:**

- Axial backlash of the motor = 8 mm
- Axial backlash of the coupling = 4 mm
- Axial backlash to be set for each coupling part (dimension *) = 2 mm

As the mid-point of the rotor’s axial backlash need not coincide with the magnetic centre of the motor, many electric motors have a mark on the shaft. When this identification mark is aligned with the outer surface of the bearing cover, the magnetic centre of the rotor is obtained.

The magnetic centre must be determined by means of a test run if the motors do not have this identification marking.

In this operating position the set axial backlash on the RUPEX coupling (dimension *) must be identical on both sides to prevent axial forces affecting the machine bearings. After completed setting, the lock nuts (35) must be tightened.

**STOP**

The set axial backlash must be sufficient to enable the RUPEX coupling to compensate for the resulting angular deviation.
3.12 Assignment of the tightening torques and widths across flats

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 \( \mu = 0.14 \)). Use of lubricant paint or lubricant, which affects the coefficient of friction \( \mu \), is not permitted.

The specified tightening torques \( T_A \) in application of standard "DIN 25202" screw-connection class "C" with a distribution of the specified torque at \( \pm 5\% \) must be maintained.

The tightening torques and set screw widths across flats are specified in table 4.

Table 6: Tightening torques and the bolt connection widths across flats

<table>
<thead>
<tr>
<th>Size</th>
<th>Tightening torques ( T_A )</th>
<th>Width across flats SW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part 7, 11 Nm</td>
<td>Part 32 Nm</td>
</tr>
<tr>
<td>285</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>320</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>360</td>
<td>170</td>
<td>105</td>
</tr>
<tr>
<td>400</td>
<td>170</td>
<td>105</td>
</tr>
<tr>
<td>450</td>
<td>180</td>
<td>255</td>
</tr>
<tr>
<td>500</td>
<td>180</td>
<td>255</td>
</tr>
<tr>
<td>560</td>
<td>340</td>
<td>500</td>
</tr>
<tr>
<td>630</td>
<td>340</td>
<td>500</td>
</tr>
<tr>
<td>710</td>
<td>580</td>
<td>870</td>
</tr>
<tr>
<td>800</td>
<td>580</td>
<td>870</td>
</tr>
<tr>
<td>900</td>
<td>600</td>
<td>870</td>
</tr>
<tr>
<td>1000</td>
<td>600</td>
<td>870</td>
</tr>
<tr>
<td>1120</td>
<td>1150</td>
<td>1750</td>
</tr>
<tr>
<td>1250</td>
<td>1150</td>
<td>1750</td>
</tr>
</tbody>
</table>

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 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 a fault the drive must be stopped at once. The necessary measures for repair must be initiated in accordance with the applicable safety regulations.
5. Faults, causes and remedy

<table>
<thead>
<tr>
<th>Faults</th>
<th>Hazards</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changed operating noises; vibrations</td>
<td>Airborne fragments</td>
<td>Search for causes of fault according to item 5.1 and item 5.2 and remove the cause.</td>
</tr>
<tr>
<td>Premature wear and tear on flexible elements; change in the properties of the flexible elements</td>
<td>Ignition hazard from creation of sparks</td>
<td>Check all parts of the coupling for damage.</td>
</tr>
<tr>
<td></td>
<td>Damage of the coupling</td>
<td>Replace damaged parts.</td>
</tr>
<tr>
<td></td>
<td>Breakdown of the equipment</td>
<td>For renewed mounting, follow the instructions in section 3. and section 4.</td>
</tr>
<tr>
<td>Breaking of cams</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.1 Possible cause of fault

Change in alignment:
- Rectify cause of alignment change (e.g. loose foundation bolts).
- Align the coupling.
- Check axial fastening and correct if necessary.
- Inspection of wear and tear according to section 6. "Maintenance and repair".

Buffers (5) worn out:
- Inspection of wear and tear on the buffers (5) according to section 6. "Maintenance and repair", replace the buffers (5) if necessary.

5.2 Incorrect use

⚠️ Failure to observe these instructions may result in breakage of the coupling.

Danger to life from airborne fragments.

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.
- Insertion of parallel keyways with groove widths that are greater than the groove widths across corners of the parallel keyways according to the standard "DIN 6885/1" with the maximum permissible bore.
- The transmission capacity of the shaft-to-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-to-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 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 mixed up, i.e. their attribution to the specified shaft is incorrect.
- Specified axial fastenings are not fitted.
- Specified tightening torques are not being adhered to.
- Bolts are fitted in dry or greased condition.
- 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, so that a shifting of the machines e.g. due to 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.
- Markings of balancing groups are not observed.

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.
- Different N-EUPEX buffers (5) are being used.
- 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

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

The buffers (5) must be replaced, when the torsional backlash exceeds the value stated in table 8.

![Wear mark](image)

**Table 8:** Wear mark for the torsional clearance

<table>
<thead>
<tr>
<th>Size</th>
<th>285</th>
<th>360</th>
<th>450</th>
<th>560</th>
<th>710</th>
<th>900</th>
<th>1120</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>6.0</td>
<td>7.0</td>
<td>8.5</td>
<td>10.0</td>
<td>12.0</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>400</td>
<td>6.0</td>
<td>7.0</td>
<td>8.5</td>
<td>10.0</td>
<td>12.0</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>500</td>
<td>6.0</td>
<td>7.0</td>
<td>8.5</td>
<td>10.0</td>
<td>12.0</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>630</td>
<td>6.0</td>
<td>7.0</td>
<td>8.5</td>
<td>10.0</td>
<td>12.0</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>800</td>
<td>6.0</td>
<td>7.0</td>
<td>8.5</td>
<td>10.0</td>
<td>12.0</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>1000</td>
<td>6.0</td>
<td>7.0</td>
<td>8.5</td>
<td>10.0</td>
<td>12.0</td>
<td>13.5</td>
<td>15.0</td>
</tr>
<tr>
<td>1250</td>
<td>6.0</td>
<td>7.0</td>
<td>8.5</td>
<td>10.0</td>
<td>12.0</td>
<td>13.5</td>
<td>15.0</td>
</tr>
</tbody>
</table>

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

6.2 Replacement of wearing parts

Remove screws (32) and place restraining ring (31) on the coupling part (1).

Deinstall bolts (4) with buffers (5) after loosening and removing the hexagon nuts (7) through the buffer bores (up to coupling size 400).

Deinstall bolts (4) with buffers (5) after loosening and removing the hexagon screws (11) and disks (8) through the buffer bores (starting from coupling size 450).

Deinstall buffers (5) after removing the circlip (12) and the disk (6) through the buffer bores (starting from coupling size 710 without deinstallation of the bolts).

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

Replace buffers (5) by sets. Only identical buffers (5) may be used.

After replacing the buffers (5), the assembly follows in reverse order. In the process, secure the screws (11) with thread locking "medium firm" (e.g. Loctite 243). Replace the self-locking hexagon nuts (7) by new hexagon nuts (7) of same quality.

For renewed mounting, follow the instructions in section 3. "Fitting" and section 4. "Start-up and operation".
6.2.1 Extract bolts for coupling sizes 450 to 1250 using the demounting box

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

⚠️ Observe instruction BA 3600.1 "Demounting box for extraction of RUPEX bolts".

6.2.2 Extract bolts for coupling sizes 450 to 1250 with grease

Separate the coupling halves (1; 2) or switch to no load. Starting 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) is not possible.

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

The thread bore of the RUPEX bolt must be filled to 90 % with common retail machine grease (e. g. Fuchs Renolit H443-HD-88).

Wrap screw (11) in Teflon tape or Teflon sealing rope and screw in manually with the disk (8) set underneath into the bolt (4) with 2-3 threads.

Wear protective glasses.

⚠️ For axial fastening it is absolutely necessary to use a disk (8) underneath the screw (11).

Danger of being jammed in by the sudden movement of the screw (11), disk (8) and sudden release of the bolt (4).

Sudden release of the bolt can be heard as a loud noise.

Slowly continue tightening the screw (11) into the thread using a screwdriver. In this way, the grease is pressed through the cross-bore between the bolt and bolt bore in the coupling part (1; 2). In order for the grease to distribute evenly on the bolt (4), be sure to tighten slowly. If sufficient pressure cannot be built up, use a longer screw (at least strength class 8.8) or refill grease if necessary.

No grease may dissipate; otherwise the screw (11) must be newly sealed.

The extraction process is finished as soon as the bolt (4) is released from the bore.

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

When reusing the old bolts (4), clean them thoroughly. No grease or Loctite residues must be left in the threaded bores/cross-bores of the bolts (4).

Apply just a small quantity of Loctite to the screw (11), otherwise there is a risk that the Loctite might seal the cross-bore.

For renewed mounting, follow the instructions in section 3. "Fitting" and section 4. "Start-up and operation".

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

Remove screws (32) and place restraining ring (31) onto the coupling part (1).

Move the coupled machines apart.

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

Pull off coupling part (1; 2). Examine the hub bore and the shaft for damage, and protect against rust. Replace damaged parts.

For renewed mounting, follow the instructions in section 3. "Fitting" and section 4. "Start-up and operation".
6.4 Demounting of coupling parts with a cylindrical and tapered interference fit set up for removal by oil-hydraulic shrinking-off

Remove screws (32) and place restraining ring (31) onto the coupling part (1). Pull the coupled machines apart and demount the buffers (5).

For demounting the following tools are needed:

- For each oil channel (their total number can be found in the dimensioned drawing), one oil pump with pressure gauge (at least 2 500 bar) or a motor pump with equivalent number of connections to be closed independently.
  For coupling parts (1; 2) with stepped bore, a motor-driven pump must be connected to the oil channel located at the point of transition from the smaller to the larger bore, 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 the manufacturer information for the handling of extraction or detaching devices and pumps.**

Mount the detaching device.

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

**Mount an axial restraint for coupling parts (1; 2) with tapered bore to prevent sudden release of the coupling part (1; 2).**

Remove screw plugs (101; 201) from the oil channels. Ventilate one oil pump and connect it to the middle oil channel.

Then, pressurise the pump with the pressure specified in the dimensioned drawing until oil dissipates from the adjacent connections or the front faces.

**The max. 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.**

Ventilate the next oil pump and connect it to the adjacent oil channel, and pressurise with the pressure specified in the dimensioned drawing until oil dissipates from the adjacent connections or the front faces.

If oil dissipates to the extent that pressure cannot be maintained while pressure is being applied, a thicker oil must be provided.

Only pressurise the hydraulic cylinder when oil dissipates on both front faces as a closed oil ring, so that the coupling part (1; 2) can slide swiftly from the shaft.

The oil must be completely collected and disposed of in accordance with valid regulations.

**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 demounted from the coupling part (1; 2). Examine the hub bore and the shaft for damage, and protect against rust. Replace damaged parts.

For renewed mounting, follow the instructions in section 3. "Fitting" and section 4. "Start-up and operation".
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
- Siemens drawing number
- Coupling type and coupling size
- Part number (see spare-parts list)
- Bore, bore tolerance, groove and balancing as well as particular characteristics, such as flange-connection dimensions, intermediate-shaft length, brake-drum dimensions.
- Any special details, e.g. temperature, electrically insulating.

Table 9: Spare-parts list

<table>
<thead>
<tr>
<th>Part number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coupling part 1</td>
</tr>
<tr>
<td>2</td>
<td>Coupling part 2</td>
</tr>
<tr>
<td>4</td>
<td>Bolt</td>
</tr>
<tr>
<td>5</td>
<td>Buffer</td>
</tr>
<tr>
<td>6</td>
<td>Washer</td>
</tr>
<tr>
<td>7</td>
<td>Hexagon nut, self-locking</td>
</tr>
<tr>
<td>8</td>
<td>Washer</td>
</tr>
<tr>
<td>11</td>
<td>Hexagon-head bolt</td>
</tr>
<tr>
<td>12</td>
<td>Locking ring</td>
</tr>
<tr>
<td>30</td>
<td>Bolt spec.</td>
</tr>
<tr>
<td>31</td>
<td>Retaining ring</td>
</tr>
<tr>
<td>32</td>
<td>Bolt</td>
</tr>
<tr>
<td>33</td>
<td>Set screw</td>
</tr>
<tr>
<td>34</td>
<td>Set screw</td>
</tr>
<tr>
<td>35</td>
<td>Nut</td>
</tr>
<tr>
<td>100</td>
<td>Set screw ISO 4028</td>
</tr>
<tr>
<td>101</td>
<td>Screw plug 1)</td>
</tr>
<tr>
<td>200</td>
<td>Set screw ISO 4028</td>
</tr>
<tr>
<td>201</td>
<td>Screw plug 1)</td>
</tr>
</tbody>
</table>

1) The plug screws (101; 201; see figure 6) are only used for the oil-hydraulic interference fit (see item 3.6).

Fig. 6: Screw plug
Fig. 7: Spare-parts drawing

1) Types RWN and RWS with axial backlash limitation
2) Bolt connections for sizes 285 to 400
3) Bolt connections for sizes 450 to 630
4) Bolt connections for sizes 710 to 1250

Up to size 360 the buffers are arranged on one side in the coupling part 1. Starting from size 400 the buffers are arranged alternately in coupling part 1 and 2.
Further Information:

"FLENDER gear units" on the Internet
www.siemens.com/gearunits

"FLENDER couplings" on the Internet
www.siemens.com/couplings

Service & Support:

Lubricants: