

# FLENDER ARPEX® all-steel couplings

ARS-6, ARP-6, ARH-8,  
ARC-6/8/10, ARW-4/6, ARF-6 series

Operating instructions  
BA 8704 en 04/2012



FLENDER couplings

**SIEMENS**

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### Operating instructions

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

Technical data, such as dimensions, weights, performance data, peak torques, operating life and operating temperature ranges, etc., relating to the ARPEX couplings listed in these operating instructions are documented in the product catalogues set out in table 1 and can be made available on request or accessed on the Internet at any time (see back cover).

Where the coupling design deviates from that shown in the respective catalogue, an order-specific dimensioned drawing containing all the required technical data is enclosed with the delivery.

**Table 1:** Assignment product catalogues

Series	ARS-6	ARP-6	ARH-8	ARC-8/10	ARW-4/6	ARF-6
Catalogue-No.	MD 10.1	MD 10.1	K430	MD 10.1	MD 10.1	MD 10.1

These data together with the contractual agreements on the coupling determine the limits of its proper use.

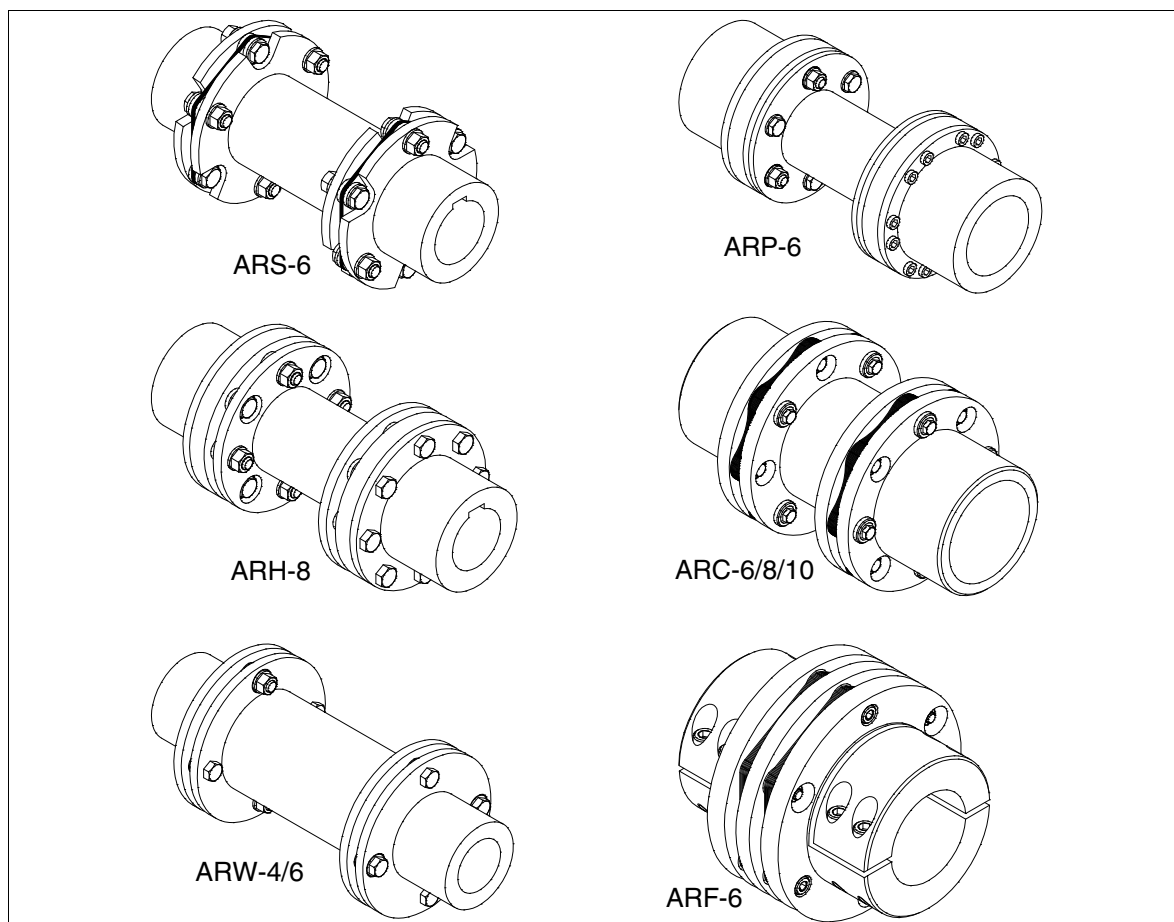


**Limited temperature ranges apply to use in potentially explosive environments in accordance with Directive 94/9/EC. The classification in temperature classes is shown in item 5.3, "Conditions of use".**



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

## 1.1 View of the various types



**Fig. 1:** View of the various types

## 2. General notes

### 2.1 Introduction

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



**All persons carrying out work on the coupling must have read and understood these instructions and must adhere to them. Siemens accepts no responsibility for damage or disruption caused by disregard of these instructions.**

The "**FLENDER coupling**" described in these instructions has been developed for stationary use in general engineering applications. The coupling serves to transmit power (torque and speed) between two shafts or flanges connected by this coupling.

The coupling has been manufactured in accordance with the state of the art and is delivered in a condition for safe and reliable use. Any changes on the part of the user which may affect safety and reliability are prohibited. This applies equally to safety features designed to prevent accidental contact.

The coupling complies with the requirements in Directive 94/9/EC.

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

The coupling is designed only for the application described on the order-specific drawing of the coupling. Other operating conditions are regarded as incorrect and must be contractually agreed. For any damage resulting therefrom only the user or operator of the machine or plant is responsible.

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

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

### 2.2 Copyright

The copyright to these instructions is held by **Siemens AG**.

These instructions must not be wholly or partly reproduced for competitive purposes, used in any unauthorised way or made available to third parties without our agreement.

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

Siemens AG  
Schlavenhorst 100  
46395 Bocholt

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



### 3. Safety instructions



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

#### 3.1 Obligations of the user

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



**For the use in potentially explosive environments the protective equipment must comply at least with type of protection IP2X.**

- The drive unit must be shut down as soon as changes to the coupling are detected during operation.
- If the coupling is intended for installation in plant or equipment, the manufacturer of such plant or equipment must ensure that the contents of the present operating instructions are incorporated in his own instructions.
- Spare parts must be obtained from Siemens (see section 11, "Spare parts, customer service").

## 4. Transport and storage



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

### 4.1 Scope of supply

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



**A damaged coupling becomes an explosion hazard. Operating the coupling with damaged coupling parts is not permitted in potentially explosive environments in accordance with Directive 94/9/EC.**

### 4.2 Transport

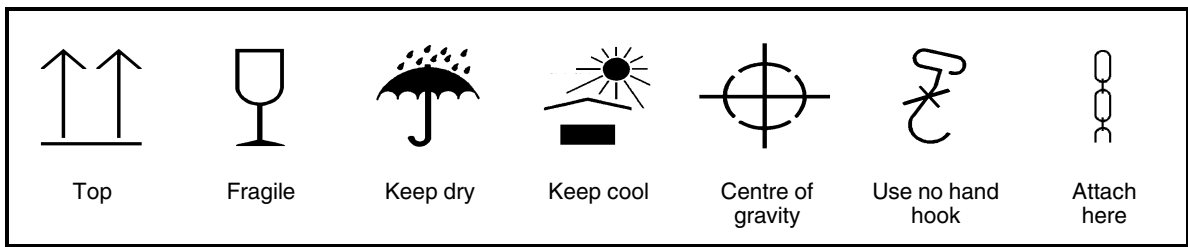


**When transporting the unit, use only lifting and handling equipment of sufficient load-bearing capacity.**

**The coupling must be transported using suitable transport equipment only.**

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

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



**Fig. 2:** Transport symbols

### 4.3 Storage of the coupling

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

Correctly stored couplings retain their properties unchanged. Unfavourable storage conditions and improper treatment will negatively affect the physical properties of the coupling. Such negative effects may be caused by e.g. the action of extreme temperatures or humidity.

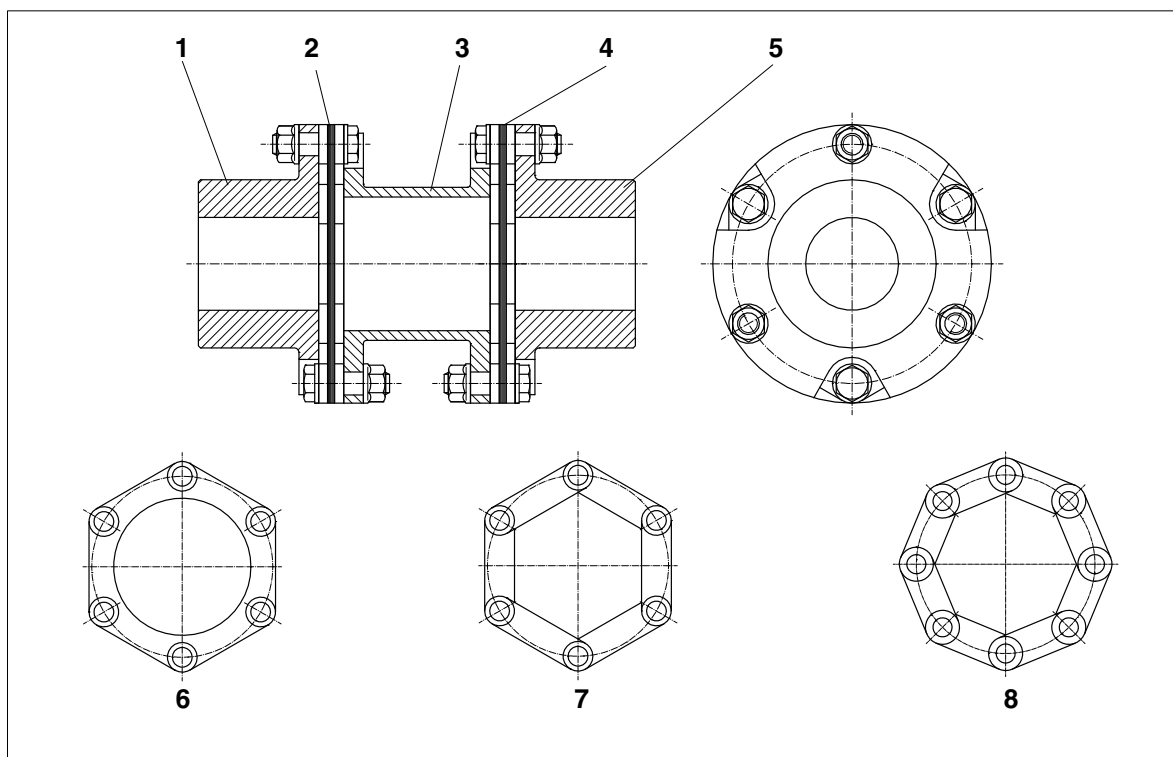
The storage area must be dry and free from dust. The couplings must not be stored with aggressive chemicals, acids, alkalis, etc.



**Damp storage rooms (air humidity higher than 65 %) are not suitable. Ensure that no condensation occurs.**

## 5. Technical description

### 5.1 General description



**Fig. 3:** Hexagonal plate pack and octagonal plate pack

1	Hub	5	Hub
2	Plate pack	6	Hexagonal ring plate pack
3	Spacer	7	Hexagonal tie plate pack
4	Plate pack	8	Octagonal tie plate pack

ARPEX couplings are all-steel couplings. The plate packs are arranged between the flanges of the coupling parts and bolted to them alternately.

The individual plates are threaded onto bushes and clamped together with a clipped on, internally bevelled retaining rings. The retaining rings are held on by the expanded bush ends, which lie against the angled face.

So constructed, the plate pack in ring plate pack designs forms a complete unit. In tie plate packs the individual tie plates are crimped together to form plate strands and then pushed together in the shape of a ring to form the plate pack.

Through this arrangement of the plate packs the ARPEX coupling is torsion-resistant and transmits the torque without circumferential backlash. In axial and radial direction the coupling is however still flexible and can absorb axial, radial and angular misalignment of the coupled units.

Depending on the series, collar bolts and nuts or conical screw connections join the plate packs to sleeve and coupling part flanges.

The size designation of the coupling indicates the outside flange diameter ( $d_a$ ) of the coupling in **mm** and the configuration of the plate pack ("6" = hexagonal) This information is prefixed by a letter combination specifying the component parts of the coupling.

**Example:** ARS-6 NHN 255-6  
Coupling with 2 hubs (**N**) and 1 "H" spacer (**H**) size 2556 with hexagonal plate pack in the ARS-6 series



5.3 Operating conditions in potentially explosive areas



The machines connected by the coupling must be earthed by an earth leakage resistance <math> < 10^6 \Omega </math>.

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 standard "DIN EN 13463-1". Where coatings have a thickness less than 200  $\mu\text{m}$ , no electrostatic charge is to be expected.

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.

- **Equipment group I (underground applications, mining)**
  - Category M2 (coupling is **not approved** for equipment category M1).
- **Equipment category II (use above ground, industry)**
  - Categories 2 and 3 (coupling is **not approved** for equipment category 1).
  - Material group G (areas, in which there are explosible gas, vapour, mist, air mixtures), zones 1 and 2 (coupling is **not approved** for use in zone 0).
  - Material group D (areas where dust can form explosible atmospheres), Zones 21 and 22 (coupling is **not approved** for equipment category 20).
  - Explosion group IIC (Explosion groups IIA and IIB are included in IIC).
  - 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 2).

**Table 2:** Temperature classes

Ambient temperature	Temperature class	Max. surface temperature
- 40 °C up to max. + 230 °C	T2	< 280 °C
- 40 °C up to max. + 150 °C	T3	< 200 °C
- 40 °C up to max. + 85 °C	T4	< 135 °C
- 40 °C up to max. + 50 °C	T5	< 100 °C
- 40 °C up to max. + 35 °C	T6	< 85 °C

## 6. Fitting



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

### 6.1 General information on fitting

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

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

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



**The tightening torques specified in tables 4, 5 and 6 must always be adhered to. Any other tightening torques may result in accelerated wear and damage to the coupling.**



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



**A damaged coupling becomes an explosion hazard. Operating the coupling with damaged coupling parts is not permitted in potentially explosive environments in accordance with Directive 94/9/EC.**



**Under no circumstances must welding work be done on the coupling or coupling components, as this will negatively affect the physical property of the coupling.**



**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 standard "DIN EN 13463-1".  
Where coatings have a thickness < 200 µm, no electrostatic charge is to be expected.  
Where coatings are thicker than 200 µm, an electrostatic charge, e.g. by cleaning the coupling, must be avoided.**

At the customer's express request Siemens also supplies unbored or prebored coupling parts for couplings which will not be operated in potentially explosive environments as set out in Directive 94/9/EU. The necessary refinishing must then be carried out in strict compliance with the following specifications and with particular care!



**Responsibility for carrying out the refinishing is borne by the customer. Siemens will accept no guarantee claims arising from unsatisfactory refinishing.**

6.2 Instructions for machining the finished bore, axial fastening, set screws and balancing

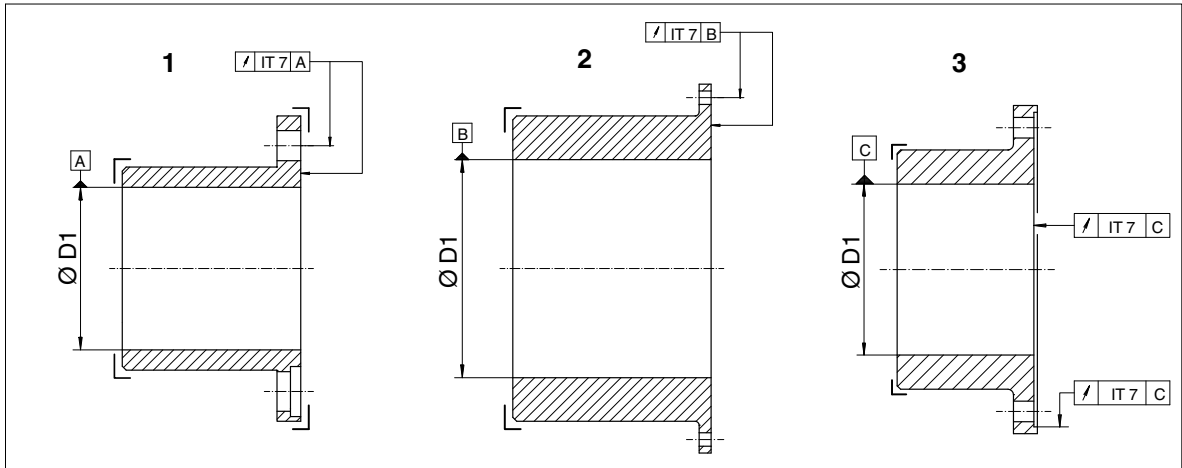
6.2.1 Finished bore

Remove preservative agent from coupling parts.



**Observe the manufacturer's instructions for handling the solvent.**

When machining the finished bore the parts must be carefully aligned. For the permissible radial and axial run-outs, refer to DIN ISO 286 Basic Degree of Tolerance IT 7. The parts must be fitted on the marked faces ( **▣** ) (see figure 4).



**Fig. 4:** Finished bore to ISO tolerances

1 "N"-hub / "B"-hub  
2 "M"-hub

3 "M"-hub



**The maximum permissible bore diameters (see section 1, "Technical Data") are designed for drive-type fastenings without taper action to DIN 6885/1 and must not under any circumstances be exceeded. The finish-machined bores must be 100 % checked with suitable measuring equipment.**

If other shaft-hub connections (such as splined hub profiles, taper or stepped bores and drive-type fastenings with taper action or other connections) are to be used instead of the drive-type fastenings provided for, Siemens must be consulted.

For drive by means of parallel keys the following fit pairs are prescribed for the bores (see table 3):

**Table 3:** Fit pairs

Type of fit	Shaft tolerance	Bore tolerances	
		Reversing operation	Setting-up operation
Interference fit with parallel-key connection	<b>h6</b>	<b>P7</b>	<b>N7</b>
	<b>k6</b>	<b>M7</b>	<b>H7</b>
	<b>m6</b>	<b>K7</b>	<b>H7</b>
	<b>n6</b>	<b>J7</b>	<b>H7</b>
	<b>p6</b>	<b>H7</b>	<b>F7</b>
Shrink fit without parallel-key connection	to customer specification	on request	on request



**The assigned fits must be adhered to in order, on the one hand, to keep the play in the shaft-hub connection as low as possible, depending on utilisation of the tolerance zones, and, on the other, to keep the hub tension arising from the oversize within the permissible load limit. Failure to adhere to the assigned fits may impair the shaft-hub connection.**

### 6.2.1.1 Parallel keyway

The parallel keyways must be designed to suit the available parallel keys. For parallel keyways the tolerance zone of the hub keyway width **ISO P9** must be adhered to.

### 6.2.2 Axial fastening

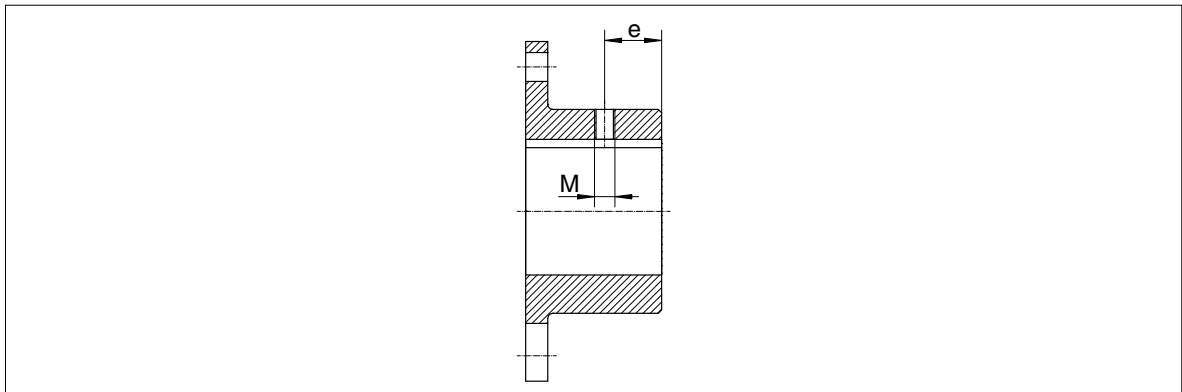
A set screw or end plate must be provided to secure the coupling parts axially. If end plates are used, Siemens must be consulted with regard to machining the recesses in the coupling parts.

### 6.2.3 Set screws



**To prevent damage to the shafts, the set-screw hole should be arranged on the parallel keyway.**

**In exceptional cases the set screw must be offset 180° to the parallel keyway, if because of the diameter of the drilled hole and hub core too little material is left between the parallel keyway and the hub core (e.g. series ARS-6, size 78-6).**



**Fig. 5:** Set-screw bore

**The following guidelines must be observed:**

The set screw should be inserted in the centre of the hub core (see figure 5). If this option is not possible, care must be taken that the distance (**e**) is at least  $M \times 1.5$ .

Use a threaded stud with cup point to DIN 916 for set screws.



**The length of the set screw must be selected so that it fills the threaded hole, but does not project from the hub ( $L_{\min.} = M \times 1.2$ ).**

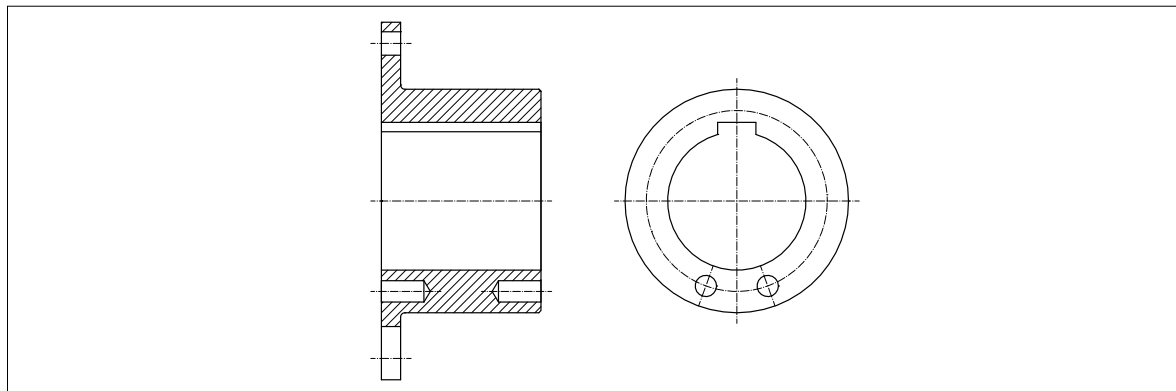


## 6.2.4 Balancing

Prebored couplings and/or prebored coupling parts are delivered unbalanced. It is recommended that these parts are balanced to suit the application after finish-boring (see DIN 740, DIN ISO 1940 part 1).

Balancing is normally done by drilling material away. To keep the amount of material to be removed to a minimum, a largest possible balance radius must be selected (see figure 6).

Finish-bored couplings and/or coupling parts are balanced according to the customer's specifications.



**Fig. 6:** Arrangement of the balancing bore with one-level balancing (balanced after machining the keyway)

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

Before beginning assembly the fitting bores and contact surfaces for rings, bushes, nuts and close-fitting bolts or taper pins and bushes (see item 6.12, "Fitting the plate packs" and/or separate assembly instructions) must be cleaned of any rust-preventer. Likewise, the shaft ends must be carefully cleaned.

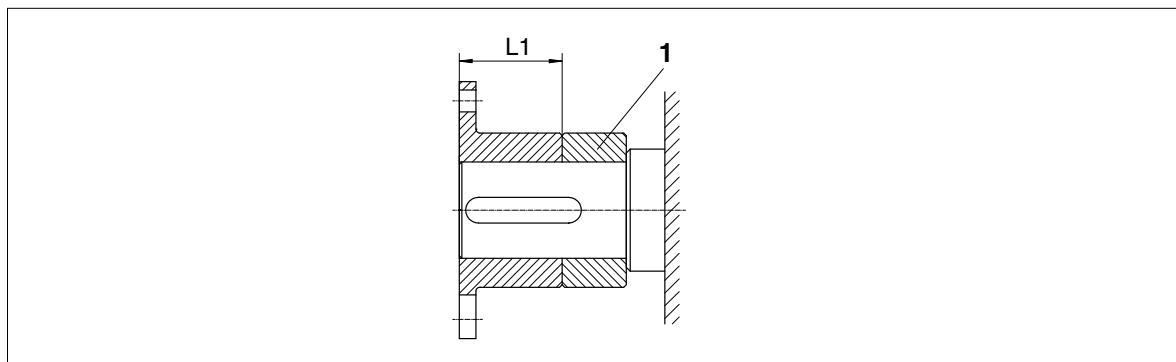


**Observe the manufacturer's instructions for handling the solvent.**



**The coupling parts must be fitted with the aid of suitable equipment to avoid damaging the shaft bearings through axial joining forces. Always use suitable lifting equipment.**

The shaft ends should not project from the inner sides of the hub. If necessary, the hubs can be adjusted to the length of the shaft by fitting spacers or spacer rings (see figure 7). Axial fastening can be effected by means of a set screw or end plate.



**Fig. 7:** Spacer ring

1 Spacer ring



**The set screws should be tightened only with a hexagon socket spanner to DIN ISO 2936, without extension tube.**

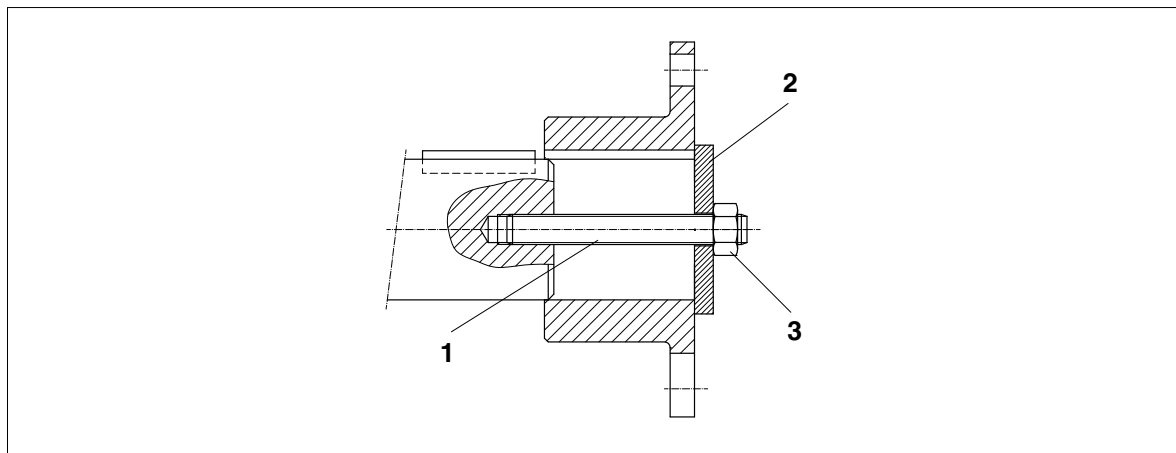
In case of hubs with a **parallel-key connection** fitting may be aided by slightly heating the coupling hubs (maximum 150 °C).



**Take precautions to avoid burns from hot parts.  
Wear suitable protective gloves.**

Hubs with transition fits and heated hubs can be pulled onto the slightly oiled shaft end with the aid of a fitting device.

Screw threaded rod (the size of the thread depends on the shaft diameter) into the shaft end. Fit an appropriately sized washer over the threaded rod. By screwing on and tightening a nut the hub is pushed onto the shaft (see figure 8).



**Fig. 8:** Fitting the hub with threaded rod

1 Threaded rod  
2 Washer

3 Nut

#### 6.4 Demounting the shaft-hub connection with parallel key

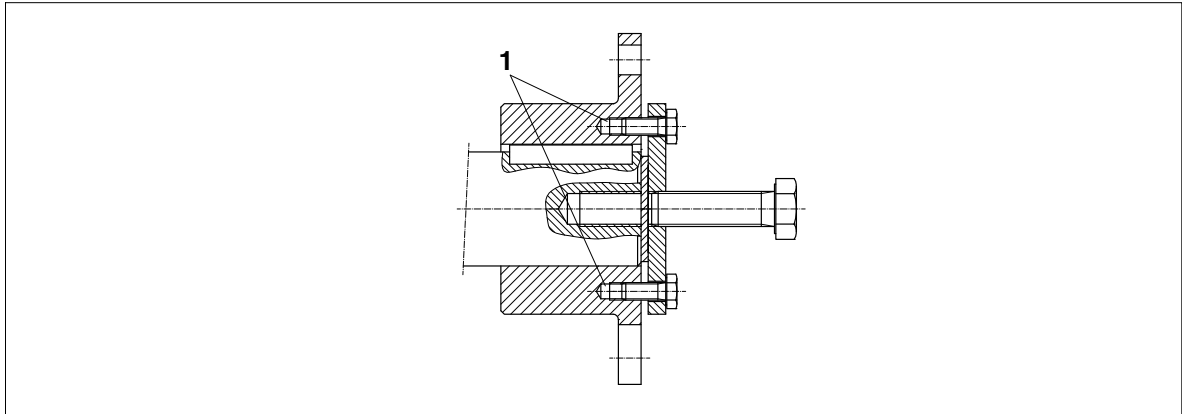
If a coupling hub with parallel-key connection is to be pulled off the shaft, the plate packs must first be demounted. Then, if necessary, the end plate can be demounted or the set screw loosened. With the aid of a detaching device (three-armed pulling-off device) or by inserting a pulling-off device into the pulling-off holes provided – if these are required in the order – pull the hub off the shaft end (see fig. 9 and 10).

In case of an interference fit the hub must, if necessary, be evenly slightly heated with a burner and carefully pulled off the shaft, using a detaching device.



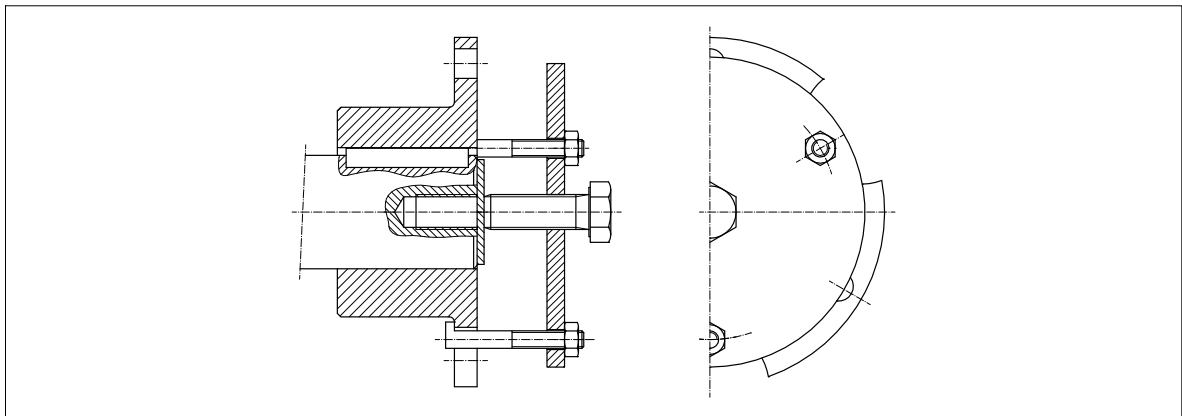
**Take precautions to avoid burns from hot parts.  
Wear suitable protective gloves.**

Check the demounted parts to see if they can be re-used and, if necessary, return them to Siemens for repair.



**Fig. 9:** Hub with tapped pulling-off holes

1 Pulling-off holes



**Fig. 10:** Three-armed pulling-off device (cannot be used for all hubs)

## 6.5 Shrink connections

### 6.5.1 Fitting

Cylindrical shrink fits are joined by heating the outer part. The correct joining temperature is calculated by the manufacturer specifically for the order and is shown on the coupling drawing delivered with the unit. To avoid premature locking the joining operation must be carried out **quickly** in a **draught-free** area.

Care must be taken to keep transport distances short.



**In the case of stepped shaft ends, when the hubs are pulled on, the locking bolts must be removed from the threaded connections. When the hubs have been pulled on, the locking screws must be screwed back in.**

**The surfaces to be joined must be absolutely clean and grease-free.**



**Observe the manufacturer's instructions for handling the solvent.**



**Take precautions to avoid burns from hot parts.  
Wear suitable protective gloves.**

## 6.5.2 Demounting

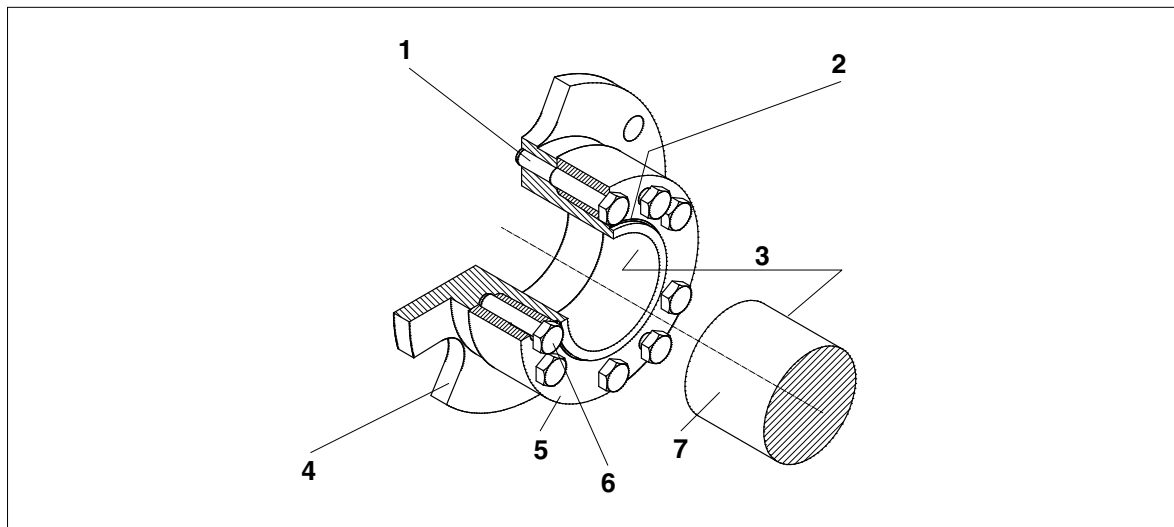
The coupling hubs must be provided with one or more oil channels, depending on length and design. The oil must be injected into the join by way of the oil connections the number of which corresponds to the number of oil pumps. Axial misalignment is achieved by means of a separate hydraulic press or mechanical pulling-off device.



**Secure hub axially. Risk of injury from falling coupling parts.**

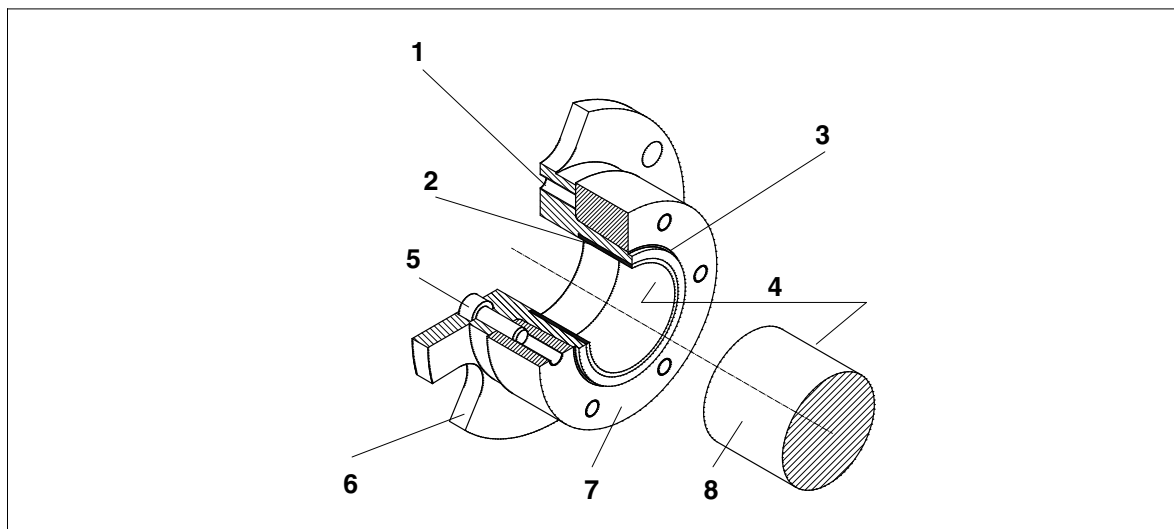
## 6.6 Clamping and slip hub connection

Forces are transmitted frictionally by the ARPEX clamping and slip hubs. The clamping or slip hubs are delivered in an assembled condition (ready to fit) (see figs. 11 and 12).



**Fig. 11:** Clamping hub, type 124 (example: ARS-6)

- |   |                            |   |                  |
|---|----------------------------|---|------------------|
| 1 | Tensioning bolt            | 5 | Clamping ring    |
| 2 | Bevel surface "lubricated" | 6 | Forcing-off bolt |
| 3 | free of grease             | 7 | Shaft            |
| 4 | Clamping hub               |   |                  |



**Fig. 12:** Slip hub, type 125 (example: ARS-6)

- |   |                            |   |                 |
|---|----------------------------|---|-----------------|
| 1 | Forcing-off thread         | 5 | Tensioning bolt |
| 2 | Bronze bush                | 6 | Clamping hub    |
| 3 | Bevel surface "lubricated" | 7 | Clamping ring   |
| 4 | free of grease             | 8 | Shaft           |

### 6.6.1 Fitting

During fitting the following procedure must be observed:

- Degrease the hub bore and shaft.



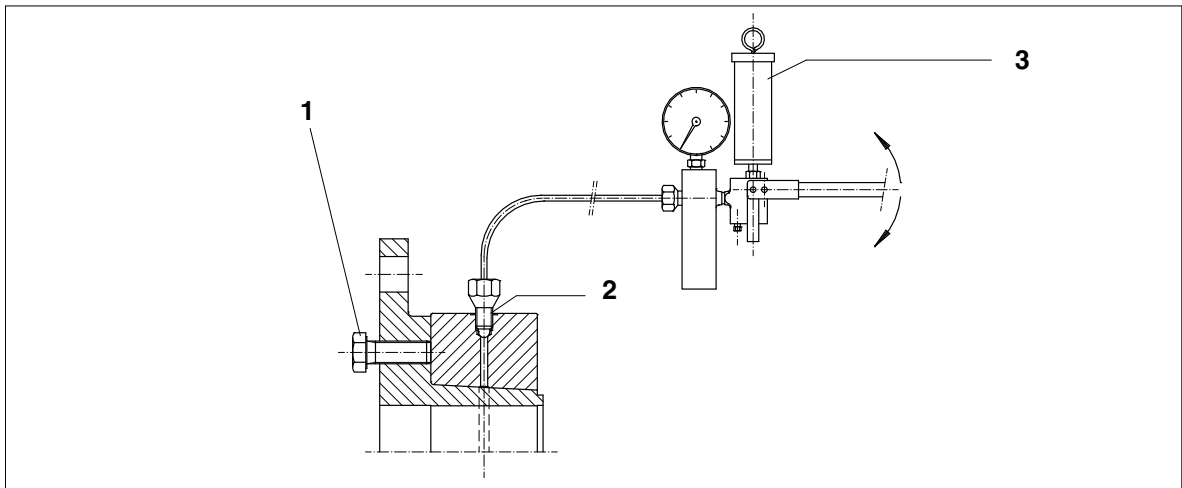
**Hub bore and shaft must be absolutely clean and free of grease.**

**Observe the manufacturer's instructions for handling the solvent.**

- Slightly loosen the tensioning bolts and pull the clamping ring off the hub slightly so that the clamping ring sits loosely on it.
- Push the hub onto the shaft.
- Tighten the tensioning bolts evenly one after the other, going round several times until the clamping ring lies evenly against the flange of the clamping or slip hub. The clamp connection is able to function when the torque for tensioning bolts (quality 10.9) specified in table 5, "Tightening torques for connecting and tensioning bolts" in item 6.8.1 has been reached and the clamping ring thus lies up against the hub flange.



**Failure to observe these instructions may impair the function of the clamping and/or slip hub.**



**Fig. 13:** Demounting with high-pressure pump

- 1 Forcing-off bolt ISO 4017  
2 G1/4"

- 3 High-pressure pump

## 6.6.2 Demounting

Undo the tensioning bolts evenly one after the other. Each bolt must be loosened only half a turn per pass. Unscrew all tensioning bolts 3 to 4 thread turns.

If the clamping ring does not come free off the clamping or slip hub by itself, forcing-off bolts to match the number of available threads must be inserted in the ARPEX flange and evenly tightened until the clamping ring comes free. Before once more pulling on the clamping ring, remove the bolts once more!

Clamping and slip hubs of type 124 (see Fig. 11) have, dependent on the size, already been equipped with forcing-off bolts in the clamping ring. Before once more pulling on the clamping ring screw them back to their original position!

If these actions do not work in case of larger clamping hubs, oil must be pumped by a high-pressure pump into the join between the clamping ring and the clamping hub to release the clamping ring. For this the high-pressure hose of the pump must be connected to the clamping ring via the G1/4" connecting thread on the outer circumference (see Fig. 13).

Before reclamping remove the forcing-off bolts and reseal the G1/4" connecting thread, using the plug supplied with the unit.

If the clamping ring is pulled off the clamping hub hydraulically, the bevel faces must be cleaned of hydraulic oil and regreased with "**Altemp Q NB 50**" (Co. Klüber).

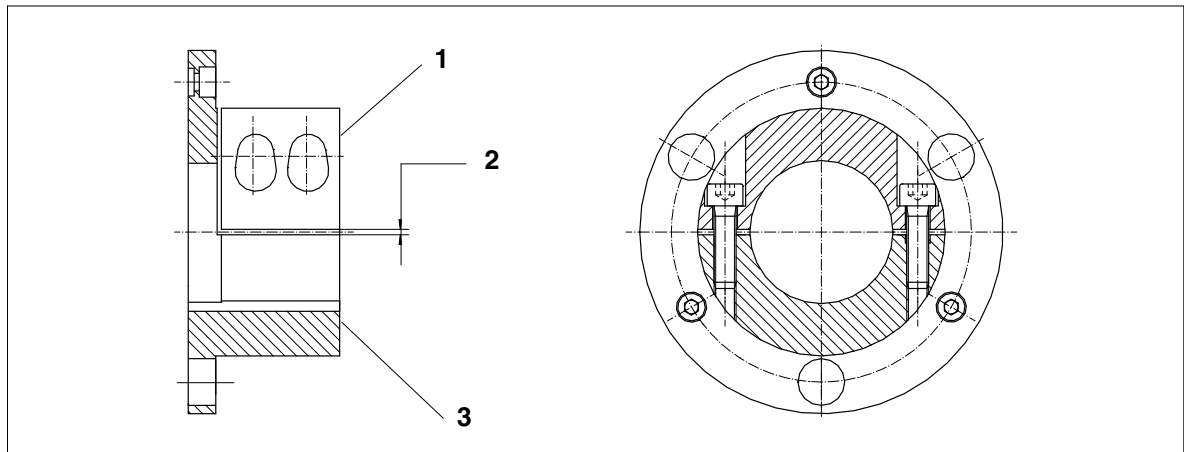


**Observe the manufacturer's instructions for handling the solvent.**

Released clamping-hub connections do not have to be demounted and re-greased before being re-tensioned. If however the bevel faces still have to be regreased, the above-mentioned lubricant must be used.

## 6.7 Split clamping hubs with half-shell

The half-shells are loosely bolted to the hubs (see figure 14).



**Fig. 14:** Split clamping hub with half-shell

- 1 Marking by numbers
- 2 Gap dimension

- 3 Marking by numbers

### 6.7.1 Fitting

Before fitting, the half-shells must be removed from the hubs and the holes carefully cleaned and degreased using a suitable degreasing agent.



**Observe the manufacturer's instructions for handling the solvent.**



**Do not interchange half-shells.**

**Check that the number markings (marking-punch number) at the side of the hub core are identical (see Fig. 14).**

Place the clamping hubs on the shaft ends. The tension screws in the half-shell must first be evenly screwed up only hand-tight.



**Ensure the half-shells are evenly seated. Check the gap size is even and, if necessary, adjust.**

Then, using a torque wrench, tighten the tension screws alternately in at least 3 passes (see table 4).

**First pass:** Tighten the clamping bolts to **30 %** of the tightening torque (see table 4).

**Second pass:** Tighten the clamping bolts to **60 %** of the tightening torque (see table 4).

**Third pass:** Tighten the clamping bolts to **100 %** of the tightening torque (see table 4).

**Table 4:** Tightening torques for split clamping hubs with half-shell

Bolt ISO 4762 (DIN 912) Thread	Quality	Tightening torque		
		30% [Nm]	60% [Nm]	100% [Nm]
<b>M6</b>	<b>10.9</b>	<b>4</b>	<b>8</b>	<b>12</b>
<b>M8</b>		<b>9</b>	<b>18</b>	<b>30</b>
<b>M10</b>		<b>18</b>	<b>36</b>	<b>60</b>
<b>M12</b>		<b>30</b>	<b>60</b>	<b>100</b>
<b>M14</b>		<b>48</b>	<b>96</b>	<b>160</b>
<b>M16</b>		<b>75</b>	<b>150</b>	<b>250</b>

### 6.7.2 Demounting

Demounting is done in reverse order of fitting. Here the tension screws must be undone alternately in at least 2 to 3 passes.



**Risk of injury from falling coupling parts.**

**Secure all coupling parts before undoing the clamping bolts.**

## 6.8 Split spacers

Split spacers are fitted together according to length and tightened hand-tight or delivered as single parts.

### 6.8.1 Fitting split spacers

- Before assembly the fitting holes and the contact surfaces of the coupling parts must be degreased.



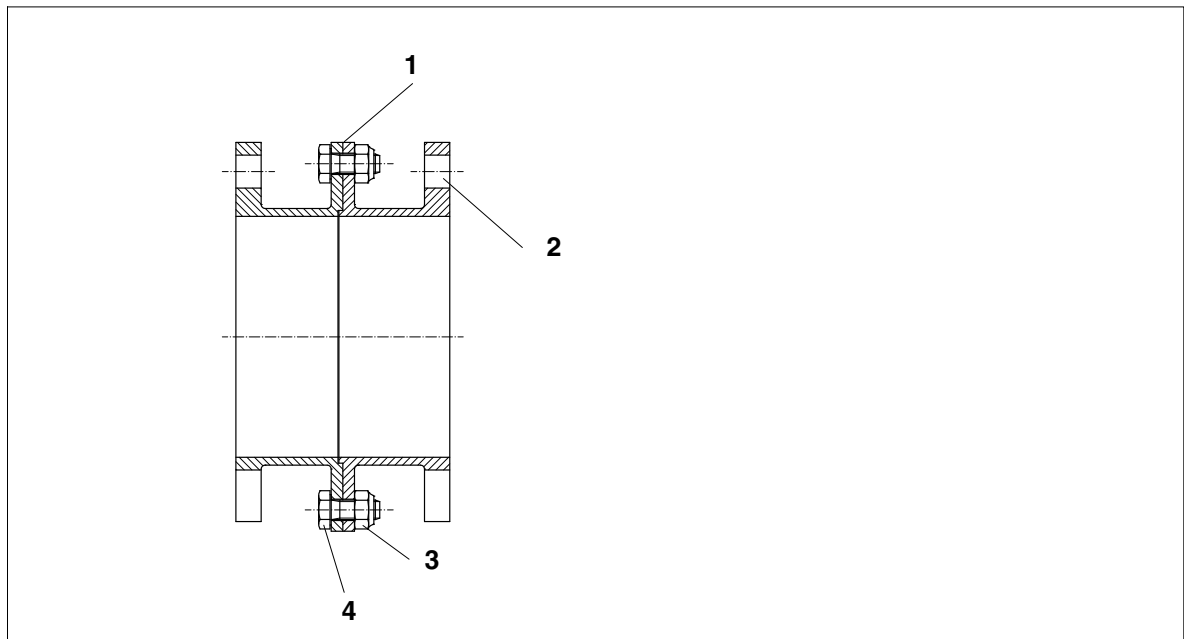
**Fitting holes and contact surfaces of the coupling parts must be absolutely clean and grease-free.**

**Observe the manufacturer's instructions for handling the solvent.**

- The inner and outer "recess" (centering pin, figure 15) and the fitting bores as well as the contact faces of the individual parts of the split spacer must be inspected for any damage and, if necessary, reworked.
- Before fitting the connecting bolts note any balancing marks (see fig. 15 and fig. 16). If the spacers are unmarked, the halves must be fitted so that the fitting holes of the outer flanges are correctly aligned (see fig. 15 and fig. 16).
- The connection of the "recess" or close-fitting bolt must be joined accurately and carefully.
- The connecting bolts must be tightened crosswise and evenly with the specified tightening torque (see table 5, "Tightening torques for connecting and tensioning bolts").
- Care must be taken that the "recess" connection is straight.



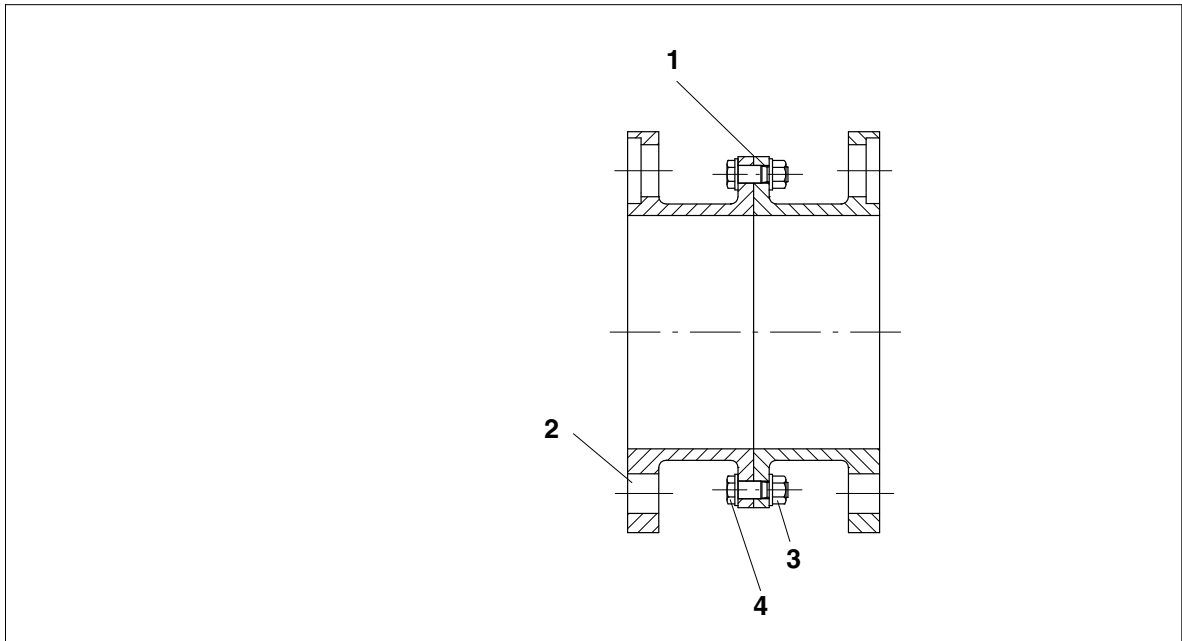
**Failure to observe these instructions may result in impairing the proper function of the coupling.**



**Fig. 15: U-spacer with "recess" (centering pin) (ARS-6)**

- |   |   |   |   |
|---|---|---|---|
| 1 | Marking on balanced spacer, during fitting, the balance marks must be one above the other | 3 | All-steel locking nut to DIN 980 Form "V" |
| 2 | Fitting bore  | 4 | Hexagon bolt to ISO 4017 - 8.8            |





**Fig. 16:** U-spacer with close-fitting bolts (**ARC-8**)

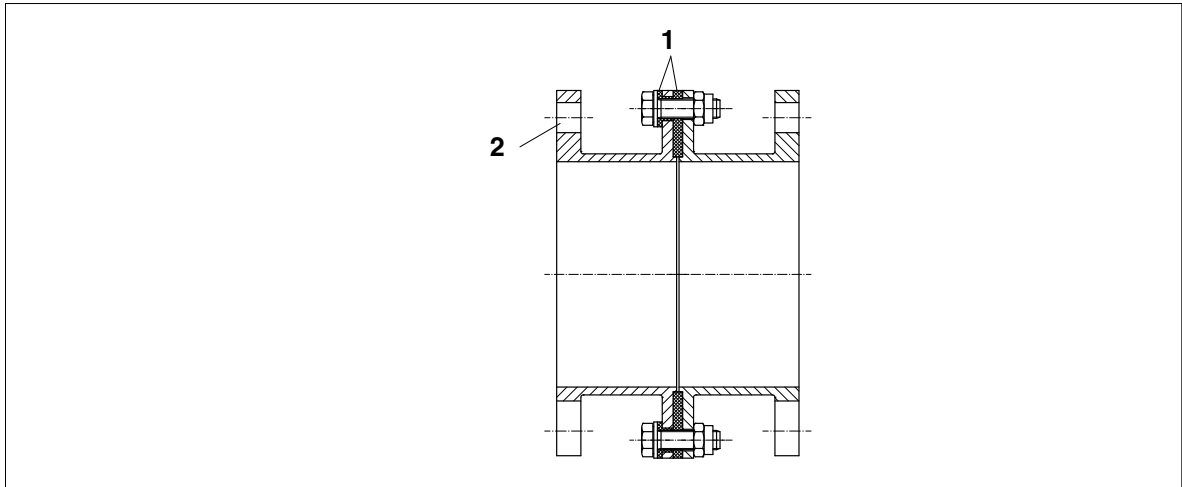
- |   |  |   |                           |
|---|--|---|---------------------------|
| 1 | Marking on balanced spacer Spacer,<br>during fitting, the balance marks must be<br>one above the other | 2 | Fitting bore              |
|   |  | 3 | Flanged nut               |
|   |  | 4 | Close-fitting bolt - 10.9 |

**Table 5:** Tightening torques for connecting and clamping bolts

Thread	Tightening torque $T_A$ Standard screw + standard nut to DIN and ISO Strength class 8.8	Tightening torque $T_A$ Standard screw + locking nut to DIN 980 See figure 15 Strength class 8.8	Tightening torque $T_A$ Close-fitting bolt + collar nut Tensioning bolt Strength class 10.9
<b>M 5</b>	<b>5 Nm</b>	<b>6 Nm</b>	<b>7 Nm</b>
<b>M 6</b>	<b>9 Nm</b>	<b>11 Nm</b>	<b>12 Nm</b>
<b>M 8</b>	<b>20 Nm</b>	<b>25 Nm</b>	<b>30 Nm</b>
<b>M 10</b>	<b>41 Nm</b>	<b>50 Nm</b>	<b>60 Nm</b>
<b>M 12</b>	<b>70 Nm</b>	<b>80 Nm</b>	<b>100 Nm</b>
<b>M 14</b>	<b>110 Nm</b>	<b>125 Nm</b>	<b>160 Nm</b>
<b>M 16</b>	<b>170 Nm</b>	<b>195 Nm</b>	<b>250 Nm</b>
<b>M 18</b>	<b>235 Nm</b>	<b>260 Nm</b>	<b>350 Nm</b>
<b>M 20</b>	<b>330 Nm</b>	<b>370 Nm</b>	<b>480 Nm</b>
<b>M 22</b>	<b>450 Nm</b>	<b>500 Nm</b>	<b>660 Nm</b>
<b>M 24</b>	<b>570 Nm</b>	<b>640 Nm</b>	<b>850 Nm</b>
<b>M 27</b>	<b>840 Nm</b>	<b>920 Nm</b>	<b>1200 Nm</b>
<b>M 30</b>	<b>1140 Nm</b>	<b>1200 Nm</b>	<b>1700 Nm</b>
<b>M 36</b>	<b>2000 Nm</b>	<b>2100 Nm</b>	<b>3100 Nm</b>

## 6.8.2 Fitting split spacers with creep-current insulation

Here the apply the same assembly instructions as those in item 6.8.1, however in the case of "U"-spacers with integrated creep-current insulation (see Fig. 17) the tightening torques in table 6, "Tightening torques for connecting bolts with creep-current insulation" must always be adhered to.



**Fig. 17:** Split spacer with creep-current insulation

1 Creep-current insulation

2 Fitting bore

**Table 6:** Tightening torques for connecting bolts with creep-current insulation

Thread	Tightening torque $T_A$
<b>M 6</b>	<b>10 Nm</b>
<b>M 8</b>	<b>20 Nm</b>
<b>M 10</b>	<b>38 Nm</b>
<b>M 12</b>	<b>75 Nm</b>
<b>M 16</b>	<b>155 Nm</b>
<b>M 20</b>	<b>280 Nm</b>
<b>M 24</b>	<b>470 Nm</b>
<b>M 30</b>	<b>1000 Nm</b>
<b>M 36</b>	<b>1550 Nm</b>



The tightening torques indicated in tables 5 and 6 apply only to untreated bolts which are inserted (only lightly oiled) in the condition as delivered.

Other tightening values, which are additionally documented or must be required about from the manufacturer, apply to coated or separately treated bolts.

6.9 "C", "D" and "F" flange screw connection

"C", "D" and "F" flanges are delivered ready-assembled as an individual part or with a spacer, as agreed.

6.9.1 Fitting

- Before fitting the coupling parts must be carefully cleaned with a suitable cleaning agent.

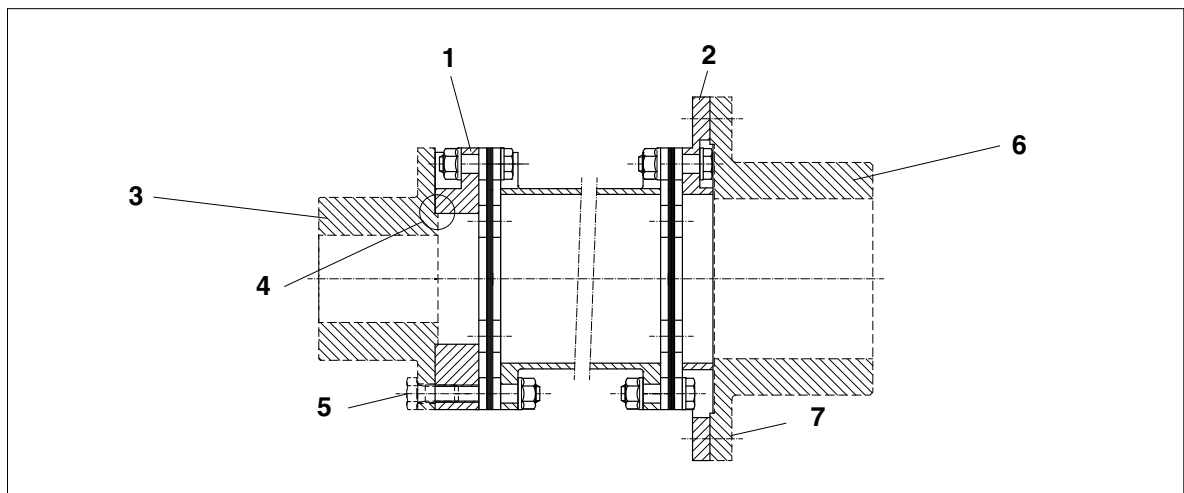


**Observe the manufacturer's instructions for handling the solvent.**

- The "recess" (centering pin, Fig. 18) or fitting bores (Fig. 19) and the contact face of the "C", "D" and "F" flange must be inspected for any damage and, if necessary, reworked.
- The connection of the "recess" or close-fitting bolt must be joined accurately and carefully.
- The connecting bolts must be tightened crosswise and evenly with the specified tightening torque (see table 5).
- Care must be taken that the "recess" connection is straight.

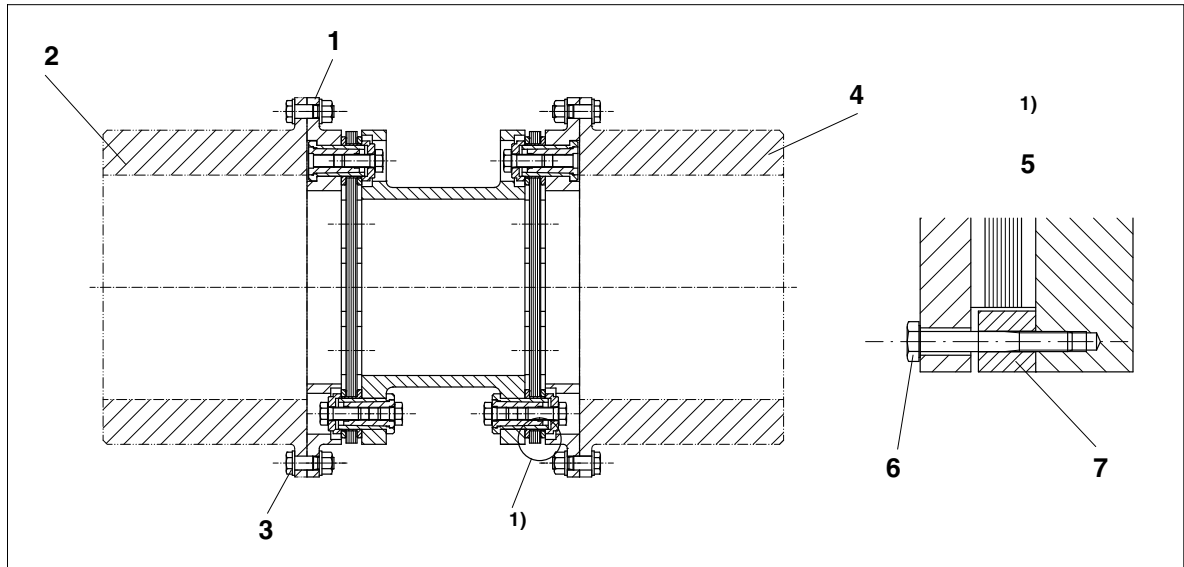


**Failure to observe these instructions may result in impairing the proper function of the coupling.**



**Fig. 18: "C" and "F" flange screw connection (example ARS)**

- |   |                                     |   |                                     |
|---|-------------------------------------|---|-------------------------------------|
| 1 | "C" flange                          | 5 | Hexagon bolt to ISO 4017 - 8.8      |
| 2 | "F" flange                          | 6 | Connection provided by the customer |
| 3 | Connection provided by the customer | 7 | Hexagon bolt to ISO 4017 - 8.8      |
| 4 | "Recess" connection                 |   |                                     |



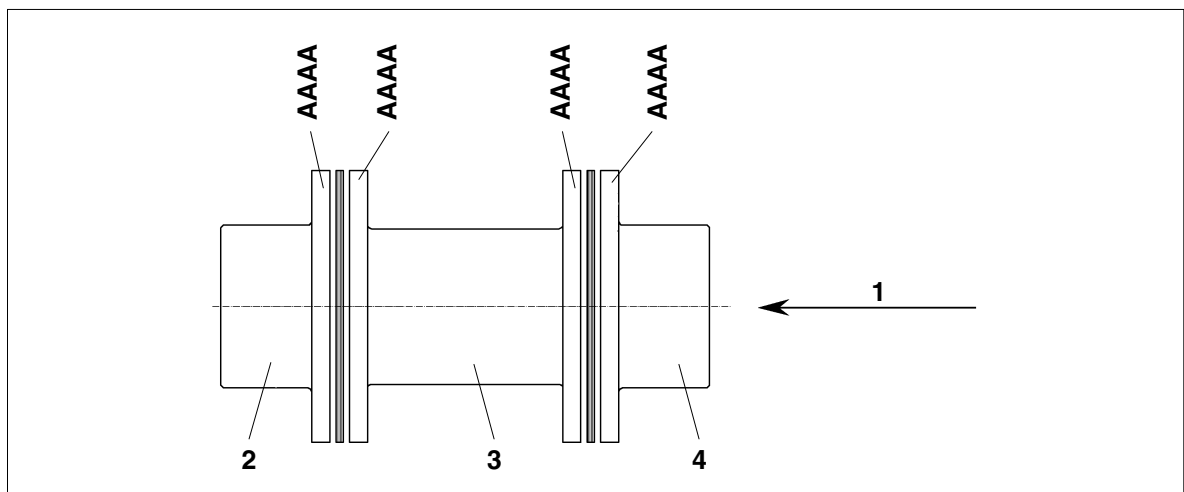
**Fig. 19:** F-flange connection (example ARC)

1) Detail "X"

- |   |                                     |   |                               |
|---|-------------------------------------|---|-------------------------------|
| 1 | "F" flange                          | 5 | Transport lock / mounting aid |
| 2 | Connection provided by the customer | 6 | Tensioning bolt               |
| 3 | Close-fitting bolt with collar nut  | 7 | Fitting spacer                |
| 4 | Connection provided by the customer |   |                               |

#### 6.10 Fitting of assembly-balanced couplings

On couplings which have been assembly-balanced each individual coupling component must be marked on the outside diameter of the flange with a four-digit number (Figure 20, "AAAA"). When assembling, care must be taken that only coupling parts having the same numbers on the outside circumference of the flange are bolted together. The coupling parts must be arranged so that the numbers are in line and can be read from **one** direction (see figure 20). Only in this way will the balancing condition meet the requirements!

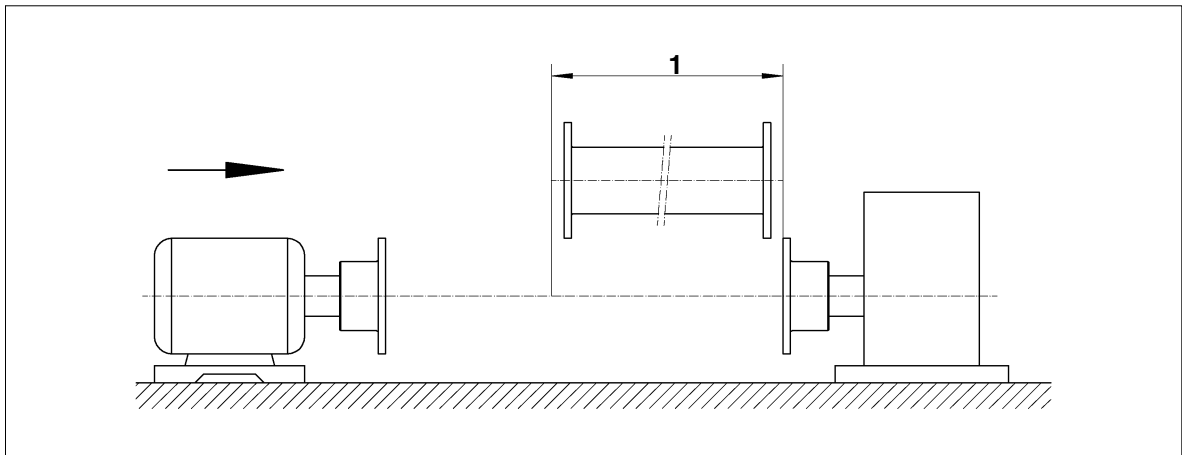


**Fig. 20:** Marking in case of assembly balancing

- |   |                    |   |        |
|---|--------------------|---|--------|
| 1 | readable from here | 3 | Spacer |
| 2 | Hub 1              | 4 | Hub 2  |

## 6.11 Pushing the units together

Set the shafts of the machines to be connected exactly the required shaft distance apart and align the machines precisely (see figure 21).



**Fig. 21:** Aligning the units

1 Distance "S<sub>x</sub>" between shafts

### 6.11.1 Inserting spacer or intermediate unit

If necessary, using suitable lifting gear, insert spacer or intermediate unit between the flanges.



**Notice, Danger of squeezing. Wear safety gloves.**

If intermediate units with prefitted plate packs are used, they should not be demounted. The plate packs are secured with transport locks (they are also used to facilitate assembly; see Detail "X" – figure 19).

After inserting the intermediate unit the transport locks **must be removed**, before the screw connections of the flanges are tightened to the specified tightening torque.



**Operation with the transport locks fitted is not permissible. Remove all transport locks.**

## 6.12 Fitting the plate packs

ARPEX plate packs are packed individually, when delivered. The delivery includes instructions for fitting ARPEX plate packs in German. Instructions in other languages must be ordered separately.

ARPEX fitting instructions include all the necessary data and instructions for correctly fitting the plate packs.

**The tightening torques for the plate pack bolting should exclusively be taken from the related actual assembly instructions!**

Furthermore all necessary details for alignment of the units to be connected are documented.

Matching of all existing sets of fitting instructions with their series is shown in table 7.

The sets of fitting instructions set out below can be ordered from Siemens or on the Internet (see back cover).

**Table 7:** Matching of the individual series with their fitting instructions

Series	Type	Assembly instructions
<b>ARS-6</b>	with close-fitting screw connection	<b>AN 4200</b>
	with conical bolting	<b>AN 4243</b>
<b>ARP-6</b>	3-part (e.g. " <b>NAN</b> ") with close-fitting screw connection	<b>AN 4224</b>
	3-part (e.g. " <b>NAN</b> ") with conical bolting	<b>AN 4256</b>
<b>ARP-6</b>	5-part (e.g. " <b>MCECM</b> ") with close-fitting screw connection	<b>AN 4228</b>
	5-part (e.g. " <b>MCECM</b> ") with conical bolting	<b>AN 4253</b>
<b>ARC-6/8/10</b>	Standard version	<b>AN 4241</b>
	Version with special conical bolting	<b>AN 4244</b>
<b>ARF-6</b>	Standard version	<b>AN 4233</b>
<b>ARW-4/6</b>	with close-fitting screw connection	<b>AN 4239</b>
	with conical bolting	<b>AN 4254</b>
<b>ARH-8</b>	with close-fitting screw connection	<b>AN 4213</b>
	with conical bolting	<b>AN 4246</b>

## 7. Start-up



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

### 7.1 Procedure before start-up

Before start-up the screw connections must be checked and, if necessary, re-tightened. The alignment and the distance dimension "S<sub>1</sub>" (see tables in series-specific assembly instructions) must also be checked and, if necessary, adjusted.

Coupling types with prefitted plate packs must be checked before start-up to ensure that the **transport locks** (see detail "X" – Figure 19) have been **completely removed**.



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



**For the use in potentially explosive environments the protective equipment must comply at least with type of protection IP2X.**



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



**A damaged coupling becomes an explosion hazard. Operating the coupling with damaged coupling parts is not permitted in potentially explosive environments in accordance with Directive 94/9/EC.**

## 8. Operation



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

### 8.1 General operating data

During operation of the coupling watch for:

- Changes in running noise
- Sudden vibrations



**If any malfunctions are noticed during operation, the drive assembly must be switched off at once. The cause of the fault must be determined, using the fault table in section 9.**

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

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

## 9. Faults, causes and remedy



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

### 9.1 General

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

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

The coupling must run with little noise and vibration in all operating phases. Irregular behaviour must be treated as a fault requiring immediate remedy.



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



**When remedying faults and malfunctions, the coupling must always be taken out of service. Secure the drive unit to prevent it from being started up unintentionally. A notice should be attached to the ON switch stating clearly that work is in progress. We also refer to the relevant accident prevention regulations at the place of installation.**

### 9.2 Possible faults

**Table 8:** Faults, causes and remedy

Faults	Causes	Remedy
Sudden changes in the noise level and/or sudden vibrations.	Change in alignment.	Stop the installation.  If necessary, rectify any cause of the changes in alignment (e.g. by fastening loose foundation bolts).  Check wear; procedure as described in section 10.
	Plate breakage, torque transmission via close-fitting bolts / conical bolting	Stop the installation.  Demount coupling and remove remains of pack.  Check and replace damaged coupling parts.  Check and, if necessary, adjust alignment (see section 6).



**Operating the coupling with broken ARPEX plate packs is not permitted under Directive 94/9/EC. A correct torque transmission is no longer guaranteed in such case. Perform a visual check of the ARPEX coupling as described in section 10.**



**A damaged coupling becomes an explosion hazard. Operating the coupling with damaged coupling parts is not permitted in potentially explosive environments in accordance with Directive 94/9/EC.**



### 9.3 Improper use

Experience has shown that the following faults can result in incorrect use of the ARPEX coupling. In addition to observing the other instructions in this manual, care must therefore be taken to avoid these faults.

Directive 94/9/EC requires the manufacturer and user to exercise especial care.



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



**Through incorrect use the coupling may become an explosion hazard.**



**Incorrect use of the ARPEX coupling can result in damage to the coupling.**



**Coupling damage may result in stoppage of the drive and the entire plant.**

#### 9.3.1 Possible 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 is not taken into consideration.
- The temperature in the direct vicinity of the coupling is beyond the permissible range.
- Machining of a finished bore with incorrect diameter or incorrect fit assignment (see section 6).
- The transmission capacity of the shaft-hub connection is not appropriate to the operating conditions.

#### 9.3.2 Possible faults when installing the coupling

- Components with transport or other damage are being fitted.
- When fitting coupling parts in a heated condition, these components are being excessively heated.
- The shaft diameter is beyond the specified tolerance range.
- Coupling parts are interchanged during fitting work.
- Specified tightening torques and/or angles are not being adhered to.
- Alignment and/or shaft-misalignment values do not match the specifications in the assembly and/or operating instructions.
- 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.
- ARPEX plate packs are not fitted correctly (see series-specific assembly instructions).
- The coupling protection used is not suitable for operation within the meaning of the explosion-protection requirements and/or in accordance with Directive 94/9/EC.
- Operating conditions are being changed without authorisation.

### 9.3.3 Possible faults in maintenance

- Maintenance intervals are not being adhered to.
- No genuine ARPEX plate packs are being used.
- Damaged ARPEX plate packs are being used.
- ARPEX plate packs are being used which do not meet the technical specification for the application.
- Leakage in the vicinity of the coupling is not being identified and as a result chemically aggressive media are damaging the coupling.

## 10. Maintenance and repair



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



**All work on the coupling must be carried out only when it is at a standstill. The drive unit must be secured against being switched on accidentally (e.g. by locking the key switch or removing the fuses from the power supply). A notice should be attached to the ON switch stating clearly that work is in progress. We also refer to the relevant accident prevention regulations at the place of installation.**

### 10.1 General

ARPEX couplings do not require maintenance; however, they should be **visually inspected** during regular system maintenance inspections **at least once a year**. Especial attention should be given to the condition of the plate packs. If individual plates or several plates are broken, the plate pack affected must be replaced (see item 10.2).

No further maintenance work is necessary.



**If the above specified maintenance instructions are not adhered to, a correct operation of the coupling within the meaning of Directive 94/9/EC can no longer be guaranteed.**

### 10.2 Replacing plate packs

Only **original ARPEX plate packs** must be used for replacement in order to guarantee trouble-free torque transmission and faultfree operation.



Normally, the plate packs can be replaced without moving the coupled machines. Exceptions are combinations with so-called "**B**" hubs (hubs which for reasons of space are fitted the other way round and so project into the spacer) and special solutions.

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

## 11. Spare parts, customer service

### 11.1 Spare-parts stockage

By stocking the most important spare parts on site you can ensure that the coupling is ready for use.

To order spare parts, refer to the spare-parts list.



**We guarantee only the original spare parts supplied by us. Non-genuine spare parts have not been tested or approved by us. They may alter technical characteristics of the coupling, thereby posing an active and/or passive risk to safety. Siemens will assume no liability or guarantee for damage caused by non-genuine spare parts not supplied by Siemens. The same applies to any accessories not supplied by Siemens.**

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

When ordering spare parts, always state the following:

- Quantity
- Designation
- Size
- Number of the coupling drawing
- Position of the spare part in the spare-parts list

### 11.2 Addresses for ordering spare parts and customer service

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

## 12. Declarations

### 12.1 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 assembly and operating instructions:

**FLENDER ARPEX®  
all-steel couplings  
ARS-6, ARP-6, ARH-8,  
ARC-6/8/10, ARW-4/6, ARF-6 series**

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 : 10-2011  
DIN EN 13463-1 : 07-2009  
DIN EN 13463-5 : 10-2011  
DIN EN 1710 : 08-2008

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

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

Bocholt, 2012-04-19

\_\_\_\_\_  
Andre Jansen  
(Director Engineering KUE)

Handwritten signature of Andre Jansen in black ink.

Bocholt, 2012-04-19

\_\_\_\_\_  
Nicola Warning  
(Director Business Subsegment KU)

Handwritten signature of Nicola Warning in black ink.

## Further Information:

"FLENDER gear units" on the Internet

[www.siemens.com/gearunits](http://www.siemens.com/gearunits)

"FLENDER couplings" on the Internet

[www.siemens.com/couplings](http://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>

Siemens AG  
Industry Sector  
Mechanical Drives  
Alfred-Flender-Straße 77  
46395 Bocholt  
GERMANY

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