

# FLENDER COUPLINGS

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## BIPEX-S

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Operating Instructions 3410en  
Edition 10/2017

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BNN, BGG, BCC, BHH, BKK, BCS, BHH-W

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## FLENDER COUPLINGS

### BIPEX-S 3410en

#### Operating Instructions


BNN, BGG, BCC, BHH, BKK, BCS, BHH-W


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## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.

 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.

 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.

<b>NOTICE</b>
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

### Proper use of Flender products

Note the following:

 <b>WARNING</b>
Flender products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Flender. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

### Trademarks

All names identified by ® are registered trademarks of Flender GmbH. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

### Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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# Introduction

## 1.1 About these instructions

These instructions describe the coupling and provide information about its handling - from assembly to maintenance. Please keep these instructions for later use.

Please read these instructions prior to handling the coupling and follow the information in them.

## 1.2 Text attributes

The warning notice system is explained on the back of the inner cover. Always follow the safety information and notices in these instructions.

In addition to the warning notices, which have to be observed without fail, you will find the following text attributes in these instructions:

1. Procedural instructions are shown as a numbered list. Always perform the steps in the order given.

- Lists are formatted as bulleted lists.
  - The dash is used for lists at the second level.

(1) Numbers in brackets are part numbers.

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### Note

A note is an important item of information about the product, the handling of the product or the relevant section of the instructions. The note provides you with help or further suggestions/ ideas.

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## 1.3 Copyright

The copyright for these instructions is held by Flender.

These instructions must not be used wholly or in parts without our authorisation or be given to third parties.

If you have any technical queries, please contact our factory or one of our service outlets (refer to Service and support (Page 43)).



## Safety instructions

### 2.1 General information

#### Instructions

These instructions are part of the delivery. Always keep these instructions close to the coupling.

Please make sure that every person who is commissioned to work on the coupling has read and understood these instructions prior to handling the coupling and observes all of the points.







Only the knowledge of these instructions can avoid faults on the coupling and ensure fault-free and safe operation. Non-adherence to the instructions can cause product or property damage or personal injury. Flender does not accept any liability for damage or operating failures that are due to non-adherence to these instructions.

#### State of the art



The coupling described here has been designed in consideration of the latest findings for demanding technical requirements. This coupling is state-of-the-art at the time of printing these instructions.

In the interest of further development, Flender reserves the right to make such changes to the individual components and accessories that increase performance and safety whilst maintaining the essential features.

#### Symbols

ISO	ANSI	Warning
		Warning - hazardous electrical voltage
	---	Warning - entanglement hazard
	---	Warning - hot surfaces
	---	Warning - substances that are harmful to health or are irritants
	---	Warning - corrosive substances

2.2 Intended use

ISO	ANSI	Warning
	---	Warning - suspended load
	---	Warning - hand injuries

**Explanation regarding Machinery Directive 2006/42/EC**

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

**Protective clothing**

In addition to the generally prescribed personal protective equipment (safety shoes, overalls, helmet, etc.), also wear suitable safety gloves and safety goggles when handling the coupling.

**Using the coupling**

The relevant work safety and environmental protection regulations must be complied with at all times during transport, assembly, installation, dismantling, operation and maintenance of the coupling.

Only qualified personnel may operate, assemble, maintain and repair the coupling. Information about qualified personnel can be found in the legal notes at the beginning of these instructions.

If lifting gear or load suspension devices are used for transporting, these have to be suitable for the weight of the coupling.

If the coupling has visible damage, it may not be assembled or put into operation.

The coupling may only be operated in a suitable housing or with touch protection according to applicable standards. This also applies to test runs and rotational direction checks.

**Work on the coupling**

Only carry out work on the coupling when it is not in operation and is not under load.

Secure the drive unit against being switched on accidentally. Attach a notice to the switch stating clearly that work is being carried out on the coupling. Ensure that the entire unit is not under load.

**2.2 Intended use**


Only use the coupling according to the conditions specified in the service and delivery contract and the technical data in the annex. Deviating operating conditions are considered improper use. The user or owner of the machine or plant is solely liable for any resulting damage.

When using the coupling please specifically observe the following:


- Do not make any modifications to the coupling that go beyond the permissible machining described in these instructions. This also applies to touch protection facilities.
- Only use original spare parts from Flender. Flender only accepts liability for original spare parts from Flender.  
Other spare parts are not tested and approved by Flender. Non-approved spare parts may possibly change the design characteristics of the coupling and thus impact active and/or passive safety.  
Flender will accept no liability or warranty whatsoever for damage occurring as a result of the use of non-approved spare parts. The same applies to any accessories that were not supplied by Flender.

If you have any queries, please contact our customer service (see Service and support (Page 43)).


## 2.3 General warning notices


	<b>WARNING</b>
<b>Danger due to bursting of the coupling</b>	
The coupling may burst if it is not used properly. There is a risk of fatal injury from flying fragments.	
<ul style="list-style-type: none"> <li>• Use the coupling for the purpose for which it is intended.</li> </ul>	



	<b>WARNING</b>
<b>Danger from hot coupling parts</b>	
Risk of injury due to hot surfaces.	
<ul style="list-style-type: none"> <li>• Wear suitable protective equipment (gloves, safety goggles).</li> </ul>	



	<b>WARNING</b>
<b>Risk of chemical burns due to chemical substances</b>	
There is a risk of chemical burns when handling aggressive cleaning agents.	
<ul style="list-style-type: none"> <li>• Please observe the manufacturer's information on how to handle cleaning agents and solvents.</li> <li>• Wear suitable protective equipment (gloves, safety goggles).</li> </ul>	

	<b>CAUTION</b>
<b>Physical injury</b>	
Risk of injury due to falling coupling parts.	
<ul style="list-style-type: none"> <li>• Secure the coupling parts to prevent them from falling.</li> </ul>	



## Description

The BIPEX-S couplings described here are torsionally flexible claw couplings that are free of torsional backlash and are available in various types and sizes. They are characterised by a very compact design.

BIPEX-S couplings are fail-safe.

These instructions describe the assembly and operation of a BIPEX-S coupling arranged horizontally with a shaft-hub connection made by a cylindrical or conical bore with a parallel key or by various clamping connections. Please consult Flender if you want to use a different type of installation.

## Application

BIPEX-S couplings are designed for use in all kinds of machines. They are primarily used in drive units with torque transmission without any backlash and only low misalignment.

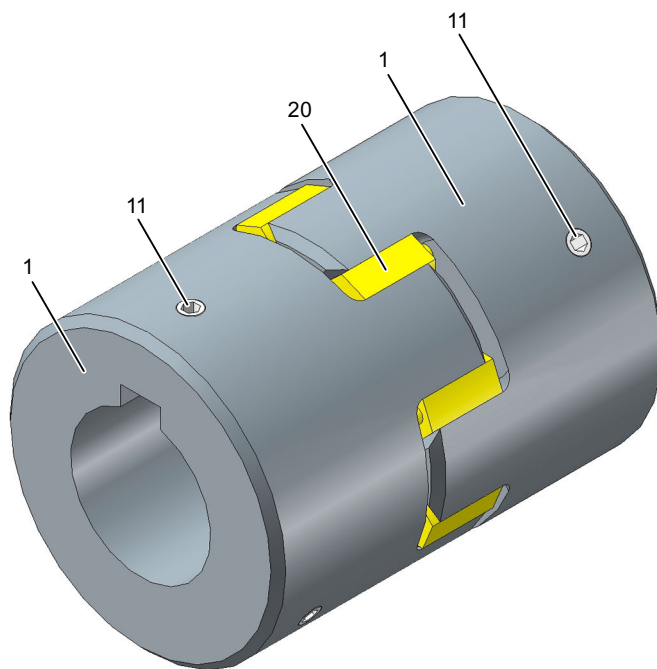
## Design

A BIPEX-S coupling consists of two hub parts that are connected to one another by a cam ring made of an elastomer material. In the BHH-W type the hub parts are connected to one another by two cam rings and a spacer.

The cam ring is fitted between the hub cams with a small amount of interference. The coupling characteristic of zero backlash is based on this.

The hub parts are joined to the shaft by finished bores with a parallel key or various clamping connections.

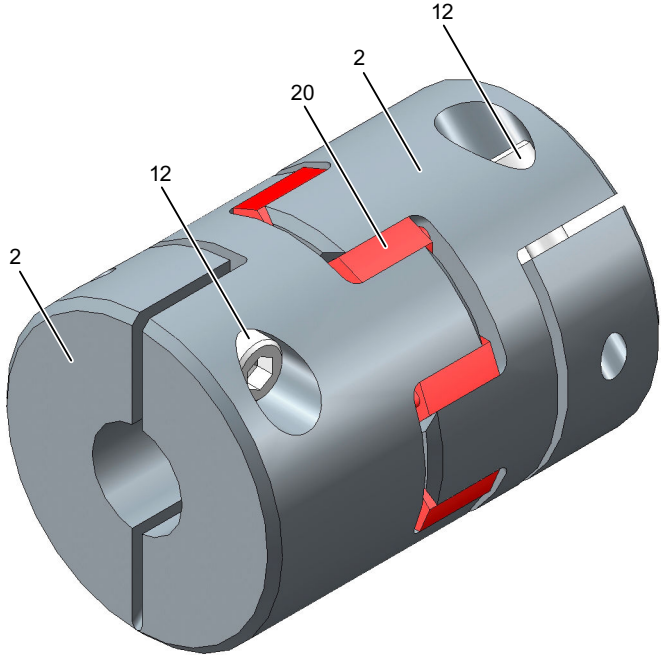
The diagrams show the various types with their constituent parts and their part numbers.



- 1 Coupling part N
- 11 Set screw
- 20 Cam ring

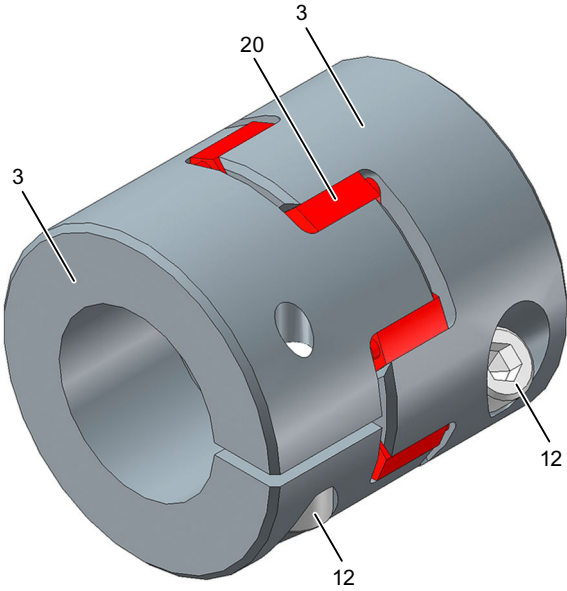
Figure 3-1 Type BNN





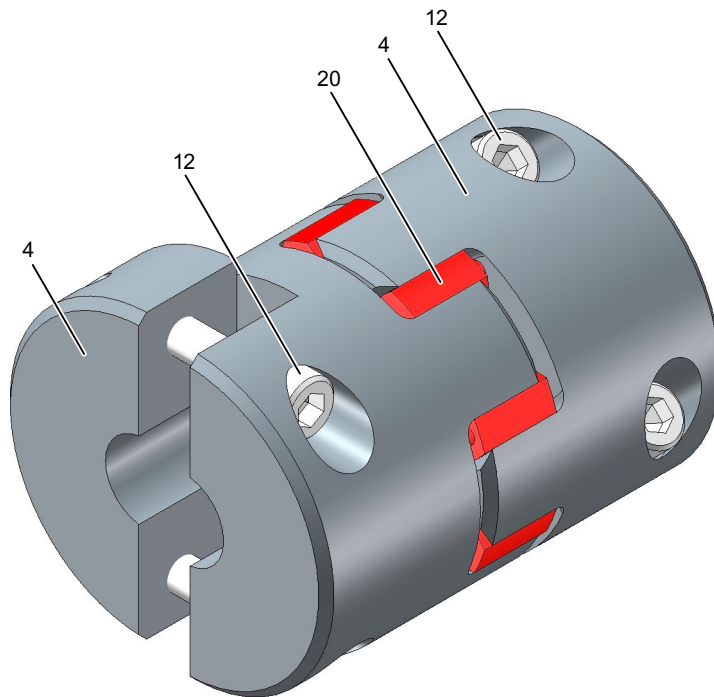
- 2 Coupling part G
- 12 Cylinder-head screw
- 20 Cam ring

Figure 3-2 Type BGG



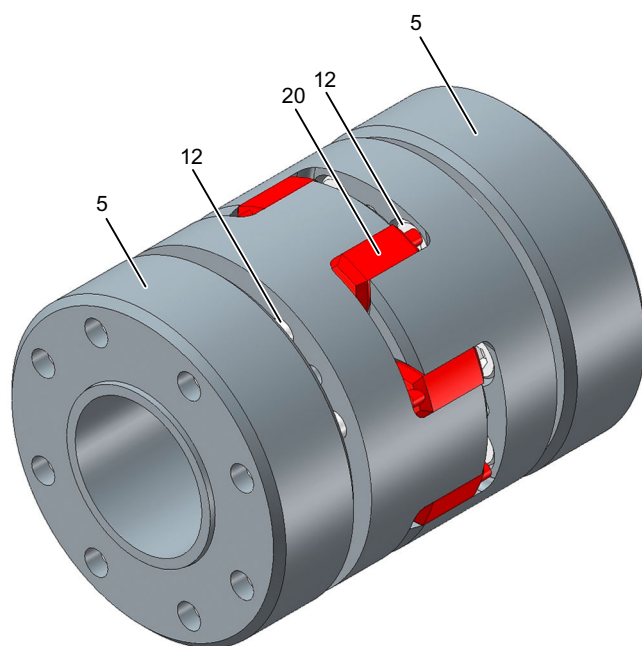
- 3 Coupling part C
- 12 Cylinder-head screw
- 20 Cam ring

Figure 3-3 Type BCC



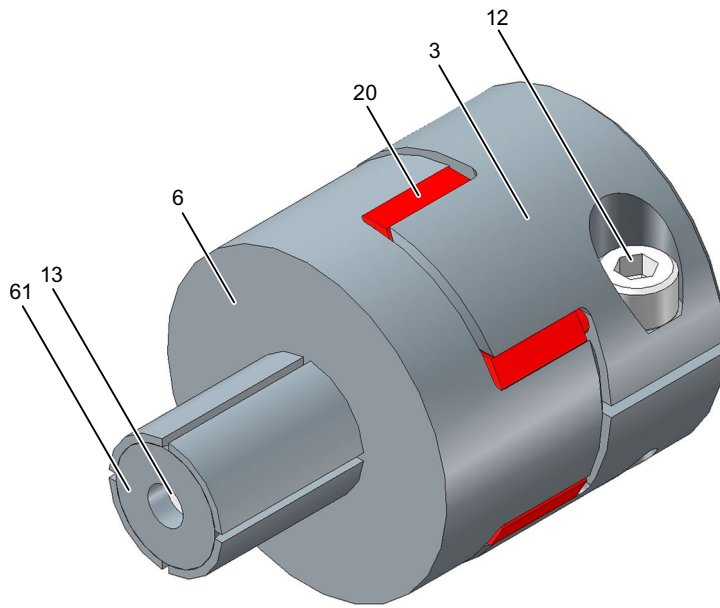
- 4 Coupling part H
- 12 Cylinder-head screw
- 20 Cam ring

Figure 3-4 Type BHH



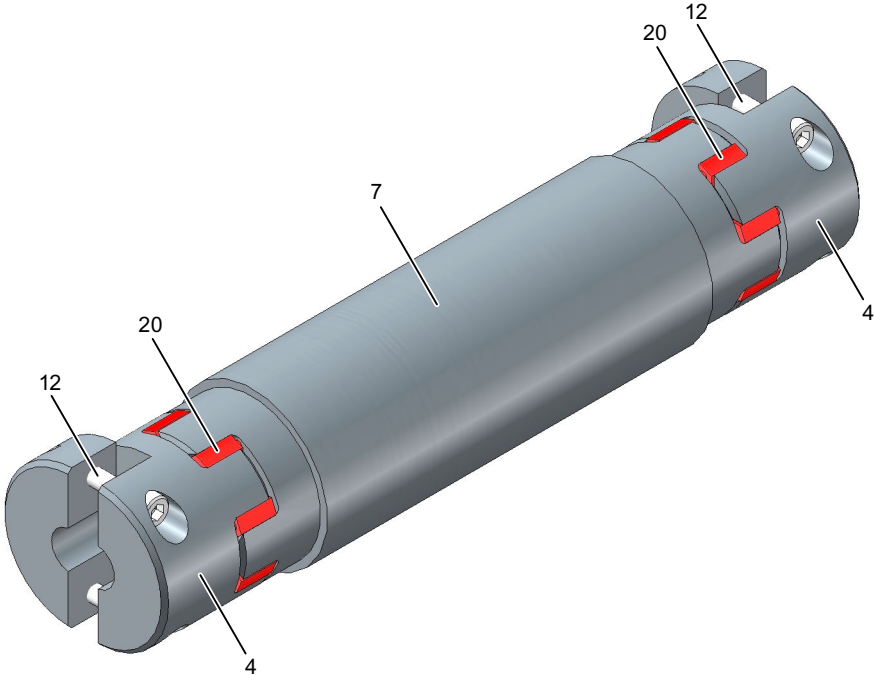
- 5 Coupling part K
- 12 Cylinder-head screw
- 20 Cam ring

Figure 3-5 Type BKK



- 3 Coupling part C
- 6 Coupling part S
- 12 Cylinder-head screw
- 13 Cylinder-head screw
- 20 Cam ring
- 61 Clamping taper

Figure 3-6 Type BCS



- 4 Coupling part H
- 7 Spacer W
- 12 Cylinder-head screw
- 20 Cam ring

Figure 3-7 Type BHH-W



## Application planning

Check the delivery for damage and for completeness. Report any damage and/or missing parts to Flender immediately.

The coupling is delivered in individual parts and preassembled groups. Preassembled groups may not be dismantled.

### 4.1 Transport of the coupling



<p><b>! WARNING</b></p> <p><b>Severe personal injury due to improper transport</b></p> <p>Severe personal injury due to falling components or due to crushing. Damage to coupling parts possible due to use of unsuitable transport means.</p> <ul style="list-style-type: none"> <li>• Only use lifting gear and load suspension devices with sufficient load bearing capacity for transport.</li> <li>• Please observe the symbols applied on the packaging.</li> </ul>
---

If not specifically contractually agreed otherwise, the packaging complies with the HPE Packaging Directive.

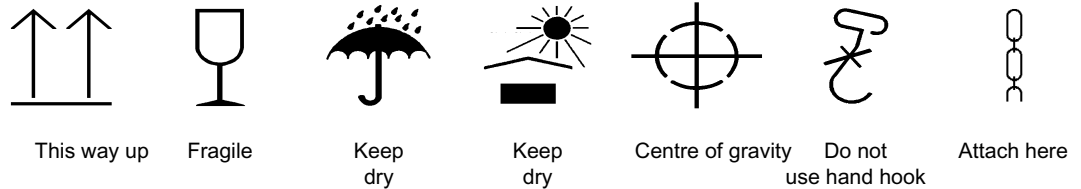


Figure 4-1 Transport symbols

### 4.2 Storage of the coupling

<p><b>NOTICE</b></p> <p><b>Property damage due to improper storage</b></p> <p>Negative changes to the physical properties of the coupling and/or coupling damage.</p> <ul style="list-style-type: none"> <li>• Please observe the information about storing the coupling.</li> </ul>
--

4.2 Storage of the coupling

The coupling, unless not specifically ordered otherwise, is supplied with preservation and can be stored for up to 3 months.

**Note**

**Information about storing the coupling**

- Ensure that the storage room is dry (relative humidity < 65 %) and free of dust.
- Ensure that there is no condensation.
- Do not store the coupling together with corrosive chemicals, acids, caustic solutions, etc.
- If the coupling contains elastomer components, ensure that there are no devices in the storage room that produce ozone, such as fluorescent lights, mercury vapour lamps or high-voltage electrical equipment.
- Store the coupling on suitable supports or in suitable containers.

**Long-term storage**

<b>NOTICE</b>
<b>Property damage due to improper long-term storage</b>
Negative changes to the physical properties of the coupling and/or coupling damage.
<ul style="list-style-type: none"> <li>• Note the handling instructions for long-term storage.</li> </ul>

1. You can find the required type of preservative agent in the following table (types of preservative agents for long-term storage).
2. Remove the elastomer components. These must not come into contact with cleaning agents and long-term preservative agents.
3. Clean the coupling parts.
4. Apply the stipulated preservative agent.
5. Store the coupling parts and the elastomer components separately.

Table 4-1 Types of preservative agents for long-term storage

Preservative agents	Features	Indoor storage	Outdoor storage
Oil spray	Anti-corrosion agent	Up to 12 months	Up to 4 months
Tectyl 846 or similar	Long-term preservative agent on wax basis	Up to 36 months	Up to 12 months
Emulsion cleaner + VCI foil	Active system, reusable	Up to 5 years	Up to 5 years



# Assembly

Assembly of the coupling comprises the following steps:

- Preparatory work (Page 25)
- Assembling the coupling (Page 26)
- Aligning the coupling (Page 29)



## WARNING

### Danger of injury due to bursting of the coupling

If you do not observe the information stipulated here regarding assembly, this can lead to bursting of the coupling during operation. There is a risk of fatal injury from flying fragments.

- Please observe all the stipulations concerning assembly.

## Note

### Information about the assembly of the coupling

- Only use undamaged components for the assembly of the coupling.
- Follow the assembly sequence.
- Please ensure that there is sufficient space at the assembly location and that the location is tidy and clean in order to be able to assemble and maintain the coupling without any risk.
- If a dimension drawing has been created for the coupling, please observe the information it contains as a matter of priority.

## 5.1 Preparatory work

No preparatory work is required, since the coupling is supplied finish bored, grooved and balanced.

Balancing is performed to customer specifications or according to the half-parallel key agreement (DIN ISO 21940-32) to balancing quality G16 (DIN ISO 21940).

## 5.2 Assembling the coupling

<b>NOTICE</b>
<b>Property damage</b> Damage to the elastomer components from cleaning agents. <ul style="list-style-type: none"><li>• Ensure that the elastomer components do not come into contact with cleaning agents.</li></ul>

<b>NOTICE</b>
<b>Property damage</b> Damage to the shaft end, the coupling parts and/or the parallel key. <ul style="list-style-type: none"><li>• Note the handling instructions regarding assembly of the coupling parts.</li></ul>

Assembly of the coupling comprises the following steps:

- Assembling the coupling parts (Page 26)
- Plug-in assembly of the coupling halves (Page 28)

### 5.2.1 Assembling the coupling parts

The assembly procedure depends on which coupling part you wish to assemble.

- Attach the coupling part N (1) with parallel key to the shaft (Page 26)
- Attaching coupling part G (2), C (3), H (4) or K (5) to the shaft with a clamping connection (Page 27)
- Attach coupling part S (6) to the hollow shaft with a clamping connection (Page 27)

#### 5.2.1.1 Attach the coupling part N (1) with parallel key to the shaft

##### Procedure

1. Undo the set screws until it is no longer possible for there to be a collision with the parallel key or the shaft.
2. Clean the bores and shaft ends.

- Put coupling part N (1) on the shaft.

---

**Note****Coupling parts with cylindrical bore**

To make assembly easier, you can heat coupling part N (1) with cylindrical bore up to a maximum of 150 °C if required. Note when doing this the temperature range of the cam ring (20) (refer to section BIPEX-S cam ring (20) (Page 64)). Remove the cam ring (20) where appropriate. Protect adjacent components against damage and heating to temperatures above 80 °C.

---

- Secure the coupling part with the set screws. When doing this the shaft must not protrude or be set back from the inner side of the hub.
- Tighten the set screws to the specified tightening torque  $T_A$  (see section ).
- If you have removed the cam ring (20), re-fit the cam ring (20).

### 5.2.1.2 Attaching coupling part G (2), C (3), H (4) or K (5) to the shaft with a clamping connection

#### Procedure

- Undo the cylinder-head screws (12).
- Clean the bores and shaft ends.
- Put coupling parts G (2), C (3), H (4) or K (5) on the shaft.
- When doing this the shaft must not protrude or be set back from the inner side of the hub.
- Tighten the cylinder-head screws (12) as follows:
  - Coupling parts G (2) and C (3)  
Tighten the cylinder-head screw (12) to the specified tightening torque  $T_A$  (see section Tightening torques and widths A/F (Page 63)).
  - Coupling part H (4)  
Tighten the cylinder-head screws (12) in alternating order in several stages up to the specified tightening torque  $T_A$  (see section Tightening torques and widths A/F (Page 63)).
  - Coupling part K (5)  
Tighten the cylinder-head screws (12) in crisscross rotation in several stages to the specified tightening torque  $T_A$  (see section Tightening torques and widths A/F (Page 63)).

### 5.2.1.3 Attach coupling part S (6) to the hollow shaft with a clamping connection

#### Procedure

- Undo the cylinder-head screw (13) and the clamping taper (61).
- Clean, de-grease/de-oil and dry the hollow shaft hole and the force fit of the coupling part S (6).

3. Insert the coupling part S (6) with cylinder-head screw (13) and clamping taper (61) into the hollow shaft.
4. Tighten the cylinder-head screw (13) to the specified tightening torque  $T_A$  (see section Tightening torques and widths A/F (Page 63)).

## 5.2.2 Plug-in assembly of the coupling halves

---

### Note

As a result of the interference between the cams and the cam ring (20) an axial force is required to insert the coupling parts axially. The axial force depends on the size of the coupling and the Shore hardness of the cam ring (20). It increases again after insertion so that there is no permanent stressing of the coupled units.

---

The assembly procedure depends on which type you wish to assemble.

- Plug-in assembly of types BNN, BGG, BCC, BHH, BKK and BCS (Page 28)
- Plug-in assembly of type BHH-W (Page 28)

### 5.2.2.1 Plug-in assembly of types BNN, BGG, BCC, BHH, BKK and BCS

#### Procedure

1. Push the cam ring (20) onto a coupling part.
2. Push the coupling halves together. When doing this, pay attention to the dimension S from section Speeds, geometry data and weights (Page 55).

### 5.2.2.2 Plug-in assembly of type BHH-W

#### Procedure

1. Push a cam ring (20) onto each coupling part H.
2. Push the spacer W (7) into a coupling part H and hold or support the spacer W (7).
3. Push the coupling halves together. When doing this, pay attention to the dimension S from section Speeds, geometry data and weights (Page 55).

## 5.3 Aligning the coupling

### 5.3.1 Purpose of alignment

The shafts that are joined by the coupling are never on an ideal precise axis but have a certain amount of misalignment.

Misalignment in the coupling leads to restoring forces that can stress adjacent machine parts (e.g. the bearings) to an unacceptable extent.

The misalignment values in operation result from the following:

- Misalignment due to assembly  
Incorrect position due to a lack of precision when aligning
- Misalignment due to operation  
Example: Load-related deformation, thermal expansion

You can minimise misalignment by aligning after assembly. A lower misalignment in the coupling has the following advantages:

- Reduced wear of the elastomer components
- Reduced restoring forces
- Misalignment reserves for operation of the coupling

You can find the maximum permitted shaft misalignment values during operation in section Shaft misalignment values during operation (Page 62).

### 5.3.2 Possible misalignment

The following types of misalignment can occur:

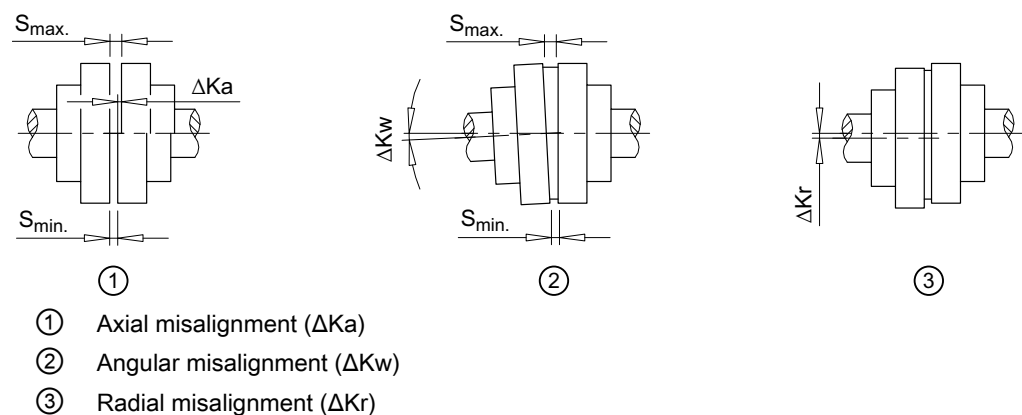


Figure 5-1 Possible misalignment

<p><b>NOTICE</b></p> <p><b>Property damage</b></p> <p>The specified permissible values for axial, angular and/or radial misalignment may not appear simultaneously.</p> <ul style="list-style-type: none"> <li>• Halve the values for if axial, angular and/or radial misalignment if they appear simultaneously.</li> </ul>
--

**5.3.2.1 Axial misalignment**

Set the axial misalignment  $\Delta K_a$  to a value within the permissible tolerance range of dimension S.

You can find the values for dimension S in section Speeds, geometry data and weights (Page 55).

**5.3.2.2 Angular misalignment**

Determine the value  $\Delta S$  ( $\Delta S = S_{max} - S_{min}$ ). The determined value  $\Delta S$  may not exceed the value  $\Delta S_{perm}$ .

You can find the values for  $\Delta S_{perm}$  in section Shaft misalignment values during operation (Page 62).

If required, you can calculate the angular misalignment  $\Delta K_w$  as follows:

$$\Delta K_w \text{ [rad]} = \Delta S / DA$$

$$\Delta K_w \text{ [deg]} = (\Delta S / DA) \cdot (180 / \pi)$$

If required, you can calculate the permissible angular misalignment  $\Delta K_{w_{perm}}$  as follows:

$$\Delta K_{w_{perm}} \text{ [rad]} = \Delta S_{perm} / DA$$

$$\Delta K_{w_{perm}} \text{ [deg]} = (\Delta S_{perm} / DA) \cdot (180 / \pi)$$

DA in mm see section Speeds, geometry data and weights (Page 55)

$\Delta S_{perm}$  see section Shaft misalignment values during operation (Page 62)

**5.3.2.3 Radial misalignment**


Determine the value  $\Delta K_r$ . The determined value  $\Delta K_r$  may not exceed the value  $\Delta K_{r_{perm}}$ .

You can find the permissible radial misalignment  $\Delta K_{r_{perm}}$  in section Shaft misalignment values during operation (Page 62).

# Commissioning

In order to ensure safe commissioning, carry out various tests prior to commissioning.

## Testing before commissioning

 <b>WARNING</b>
<b>Danger</b> Overload conditions can occur during the commissioning of the coupling. The coupling can burst and metal parts can be flung out. There is a risk of fatal injury from flying fragments. <ul style="list-style-type: none"><li>• Carry out the tests prior to commissioning.</li><li>• Do not touch the rotating coupling.</li></ul>

1. Check the tightening torques of the screws of the coupling in accordance with section Tightening torques and widths A/F (Page 63).
2. Check the tightening torques of the foundation bolts of the coupled machines.
3. Check whether the enclosures (coupling guard, touch protection) have been installed and that the function of the coupling has not been adversely affected by the enclosure. This also applies to test runs and rotational direction checks.





## Operation

### 7.1 Normal operation of the coupling

The coupling runs quietly and shock-free during normal operation.


### 7.2 Faults - causes and rectification

A form of behaviour which is different to normal operation is classed as a fault and has to be rectified immediately.

Look out specifically for the following faults during coupling operation:

- Unusual coupling noise
- Sudden occurrence of shocks

#### 7.2.1 Procedure in the event of malfunctions

 <b>WARNING</b>
<p><b>Danger due to bursting of the coupling</b></p> <p>There is a risk of fatal injury from flying fragments.</p> <ul style="list-style-type: none"> <li>• Switch off the unit at once if any malfunctions occur.</li> <li>• Note during the maintenance work the possible causes of faults and the notes on rectifying them.</li> </ul>

Proceed as described below if there is a malfunction of the coupling during operation:

1. De-energise the drive immediately.
2. Initiate the required action for repair, taking into consideration the applicable safety regulations.

If you cannot determine the cause or if you cannot carry out repair work with your own means, request one of our customer service technicians.

#### 7.2.2 Identifying the fault cause

Faults occur frequently due to application errors or they occur due to operational circumstances such as wear of wearing parts or changes to the system.

The faults and fault causes listed below only serve as an indication for troubleshooting. In the case of a complex system be sure to include all the system components in the search for the fault.



<p><b>! WARNING</b></p> <p><b>Physical injury</b></p> <p>Injury from rotating parts.</p> <ul style="list-style-type: none"> <li>• Only carry out work on the coupling when it is not moving.</li> <li>• Secure the drive unit against being operated accidentally.</li> <li>• Attach a notice to the switch stating clearly that work is being carried out on the coupling.</li> <li>• Before starting any work, make sure that the unit is free from loads.</li> </ul>
---

**Intended use**

The coupling is only approved for the applications specified in these instructions. Please observe all the stipulations in section Intended use (Page 12).

**7.2.2.1 Possible faults**

Table 7-1 Table of faults

<b>Fault</b>	<b>Cause</b>	<b>Rectification</b>
Sudden changes in the noise level and/or sudden occurrences of shocks	Wear of wearing parts	Follow the instructions given in section Replacing wearing parts (Page 36).
	Changed alignment	Follow the instructions given in section Correcting the changed alignment (Page 37).
	Coupling not suitable for the operating conditions. Check the possible causes given in section Unsuitable coupling (Page 35).	Use a coupling that is suitable for the operating conditions.
	Incorrect assembly of the coupling. Check the possible causes given in sections Assembly-related causes (Page 35) and Specific installation-related and maintenance-related causes (Page 36).	Reassemble the coupling in accordance with these instructions. Please observe all the stipulations and requirements given in chapter Assembly (Page 25).
	Incorrect maintenance of the coupling. Check the possible causes given in sections Maintenance-related causes (Page 36) and Specific installation-related and maintenance-related causes (Page 36).	Please observe all the stipulations and requirements given in chapter Servicing (Page 39).

Fault	Cause	Rectification
Presence of vibration	Coupling not suitable for the operating conditions. Check the possible causes given in section Unsuitable coupling (Page 35).	Use a coupling that is suitable for the operating conditions.
	Incorrect assembly of the coupling. Check the possible causes given in sections Assembly-related causes (Page 35) and Specific installation-related and maintenance-related causes (Page 36).	Reassemble the coupling in accordance with these instructions. Please observe all the stipulations and requirements given in chapter Assembly (Page 25).
	Incorrect maintenance of the coupling. Check the possible causes given in sections Maintenance-related causes (Page 36) and Specific installation-related and maintenance-related causes (Page 36).	Please observe all the stipulations and requirements given in chapter Servicing (Page 39).

### 7.2.2.2 Possible causes

#### Unsuitable coupling

- Important information on the description of the drive unit and the environment were not available when the coupling was chosen.
- System torque too high and/or torque dynamics not permissible.
- System speed too high.
- Application factor not selected correctly.
- Chemically aggressive environment not taken into consideration.
- Coupling not suitable for the ambient temperature.
- Diameter and/or assigned fit of the finished bore not permissible.
- Width across corners of the parallel keyways greater than the width across corners of the parallel keyways in accordance with DIN 6885/1 for the maximum permissible bore.
- Shaft-hub connection incorrectly sized.
- Maximum permissible load conditions not taken into consideration.
- Maximum permissible overload conditions not taken into consideration.
- Dynamic load conditions not taken into consideration.
- Coupling and the machine and/or drive train form a critical torsional, axial or bending vibration system.

#### Assembly-related causes

- Damaged parts installed.
- Shaft diameter outside the stipulated tolerance range.

- Coupling parts interchanged and hence not assigned to the specified shaft.
- Stipulated locking elements to prevent axial movements not installed.
- Stipulated tightening torques not adhered to.
- Bolts inserted dry or greased.
- Flange surfaces of screwed connections not cleaned.
- Alignment and/or shaft misalignment values not set in accordance with the instructions.
- Coupled machines were not correctly connected to the foundation so that a shifting of the machines leads to an impermissible displacement of the coupling parts.
- Coupled machines not earthed adequately.
- Coupling guard used is not suitable.

#### **Maintenance-related causes**

- Stipulated maintenance intervals not adhered to.
- Spare parts that were used were not original spare parts from Flender.
- Flender spare parts that were used were old or damaged.
- Leak in the area of the coupling not detected so that chemically aggressive substances damage the coupling.
- Indications of faults, such as noise or vibration, were not heeded.
- Stipulated tightening torques not adhered to.
- Alignment and/or shaft misalignment values not set in accordance with the instructions.

#### **Specific installation-related and maintenance-related causes**

- Cam ring (20) not fitted.
- Fitted cam ring (20) heated up excessively when applying heat to the coupling parts.

### **7.2.3 Correcting faults**

#### **7.2.3.1 Replacing wearing parts**

Cam rings (20) are subject to wear and this wear can result in torsional backlash.

#### **Procedure**

1. Check the wear on the cam ring (20) (see section Maximum permissible torsional backlash (Page 40)).
2. Replace the cam ring (20) where appropriate (see section Replacing wearing parts (Page 40)).

### **7.2.3.2 Correcting the changed alignment**


A changed alignment of the coupling during operation often occurs when the coupled machines shift towards one another. A cause of this can be loose foundation bolts.


#### **Procedure**

1. Correct the cause for the change in alignment.
2. Check the wearing parts for wear and replace them as required.
3. Check the locking elements that prevent axial movements and correct these as required.
4. Realign the coupling.




## 8.1 Maintenance intervals

 <b>WARNING</b>
<b>Danger of injury due to bursting of the coupling</b>
The coupling can burst if the maintenance intervals are not adhered to. There is a risk of fatal injury from flying fragments.
<ul style="list-style-type: none"> <li>• Please observe all the stipulations concerning maintenance of the coupling in this section.</li> </ul>

 <b>WARNING</b>
<b>Danger of injury due to bursting of the coupling</b>
The coupling can burst if the maximum permitted torsional backlash is exceeded. There is a risk of fatal injury from flying fragments.
<ul style="list-style-type: none"> <li>• Note also the actual wear of the elastomer components.</li> </ul>



 <b>WARNING</b>
<b>Physical injury</b>
Injury from rotating parts.
<ul style="list-style-type: none"> <li>• Only carry out work on the coupling when it is not moving.</li> <li>• Secure the drive unit against being operated accidentally.</li> <li>• Attach a notice to the switch stating clearly that work is being carried out on the coupling.</li> <li>• Before starting any work, make sure that the unit is free from loads.</li> </ul>

Check the torsional backlash between the coupling parts at the specified maintenance intervals.

- No wear is permitted at the cam ring (20) for applications without backlash. Replace the cam ring (20) as soon as any torsional backlash is found.
- The maximum permissible torsional backlash for the various types for other applications can be found in section Maximum permissible torsional backlash (Page 40).

Table 8-1 Maintenance intervals

Type	Initial maintenance	Follow-up maintenance
All types	3 months after commissioning	Every 12 months

**Note**

**Shorter maintenance intervals**

If necessary, set shorter maintenance intervals depending on actual wear.

## 8.2 Maximum permissible torsional backlash

In order to calculate the torsional backlash, rotate one coupling part without applying torque up to the stop. Mark both of the coupling halves in the way shown in the diagram below. Turn the coupling part in the opposite direction up to the stop. The markings on both halves will then move apart. The distance between the markings corresponds to the torsional backlash.

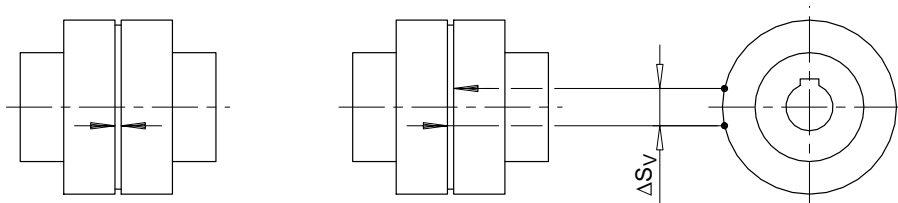


Figure 8-1 Markings for calculating the torsional backlash

Table 8-2 Maximum permissible torsional backlash for the BIPEX-S coupling

Size	5	7	9	14	19	24	28	38	42	48
Maximum permissible torsional backlash $\Delta S_v$ [mm]	0.4	0.6	1	1.4	1	1.3	1.7	2	2.4	2.7

## 8.3 Replacing wearing parts

**! WARNING**

**Danger due to bursting of the coupling**

If you do not observe the information stipulated here regarding replacement of wearing parts, this can lead to bursting of the coupling during operation. There is a risk of fatal injury from flying fragments.

- Please observe all the stipulations concerning the replacement of wearing parts.

Replace the cam ring (20) if the maximum permissible torsional backlash has been reached.



**Procedure**

1. With type BHH-W secure the spacer W (7) to prevent it from falling.
2. Move the coupled machines apart.
3. With type BHH-W remove the spacer W (7) radially.
4. Remove the cam ring (20), or in the case of type BHH-W, both cam rings (20).
5. Insert the new cam ring (20) or the two new cam rings (20).  
Please observe the information in section Use and storage of the cam rings (Page 64).

When reinstalling the coupling parts please observe the information in chapters Assembly (Page 25) and Commissioning (Page 31).

**8.4 Removing coupling part N (1)****WARNING****Danger from burners and hot coupling parts**

Risk of injury due to burners and hot surfaces.

- Wear suitable protective equipment (gloves, safety goggles).

**Procedure**

1. Move the coupled machines apart.
2. Secure the coupling parts to prevent them from falling.
3. Remove the set screws.
4. Use a suitable pulling fixture.
5. Heat up the coupling part N (1) using a burner above the parallel keyway along its length to maximum 80 °C.  
Note when doing this the temperature range of the cam ring (20) (refer to section BIPEX-S cam ring (20) (Page 64)). Remove the cam ring (20) where appropriate.
6. Pull off the coupling part N (1). Use suitable lifting gear when doing this.
7. Check the hub bore and the shaft for damage and protect them against corrosion.
8. Replace any damaged parts.

When reinstalling the coupling parts please observe the information in chapters Assembly (Page 25) and Commissioning (Page 31).

## **8.5 Removing coupling part G (2), C (3), H (4) or K (5)**

### **Procedure**

1. With type BHH-Wsecure the spacer W (7) to prevent it from falling.
2. Move the coupled machines apart.
3. With type BHH-Wremove the spacer W (7) radially.
4. Secure the coupling parts to prevent them from falling.
5. Undo the cylinder-head screws (12).
6. Pull off coupling parts G (2), C (3), H (4) or K (5). Use suitable lifting gear when doing this.
7. Check coupling parts G (2), C (3), H (4) or K (5), the spacer W (7) and the shaft for any damage and protect them against corrosion.
8. Replace any damaged parts.

When reinstalling the coupling parts please observe the information in chapters Assembly (Page 25) and Commissioning (Page 31).

## **8.6 Removing coupling part S (6)**

### **Procedure**

1. Move the coupled machines apart.
2. Secure the coupling parts to prevent them from falling.
3. Undo the cylinder-head screw (13).
4. Pull off the coupling part S (6) together with the clamping taper (61). Use suitable lifting gear when doing this.
5. Check the coupling part S (6), the clamping taper (61) and the shaft for any damage and protect them against corrosion.
6. Replace any damaged parts.

When reinstalling the coupling parts please observe the information in chapters Assembly (Page 25) and Commissioning (Page 31).

## Service and support

### 9.1 Contact

#### Contact

When ordering spare parts, requesting a customer service technician or in the case of technical queries, please contact our factory or one of our customer service addresses:

Flender GmbH

Schlavenhorst 100

46395 Bocholt

Germany

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

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



## Disposal

### Disposal of the coupling

Dispose of the coupling parts according to applicable national regulations or recycle them.



## Spare parts

### 11.1 Ordering spare parts

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

---

**Note****Original spare parts**

Only use original spare parts from Flender. Flender only accepts liability for original spare parts from Flender.

Other spare parts are not tested and approved by Flender. Non-approved spare parts may possibly change the design characteristics of the coupling and thus impact active and/or passive safety.

Flender will accept no liability or warranty whatsoever for damage occurring as a result of the use of non-approved spare parts. The same applies to any accessories that were not supplied by Flender.

---

You can find the available spare parts for the coupling described here at Spare parts drawing and spare parts list (Page 48).

You will find our contact data for ordering spare parts in Service and support (Page 43).

#### Information required when ordering spare parts

- Flender order number with item
- Flender drawing number
- Coupling type and size
- Part number (refer to Spare parts drawing and spare parts list (Page 48))
- Dimensions of the spare part, for example:
  - Bore
  - Bore tolerance
  - Parallel keyway and balancing
- Special dimensions, for example, flange connection dimensions, intermediate sleeve length or brake drum dimensions

11.2 Spare parts drawing and spare parts list

- Any special properties of the spare part, such as, for example:
  - Temperature resistance
  - Electrical insulation
  - Operating fluid
  - Use in potentially explosive atmospheres
- Quantity

## 11.2 Spare parts drawing and spare parts list

### 11.2.1 Type BNN

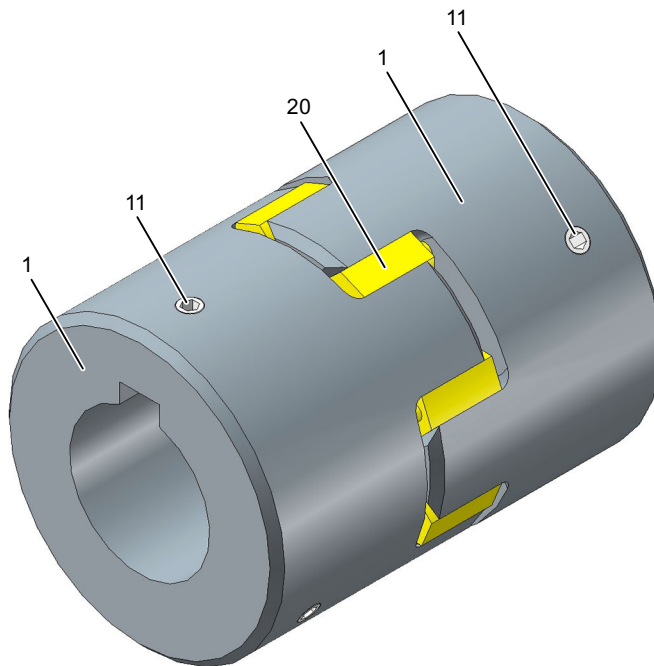


Figure 11-1 Spare parts drawing for type BNN

Table 11-1 Spare parts list for type BNN

Part number	Designation
1	Coupling part N
11	Set screw
20	Cam ring



## 11.2.2 Type BGG

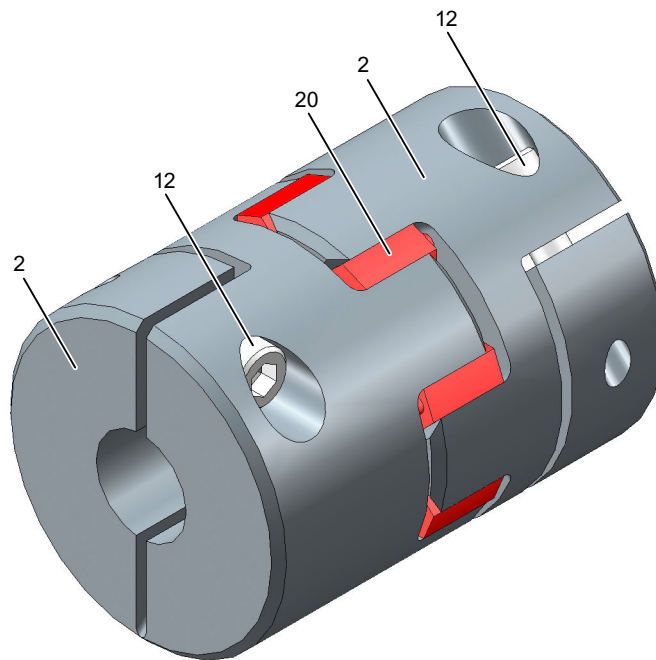


Figure 11-2 Spare parts drawing for type BGG

Table 11-2 Spare parts list for type BGG

Part number	Designation
2	Coupling part G
12	Cylinder-head screw
20	Cam ring

### 11.2.3 Type BCC

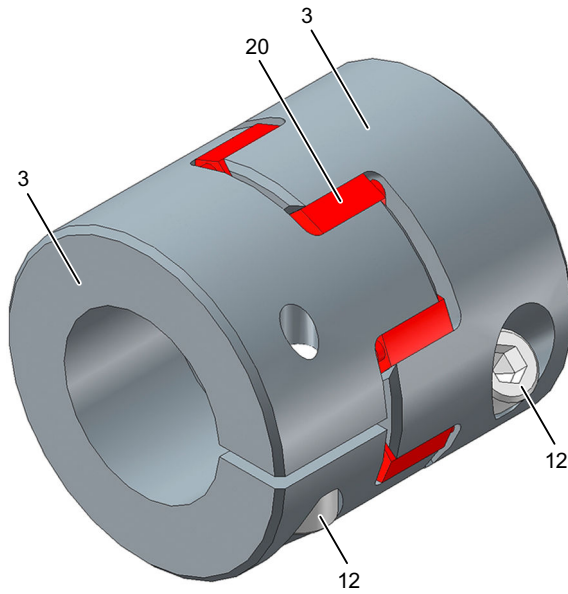


Figure 11-3 Spare parts drawing for type BCC

Table 11-3 Spare parts list for type BCC

Part number	Designation
3	Coupling part C
12	Cylinder-head screw
20	Cam ring

### 11.2.4 Type BHH

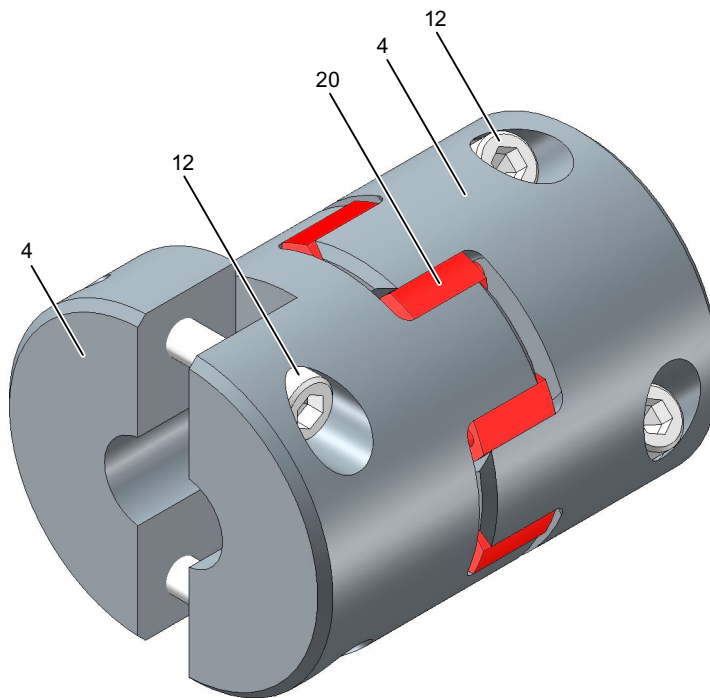


Figure 11-4 Spare parts drawing for type BHH

Table 11-4 Spare parts list for type BHH

Part number	Designation
4	Coupling part H
12	Cylinder-head screw
20	Cam ring

### 11.2.5 Type BKK

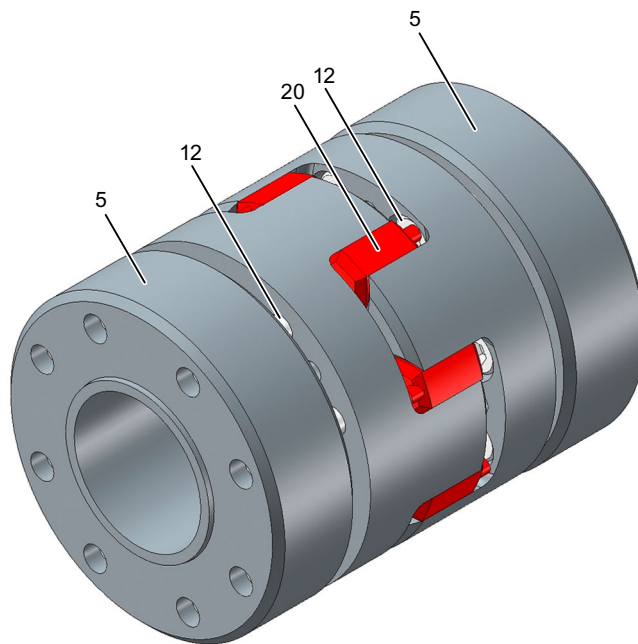


Figure 11-5 Spare parts drawing for type BKK

Table 11-5 Spare parts list for type BKK

Part number	Designation
5	Coupling part K
12	Cylinder-head screw
20	Cam ring

## 11.2.6 Type BCS

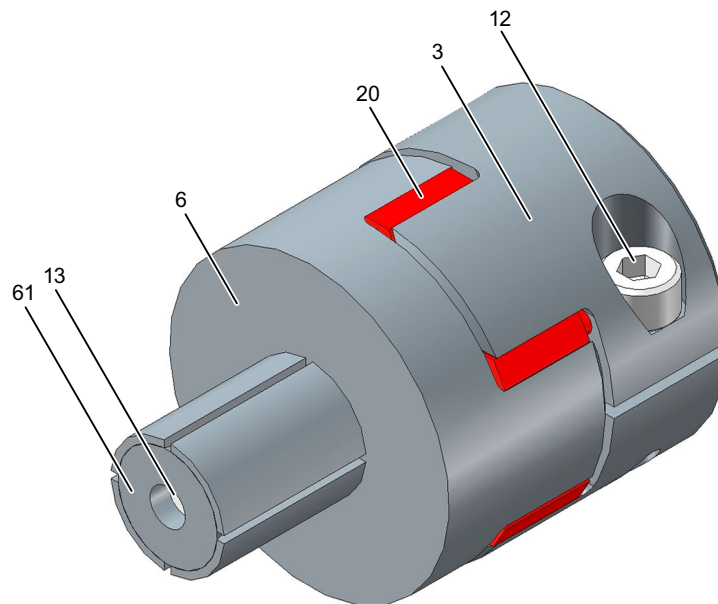


Figure 11-6 Spare parts drawing for type BCS

Table 11-6 Spare parts list for type BCS

Part number	Designation
3	Coupling part C
6	Coupling part S
12	Cylinder-head screw
13	Cylinder-head screw
20	Cam ring
61	Clamping taper

### Note

The hub S (6), the clamping taper (61) and the clamping screw (13) make up one module. Replace the entire module.

### 11.2.7 Type BHH-W

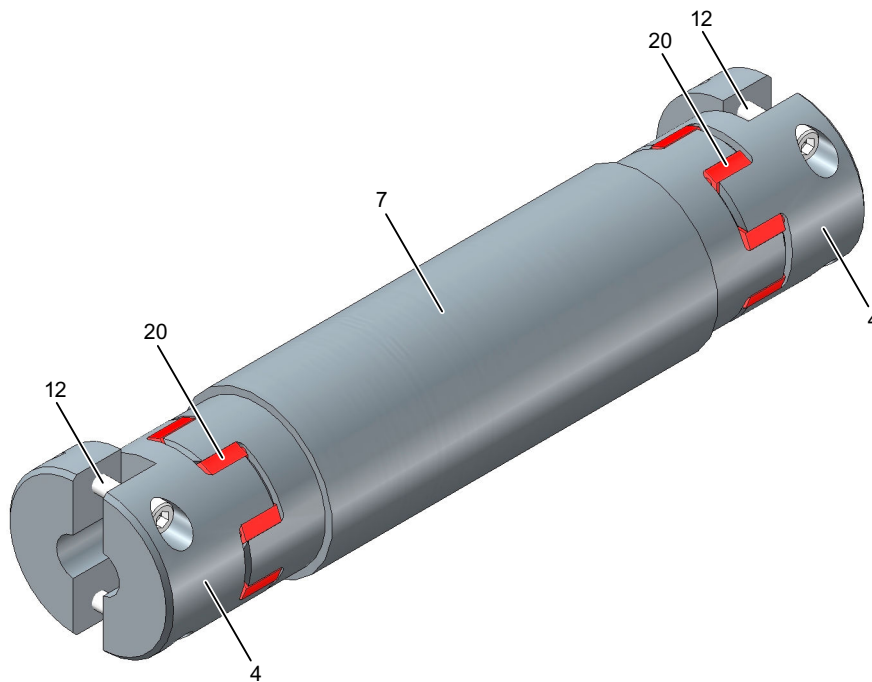


Figure 11-7 Spare parts drawing for type BHH-W

Table 11-7 Spare parts list for type BHH-W

Part number	Designation
4	Coupling part H
7	Spacer W
12	Cylinder-head screw
20	Cam ring

## Technical data

### A.1 Speeds, geometry data and weights

In this section you can find dimensional drawings and technical data for BIPEX-S couplings of the following types:

- Type BNN (Page 55)
- Type BGG (Page 56)
- Type BCC (Page 57)
- Type BHH (Page 58)
- Type BKK (Page 59)
- Type BCS (Page 60)
- Type BHH-W (Page 61)

#### A.1.1 Type BNN

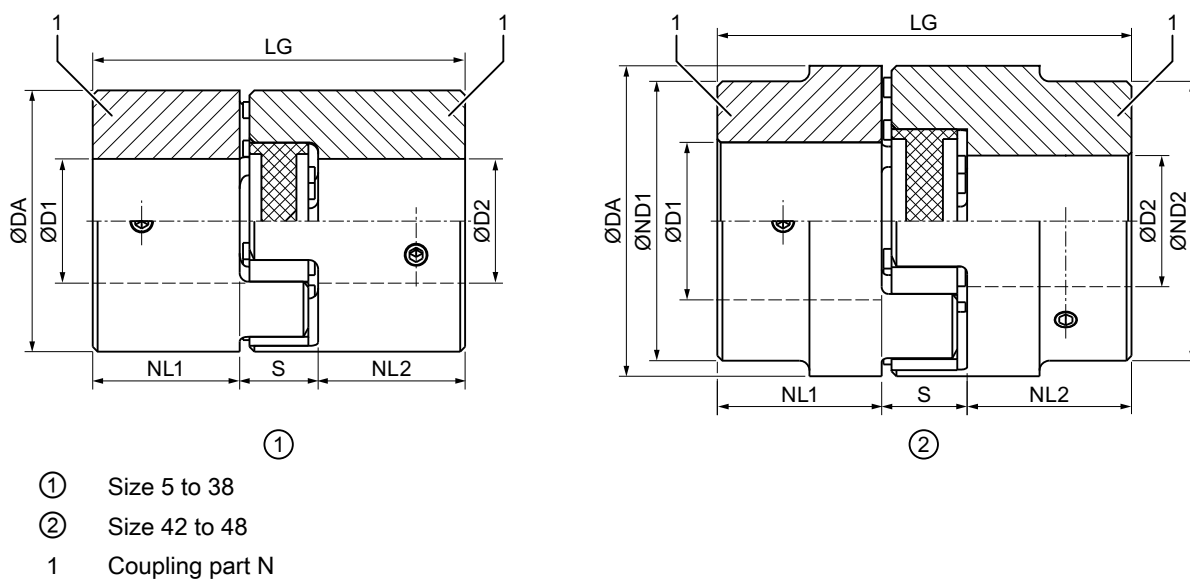


Figure A-1 Type BNN

Technical data

A.1 Speeds, geometry data and weights

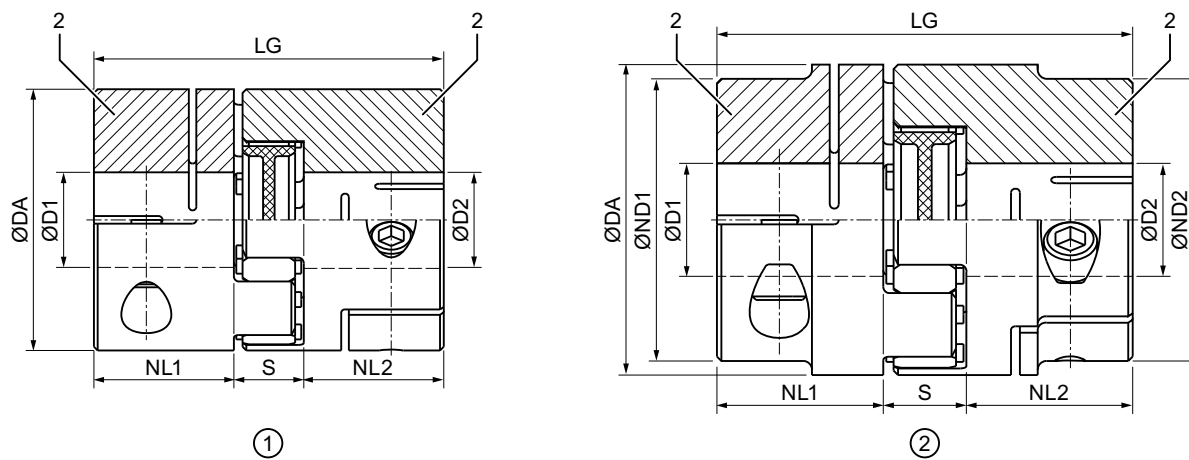
Table A-1 Geometry data and weights of type BNN

Size	DA mm	D1 / D2 max. <sup>1)</sup> mm	ND1 / ND2 mm	NL1 / NL2 mm	S		LG mm	Weight <sup>2)</sup> m kg
					mm	perm dev. mm		
5	10	5	-	5	5	+0.2	15	0.003
7	14	7	-	7	8	+0.3	22	0.007
9	20	10	-	10	10	+0.4	30	0.018
14	30	16	-	11	13	+0.5	35	0.045
19	40	24	-	25	16	+0.5	66	0.14
24	55	28	-	30	18	+0.5	78	0.36
28	65	38	-	35	20	+0.5	90	0.53
38	80	45	-	45	24	+1.0	114	1.1
42	95	55	85	50	26	+1.0	126	3.5
48	105	62	95	56	28	+1.0	140	5.3

<sup>1)</sup> Maximum bore for parallel keyway in accordance with DIN 6885/1.

<sup>2)</sup> Weight applies to one coupling with maximum bore.

A.1.2 Type BGG



- ① Size 5 to 38
- ② Size 42 to 48
- 2 Coupling part G

Figure A-2 Type BGG

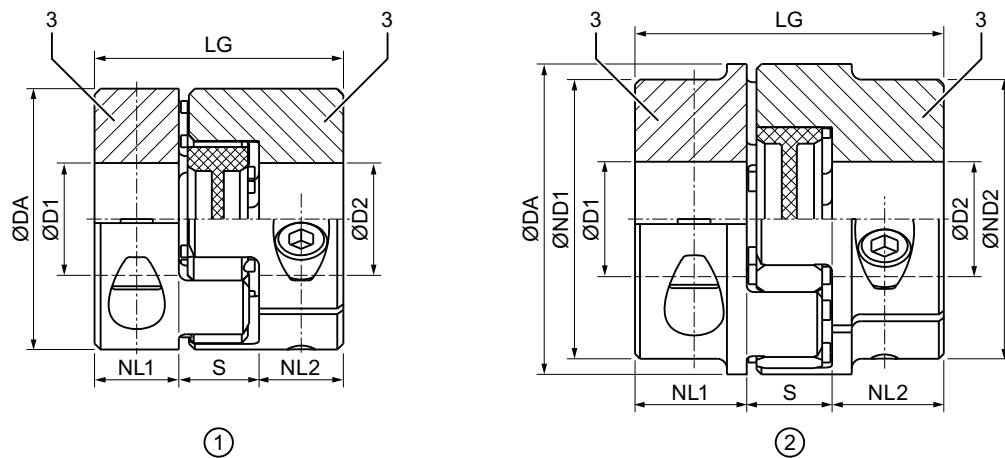


Table A-2 Geometry data and weights of type BGG

Size	DA mm	D1 / D2 max. mm	ND1 / ND2 mm	NL1 / NL2 mm	S		LG mm	Weight <sup>1)</sup> m kg
					mm	perm dev. mm		
5	10	4	-	5	5	+0.2	15	0.003
7	14	7	-	7	8	+0.3	22	0.007
9	20	9	-	10	10	+0.4	30	0.019
14	30	16	-	11	13	+0.5	35	0.04
19	40	24	-	25	16	+0.5	66	0.14
24	55	28	-	30	18	+0.5	78	0.35
28	65	38	-	35	20	+0.5	90	0.51
38	80	45	-	45	24	+1.0	114	1.0
42	95	50	85	50	26	+1.0	126	3.6
48	105	55	95	56	28	+1.0	140	5.0

<sup>1)</sup> Weight applies to one coupling with maximum bore.

### A.1.3 Type BCC



- ① Size 14 to 38
- ② Size 42 to 48
- 3 Coupling part C

Figure A-3 Type BCC

Technical data

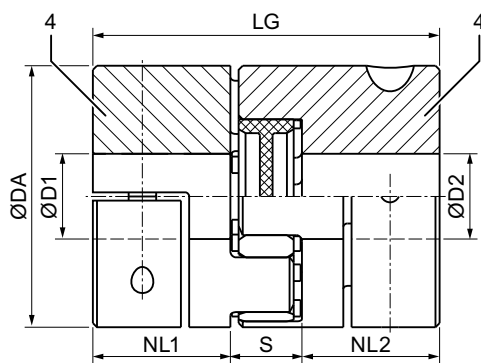
A.1 Speeds, geometry data and weights

Table A-3 Geometry data and weights of type BCC

Size	DA mm	D1 / D2 max. mm	ND1 / ND2 mm	NL1 / NL2 mm	S		LG mm	Weight <sup>1)</sup> m kg
					mm	perm dev. mm		
14	30	16	-	11	13	+0.5	35	0.04
19	40	24	-	17	16	+0.5	50	0.11
24	55	28	-	20	18	+0.5	58	0.26
28	65	35	-	21	20	+0.5	62	0.38
38	80	45	-	31	24	+1.0	86	0.79
42	95	50	85	34	26	+1.0	94	2.5
48	105	55	95	40	28	+1.0	108	3.3

<sup>1)</sup> Weight applies to one coupling with maximum bore.

A.1.4 Type BHH



4 Coupling part H

Figure A-4 Type BHH

Table A-4 Geometry data and weights of type BHH

Size	DA mm	D1 / D2 max. mm	NL1 / NL2 mm	S		LG mm	Weight <sup>1)</sup> m kg
				mm	perm dev. mm		
14	30	16	11	13	+0.5	35	0.02
19	40	23	25	16	+0.5	66	0.15
24	55	30	30	18	+0.5	78	0.35
28	65	38	35	20	+0.5	90	0.53
38	80	48	45	24	+1.0	114	0.98
42	95	50	50	26	+1.0	126	4.1
48	105	55	56	28	+1.0	140	5.6

<sup>1)</sup> Weight applies to one coupling with maximum bore.

### A.1.5 Type BKK

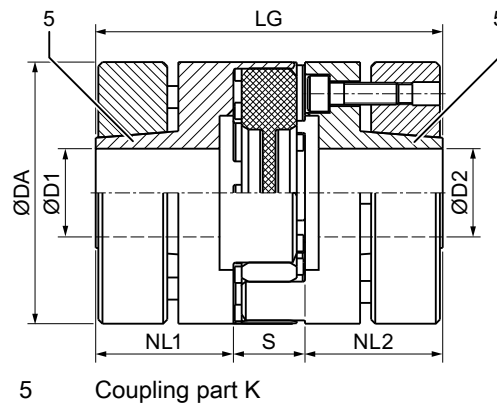


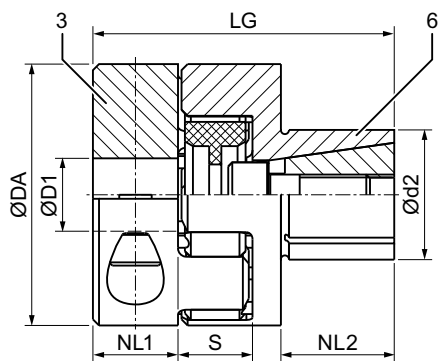
Figure A-5 Type BKK

Table A-5 Geometry data and weights of type BKK

Size	DA mm	D1 / D2 max. mm	NL1 / NL2 mm	S		LG mm	Weight <sup>1)</sup> m kg
				mm	perm dev. mm		
14	30	14	18.5	13	+0.5	50	0.11
19	40	20	25	15	+0.5	65	0.23
24	55	25	30	18	+0.5	78	0.57
28	65	36	35	20	+0.5	90	0.86
38	80	48	43.5	24	+1.0	111	1.5
42	95	50	50	26	+1.0	126	4.0
48	105	55	56	28	+1.0	140	5.4

<sup>1)</sup> Weight applies to one coupling with maximum bore.

**A.1.6 Type BCS**



- 3 Coupling part C
- 6 Coupling part S

Figure A-6 Type BCS

Table A-6 Geometry data and weights of type BCS

Size	DA mm	D1 max. mm	d2 max. mm	NL1 mm	NL2 mm	S		LG mm	Weight <sup>1)</sup> m kg
						mm	perm dev. mm		
9	20	9	16	10	11	10	+0.4	40	0.03
14	30	16	25	11	12.5	13	+0.5	42.5	0.06
19	40	24	30	17	20	16	+0.5	61	0.13
24	55	28	38	20	30	18	+0.5	76	0.33
28	65	35	42	21	36	20	+0.5	85	0.50
38	80	45	60	31	45	24	+1.0	113	1.1

<sup>1)</sup> Weight applies to one coupling with maximum bore.

### A.1.7 Type BHH-W

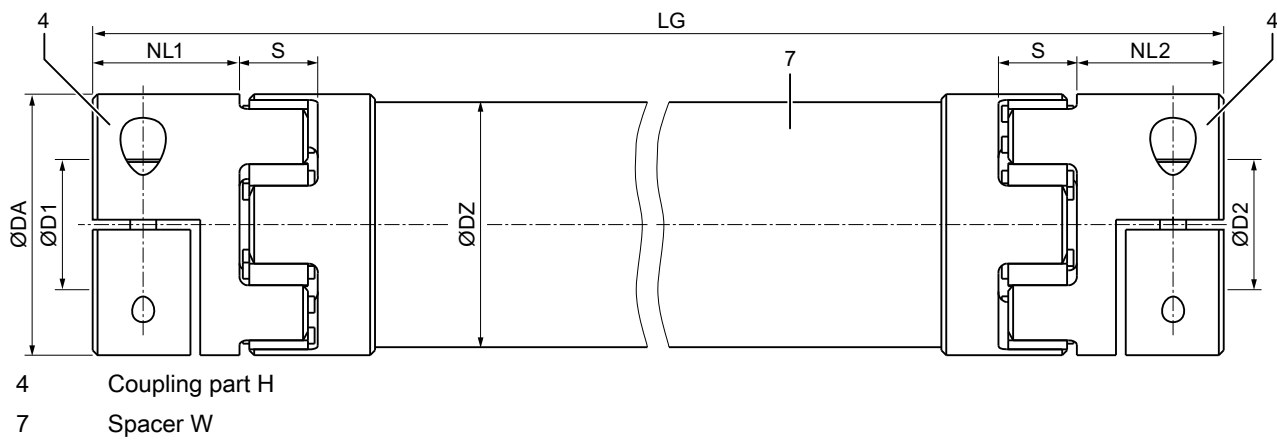


Figure A-7 Type BHH-W

Table A-7 Geometry data and weights of type BHH-W

Size	DA mm	D1 / D2 max. mm	NL1 / NL2 mm	S		DZ mm	LG		Weight <sup>1)</sup> m kg
				mm	perm dev. mm		min. mm	max. mm	
14	30	16	11	13	+0.5	30	85	3000	1.35
19	40	23	25	16	+0.5	40	135	3000	1.75
24	55	30	30	18	+0.5	50	165	3000	3.4
28	65	38	35	20	+0.5	60	205	3000	3.5
38	80	48	45	24	+1.0	75	250	3000	7.8
42	95	50	50	26	+1.0	90	265	3000	11.8
48	105	55	56	28	+1.0	110	285	3000	15.3

<sup>1)</sup> Weight applies to one coupling with maximum bore and shaft spacing 1000 mm.

A.2 Shaft misalignment values during operation

## A.2 Shaft misalignment values during operation

Table A-8 Maximum permissible shaft misalignment values during operation

Size	Shore hardness	Permissible shaft misalignment <sup>1)</sup>			
		Axial $\Delta K_{a_{perm}}$ mm	Radial $\Delta K_{r_{perm}}$ mm	Angular	
				$\Delta K_{w_{perm}}$ Degrees	$\Delta S_{perm}$ mm
5	80 Shore A	0.4	0.12	1.1	0.19
	92 Shore A	0.4	0.06	1	0.17
	98 Shore A	0.4	0.04	0.9	0.16
7	80 Shore A	0.6	0.15	1.1	0.27
	92 Shore A	0.6	0.1	1	0.24
	98 Shore A	0.6	0.06	0.9	0.22
	64 Shore D	0.6	0.04	0.8	0.20
9	80 Shore A	0.8	0.19	1.1	0.38
	92 Shore A	0.8	0.13	1	0.35
	98 Shore A	0.8	0.08	0.9	0.31
	64 Shore D	0.8	0.05	0.8	0.28
14	80 Shore A	1	0.21	1.1	0.58
	92 Shore A	1	0.15	1	0.52
	98 Shore A	1	0.09	0.9	0.47
	64 Shore D	1	0.06	0.8	0.42
19	80 Shore A	1.2	0.15	1.1	0.77
	92 Shore A	1.2	0.1	1	0.70
	98 Shore A	1.2	0.06	0.9	0.63
	64 Shore D	1.2	0.04	0.8	0.56
24	92 Shore A	1.4	0.14	1	0.96
	98 Shore A	1.4	0.1	0.9	0.86
	64 Shore D	1.4	0.07	0.8	0.77
28	92 Shore A	1.5	0.15	1	1.13
	98 Shore A	1.5	0.11	0.9	1.02
	64 Shore D	1.5	0.08	0.8	0.91
38	92 Shore A	1.8	0.17	1	1.40
	98 Shore A	1.8	0.12	0.9	1.26
	64 Shore D	1.8	0.09	0.8	1.12
42	92 Shore A	2	0.19	1	1.66
	98 Shore A	2	0.14	0.9	1.49
	64 Shore D	2	0.1	0.8	1.33
48	92 Shore A	2.1	0.23	1	1.83
	98 Shore A	2.1	0.16	0.9	1.65
	64 Shore D	2.1	0.11	0.8	1.47

1) The specified permissible values for axial, angular and/or radial misalignment may not appear simultaneously. Halve the values given in the table if axial, angular and/or radial misalignment appear simultaneously.

## A.3 Tightening torques and widths A/F

Table A-9 Tightening torques  $T_A$  and widths A/F SW for parts 11, 12 and 13

Size	Type BNN Part 11 <sup>1)</sup>		Type BGG Part 12 <sup>2)</sup>		Type BCC Part 12 <sup>2)</sup>		Type BHH Part 12 <sup>2)</sup>		Type BKK Part 12 <sup>2)</sup>		Type BCS				Type BHH- W Part 12 <sup>2)</sup>	
	$T_A$ Nm	SW mm	$T_A$ Nm	SW mm	$T_A$ Nm	SW mm	$T_A$ Nm	SW mm	$T_A$ Nm	SW mm	$T_A$ Nm	SW mm	$T_A$ Nm	SW mm	$T_A$ Nm	SW mm
5	2.5	1.5	0.3	1.5	-	-	-	-	-	-	-	-	-	-	-	-
7	2.5	1.5	0.4	1.5	-	-	-	-	-	-	-	-	-	-	-	-
9	5	2	0.8	2	-	-	-	-	-	-	0.75	2	8	3	-	-
14	5	2	2	2.5	2	2.5	1.4	3	1.3	2.5	2	2.5	9	4	3	3
19	10	2.5	11	5	10	4	8	4	2.9	3	15	4	15	5	5.9	4
24	10	2.5	15	5	18	5	10.5	5	6	4	15	5	35	6	15	5
28	15	4	32	6	43	6	25	6	6	4	35	6	70	8	32	6
38	15	4	38	6	84	8	25	6	10	5	35	6	120	10	38	6
42	20	4	84	8	84	8	69	8	35	6	-	-	-	-	84	8
48	20	4	145	10	145	10	120	10	69	8	-	-	-	-	145	10

<sup>1)</sup> Threaded stud ISO 4029

<sup>2)</sup> Hexagon socket cap screw DIN EN ISO 4762

Apply the recommended tightening torques in accordance with the stipulations in section Tightening procedure (Page 63).

## A.4 Tightening procedure

Tighten fastening screws to the specified tightening torque in accordance with the following table:

Table A-10 Tightening procedure

Scatter of the torque applied at the tool	Tightening procedure (As a rule, the tightening procedures listed are within the specified tool torque scatter)
±5 %	<ul style="list-style-type: none"> <li>Hydraulic tightening with mechanical screwdriver</li> <li>Torque-controlled tightening with a torque wrench or a torque wrench that gives a signal</li> <li>Tightening with a precision mechanical screwdriver with dynamic torque measurement</li> </ul>

The tightening torques apply to screws/bolts with untreated surfaces that are not oiled or are only lightly oiled, and for screws/bolts that are used with a liquid screw locking agent in accordance with these instructions. Use with lubricant paint or lubricant is not permitted.

## A.5 Cam rings

### A.5.1 Use and storage of the cam rings

Note the following concerning the use and storage of the cam rings:

- Storage possible for up to 5 years
- Protect against direct sunlight, artificial light with a high UV-content and extreme temperatures
- Avoid contact with aggressive media

### A.5.2 BIPEX-S cam ring (20)

Table A-11 BIPEX-S cam ring

Material	Hardness	Comment	Marking	Temperature range
PU	98 Shore A	Standard for type BGG, BCC, BHH, BKK, BCS	red	-30 °C to +90 °C
PU	92 Shore A	Standard for type BNN	yellow	-40 °C to +90 °C
PU	80 Shore A		blue	-50 °C to +80 °C
PU	64 Shore D		green	-50 °C to +120 °C





# FLENDER COUPLINGS

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BIPEX-S

Operating Instructions 3410en

Edition 10/2017

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