FLENDER COUPLINGS

N-ZAPEX

Operating instructions M3563-01en
Version 04/2026

XNN, XNNA, XNZS, XNZA



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FLENDER

Original operating instructions

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Introduction 1

1.1 Legal information

Warning system

These instructions contain information you must observe for your own personal safety as well as to avoid damage to property and persons. The information regarding your personal safety is highlighted with a warning triangle. Information exclusively regarding property damage alone is not marked with a warning triangle. Depending on the hazard class, the warnings shall be depicted as follows, in descending order.

⚠ DANGER

means that death or severe physical injury **will** occur if the relevant precautionary measures are not taken.

⚠ WARNING

means that death or severe physical injury **may** occur if the relevant precautionary measures are not taken.

⚠ CAUTION

means that mild physical injury may occur if the relevant precautionary measures are not taken.

NOTE

means that damage to property may occur if the relevant precautionary measures are not taken.

If multiple hazard classes come into play, the warning for the highest level in question shall always be used. If a warning containing the warning triangle warns of harm to individuals, the same warning may also include a warning regarding damage to property.

Information



Information

Information offers additional notes, assistance and tips for handling the product.

Qualified personnel

The product/system associated with this documentation may only be used by **qualified personnel** trained to perform the relevant tasks, taking into account the associated documentation for the relevant tasks, particularly the safety information and warnings included therein. Due to their qualification and experience, qualified personnel are capable of detecting risks and avoiding potential hazards when dealing with these products/systems.

Intended use of Flender products

Please note the following:

⚠ WARNING

Flender products are only suitable for the uses set out in the catalogue and associated technical documentation. If third-party products and components are used, these must be recommended and/or authorised by Flender. Safe and flawless operation of the products requires proper transport, proper storage, setup, assembly, installation, commissioning, operation and maintenance. The permissible environmental conditions must be adhered to. Instructions in the associated documentation must be followed.

Trademarks

All designations marked with the trademark symbol ® are registered trademarks of Flender GmbH. Other designations in this document may be trademarks whose use by third parties for their own purposes may violate the rights of the owner.

Liability disclaimer

We have assessed the contents of these instructions for compliance with the hardware and software described. However, deviations cannot be ruled out, so we are unable to accept liability for full compliance. The details in these instructions are regularly reviewed and necessary corrections are contained in subsequent editions.

1.2 About these instructions

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

Read these instructions prior to handling the coupling. The instructions should be observed.

1.3 Text attributes

In addition to the warnings that you must observe for safety reasons, you will find the following text features 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.

1.4 Copyright

The copyright of 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 57)).

Safety information

2

2.1 General information

Instructions

These instructions include all of the important information necessary for using this product safely. Ensure that the valid operating instructions are available for all work on the coupling. The currently valid operating instructions are available for download on the website of Flender GmbH (http://www.flender.com/). Earlier versions of the operating instructions are available upon request.

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 and/or personal injury. Flender does not accept any liability for damage or operating failures that are due to non-adherence to these instructions.

These instructions apply to couplings that can be used in potentially explosive atmospheres as well as in atmospheres that are not potentially explosive.
If you use the coupling in potentially explosive atmospheres, the coupling must have a corresponding marking. The declaration of conformity in the annex only applies to these couplings.

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 assembly units and accessories that increase performance and safety while maintaining the essential features.

Symbols

ISO	ANSI	Warning
		Warning – hazardous electrical voltage
		Warning – explosive substances
	---	Warning – entanglement hazard

ISO	ANSI	Warning
	---	Warning – hot surfaces
	---	Warning – corrosive substances
	---	Warning – suspended load
	---	Warning – hand injuries
		Explosion protection approval

Table 2-1 : General warnings

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.

Explosion Protection Directive

The term “Explosion Protection Directive” used in these instructions refers to the harmonization legislation of the European Union relating to equipment and protective systems intended for use in potentially explosive atmospheres complied with in accordance with the co-applicable EU Declaration of Conformity.

Protective clothing

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

Using the coupling

The relevant occupational 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 hoisting gear or load lifting 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.

Ensure that the drive aggregate cannot be inadvertently switched on. Attach an information notice to the start 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 operator of the machine or system 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 equipment.
- Use only original replacement parts from Flender. Flender only accepts liability for original replacement parts from Flender.
  Other spare parts are not tested and approved by Flender. Non-approved replacement 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 57)).

2.3 Safety information for a coupling when used in potentially explosive atmospheres

Information

Declaration of conformity

A declaration of conformity required according to the corresponding Explosion Protection Directive can be found in chapter Declaration of conformity (Page 75).

2.3.1 Marking

You can find a description of the coupling parts in Chapter Description (Page 21).

A coupling designed in accordance with the Explosion Protection Directive has a marking on the coupling parts.

Maximum marking

The maximum marking according to the Explosion Protection Directive appears as shown below:

Flender GmbH	CE	II 2G Ex h IIC T6 ... T5 Gb X
D 46393 Bocholt		II 2D Ex h IIIC T85 °C ... 100 °C Db X
N-ZAPEX	<Year of manufacture>	I M2 Ex h Mb X

Reduced marking

A reduced marking may be affixed due to structural conditions. The reduced marking is representative of the maximum markings listed above.

2.3.2 Conditions of use

Note also the material-dependent permissible ambient temperature of the O-rings (12) and HO-rings (12) according to Chapter Sealing rings (Page 73).

A coupling designed in accordance with the Explosion Protection Directive is suitable for the following conditions of use:

- Equipment group I
  - Category M2
- Equipment group II
  - Category 2 and 3
  - Group of substances G, zone 1 and 2
  - Group of substances D, zone 21 and 22
  - Explosion group IIA, IIB and IIC

1. Gases, vapours or mists

Check the ambient temperature for use of the coupling in the relevant temperature class.

The maximum surface temperature of the coupling for a potentially explosive atmosphere as a result of gas/vapour/mist mixtures is obtained from the maximum ambient temperature and/or the maximum temperature of the adjacent components. The self-heating of the coupling is minor. In normal atmospheric conditions for explosion protection applications, a maximum surface temperature <85 °C can be expected.

Max. ambient temperature	Temperature class	Max. surface temperature
-45 °C to +80 °C	T4	<135 °C
-45 °C to +60 °C	T5	<100 °C
-45 °C to +45 °C	T6	<85 °C

Table 2-2 : Temperature classes for explosive atmospheres as a result of gases, vapours or mists

2. Dust/air mixtures

Check the ambient temperature.

The maximum surface temperature of the coupling for a potentially explosive atmosphere as a result of dust/air mixtures is obtained from the maximum ambient temperature and/or the maximum temperature of the adjacent components. The self-heating of the coupling is minor. In normal atmospheric conditions for explosion protection applications, a maximum surface temperature <85 °C can be expected.

Notes concerning operation of the coupling in potentially explosive atmospheres

- Only use the coupling underground in mines in potentially explosive atmospheres together with drive motors that can be switched off in the event of the formation of an explosive atmosphere.
- Earth machines that are connected via the coupling with a leakage resistance of less than 10^6 Ω.
- If you want to use a coated coupling in potentially explosive atmospheres, please note the requirements concerning the conductivity of the paint and the limitation on the paint layer thickness applied in accordance with EN 80079-36. No build-up of electrostatic charges is to be expected with a paint layer thickness of less than 200 µm.

2.4 General warning notices



⚠ DANGER

Risk of explosion if not used as intended

The coupling can burst. There is a risk of fatal injury from flying fragments. Personal injury, property damage and fire damage caused by sparks may occur. If a coupling bursts in an area at risk of explosion, then this can result in an explosion.

- Use the coupling for the purpose for which it is intended.



⚠ DANGER

Risk of explosion when using coupling parts without Ex marking

Coupling parts without Ex marking have not been approved for use in potentially explosive atmospheres. These coupling parts can lead to an explosion during operation. There is a risk to life.

- Only use couplings with Ex marking in potentially explosive atmospheres.



⚠ DANGER

Risk of explosion due to the use of unsuitable and/or damaged components

The use of unsuitable and/or damaged components can lead to an explosion in potentially explosive atmospheres. There is a risk to life.

- Observe the information regarding conditions of use.



⚠ DANGER

Risk of explosion due to improper operation

Improper operation of the coupling can lead to an explosion in potentially explosive atmospheres. There is a risk to life.

- Please observe the notes concerning operation of the coupling in potentially explosive atmospheres.



⚠ DANGER

Risk of explosion from hot coupling parts

Risk of burns on hot surfaces. Hot coupling parts can lead to an explosion in potentially explosive atmospheres. There is a risk to life.

- Wear suitable protective equipment (gloves, safety glasses).
- Make sure that the area is not at risk of explosion.



⚠ WARNING

Risk of chemical burns due to chemical substances

There is a risk of chemical burns when handling aggressive cleaning agents.

- Please observe the manufacturer's information on how to handle cleaning agents and solvents.
- Wear suitable protective equipment (gloves, safety goggles).



⚠ WARNING

Risk of crushing due to falling components

Falling components can cause crushing, serious injury and death. The components can be damaged.

- Secure the components to prevent them from falling
- Only use suitable and technically flawless hoisting gear and load lifting attachments.
- Only use hoisting gear and load lifting attachments with sufficient load-bearing capacity.

Description

3

The N-ZAPEX couplings described here are universally applicable, torsionally rigid gear couplings that are available in various models and sizes. The couplings can be used in accordance with the Explosion Protection Directive in potentially explosive atmospheres if they have a corresponding marking.

These instructions describe the assembly and operation of a N-ZAPEX coupling arranged horizontally with a shaft-hub connection made by a cylindrical or conical bore with parallel key or by a pressurised oil interference fit. Please consult Flender if you want to use a different type of installation.

Area of application

N-ZAPEX Couplings are designed for use in all kinds of machines. They are designed to withstand high torques and harsh operating conditions.

Structure

The N-ZAPEX coupling consists of the two hubs (1) and (2) with external teeth, which are fitted onto the machine shafts. The external teeth engage in a flanged sleeve (5) in each case, which has corresponding internal teeth. The flanged sleeves (5) or the flanged sleeves (5) and the X-sleeve (4) are bolted together with fitting bolts (8) and nuts (9). The external teeth of the hubs (1), (2) are arranged off-centre on the hub. Depending on the mounting position, this results in A, B or AB versions with a different shaft clearance S.

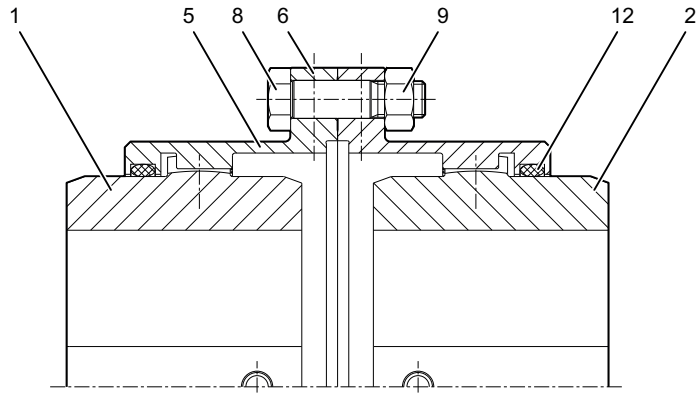
The gear is lubricated using grease. Depending on the size, O-rings (12) or HO-rings (12) seal the lubricant chambers from the outside. Seal the parallel keyways against lubricant leakage during assembly.

Please note that in the area around the sealing surfaces, it is not possible to ensure corrosion protection, or at least only to a very limited extent.

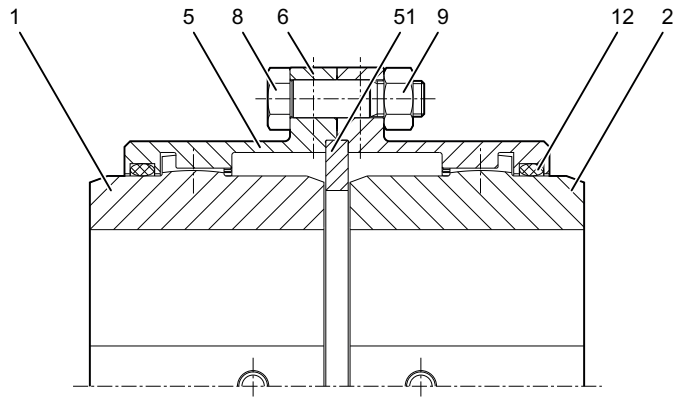
For the XNNA model, the axial backlash is restricted by the retaining ring (51) and the flanged sleeve (5), for the XNZA model, they are restricted by the X-sleeve (4) and the flanged sleeve (5). Models XNNA and XNZA are only in version A.

The spare parts drawings and spare parts list can be found under Spare parts drawing and spare parts list (Page 62).

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



XNN



XNNA

Figure 3-1: Spare parts drawing for models XNN and XNNA

1	Hub	2	Hub
5	Flanged sleeve	6	Screw plug
8	Fitting bolt	9	Hexagon nut
12	Sealing ring (O-ring or HO-ring)	51	Retaining ring

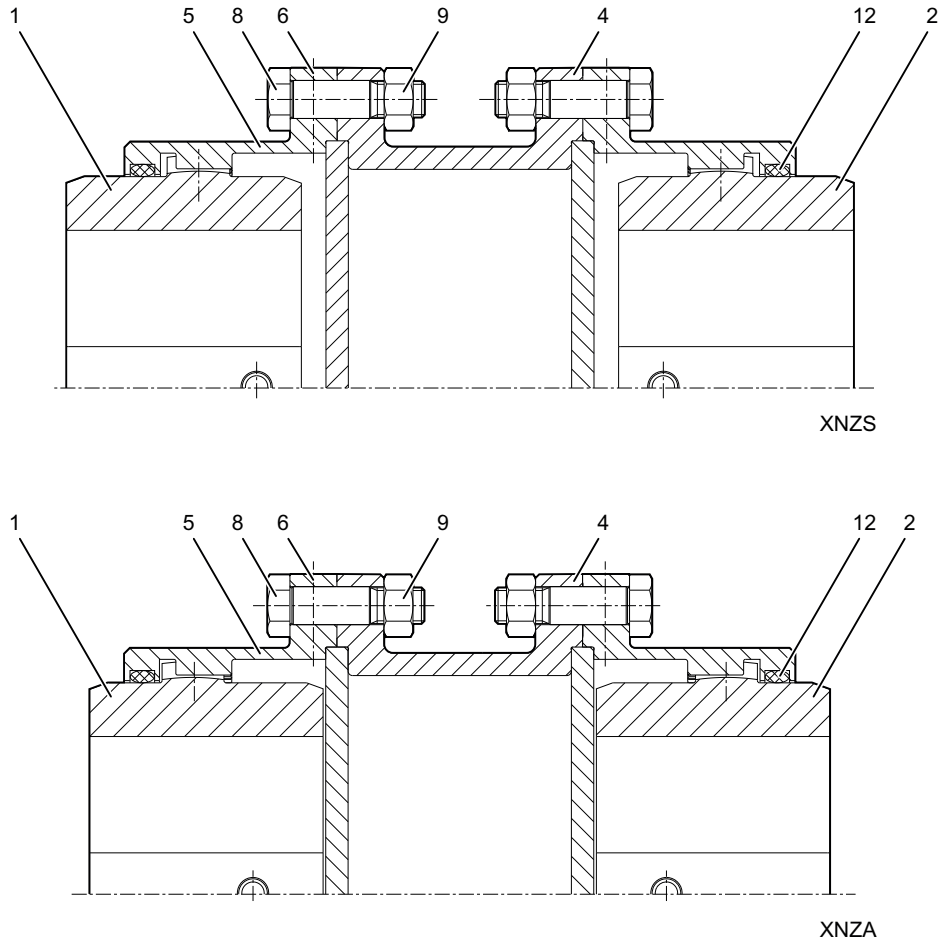


Figure 3-2: Spare parts drawing for models XNZS and XNZA

1	Hub	2	Hub
4	X-sleeve	5	Flanged sleeve
6	Screw plug	8	Fitting bolt
9	Hexagon nut	12	Sealing ring (O-ring or HO-ring)

In the pressurised oil interference fit, the screw plug (22) seals the oil channels. You will find an illustration of the screw plugs (22) in Section Screw plug (Page 64).

Application planning 4

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.

4.1 Transport of the coupling



⚠ WARNING

Risk of crushing due to improper transport

Falling components can cause crushing, serious injury and death. The components can be damaged.

- Only use suitable and technically flawless hoisting gear and load lifting attachments.
- Only use hoisting gear and load lifting attachments with sufficient load-bearing capacity.
- The symbols on the packaging must be observed.

Unless otherwise agreed contractually, the packaging complies with the HPE Packaging Guidelines.

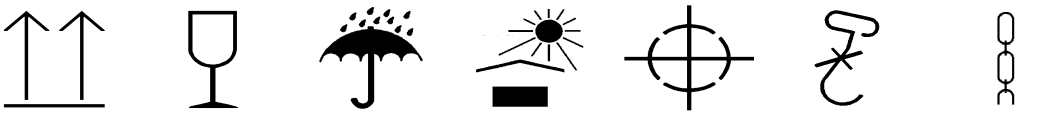


Figure 4-1: Transport symbols

4.2 Storage of the coupling

NOTE

Property damage due to improper storage

Negative changes to the physical properties of the coupling and/or coupling damage.

- Please observe the procedure for storing the coupling.

The coupling, unless specifically ordered otherwise, is supplied with preservation and can be stored for up to 3 months.

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

NOTE

Property damage due to improper long-term storage

Negative changes to the physical properties of the coupling and/or coupling damage.

- Carefully observe the specifications for long-term storage.

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.

Preservative agent	Features	Indoor storage	Outdoor storage
Oil spray	Corrosion protection	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

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

Assembly 5

Assembly of the coupling comprises the following steps:

- Preparatory work (Page 27)
- Mounting the coupling (Page 33)
- Aligning the coupling (Page 36)
- Fill with lubricant (Page 39)



⚠ DANGER

Risk of explosion if specifications relating to assembly are not adhered to

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. If a coupling bursts in an area at risk of explosion, then this can result in an explosion.

- Carefully observe all of the specifications relating to assembly.

Notes for assembling the coupling

- Only use undamaged components when assembling 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.

⚠ CAUTION

Cutting hazard due to sharp edges

Sharp edges on the parallel keyway and parallel key groove may cause hand injuries.

- Wear protective gloves.

5.1 Preparatory work

Please consult Flender if you want to machine a conical finished bore.

Carry out the following steps if the coupling does not have a finished bore:

- Mill the finished bore (Page 28)
- Mill the parallel keyway (Page 29)
- Machining an axial locking mechanism (Page 29)
- Balancing the coupling (Page 32)

Information

The customer is responsible for execution of the finishing work on the coupling. Flender shall have no liability whatsoever for claims under warranty arising from finishing work that has not been carried out adequately.

5.1.1 Mill the finished bore

The diameter of the finished bore depends on the shaft used.

Recommended assigned fits

In the following table you can find the recommended assigned fits for bores with a parallel key connection.

Description	Interference fit					
Shaft tolerance	h6	k6	m6	n6	p6	s6
Bore tolerance	P7	M7	K7	J7	H7	F7

Table 5-1 : Recommended assigned fits for bores with parallel key connection

Bore diameter



DANGER

Risk of explosion if maximum bore diameter is exceeded

The coupling can burst. There is a risk of fatal injury from flying fragments. In an area at risk of explosion, a burst coupling may result in an explosion.

- Adhere to the maximum bore diameter specified.

The maximum diameters are listed in Section Speeds, geometry data and weights (Page 65).

Procedure

1. Remove the preservation and clean hubs (1) and/or (2) to be machined.
2. Clamp the hub according to the following figure.

NOTE

Damage to the functional surface due to incorrect clamping

Never clamp the hub to the sealing surface of the sealing ring (12).

3. Machine the finished bore according to the following figure.

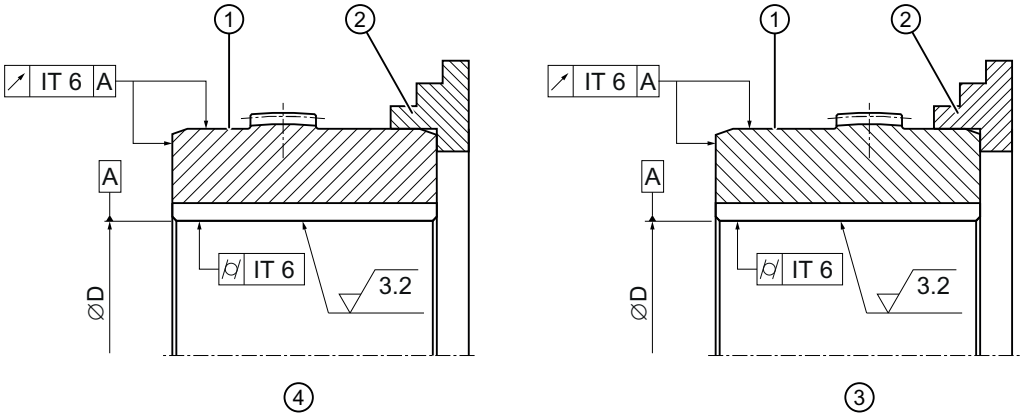


Figure 5-1: Tolerances for finished bore

① Sealing surface of the sealing ring
② Clamping chuck
③ Version B: Clamping chuck on the short hub side
④ Version A: Clamping chuck on the long hub side

5.1.2 Mill the parallel keyway

Applicable standards

- For one parallel keyway, machine it according to DIN 6885/1 ISO P9.
- For two parallel keyways, machine them according to DIN 6885/1 ISO JS9.
- If you want to mill a parallel keyway that does not correspond to DIN 6885/1, please consult Flender.

5.1.3 Machining an axial locking mechanism

The hub (1) and/or (2) is secured by a set screw or an end plate to prevent axial movement.

Please consult Flender if you want to use an end plate.

Note the following when using a set screw:

- Diameter and axial position of the threaded hole in the hub
- Position of the threaded hole with respect to the parallel keyway
- Selection of set screw

Diameter and axial position of the threaded hole in the hub

The following diagram shows the axial position of the threaded hole.

When arranging the threaded hole, note the difference between the A or B version of the hub (1) or (2).

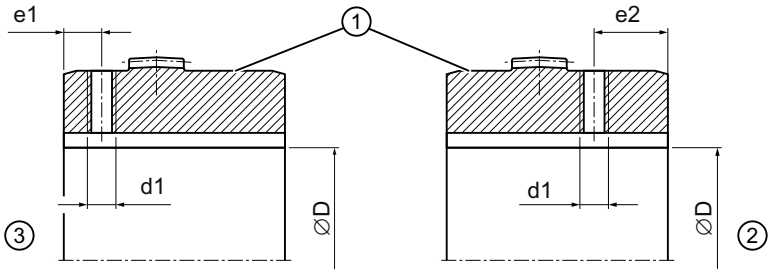


Figure 5-2: Diameters and axial position of the threaded hole in the hub

① Sealing surface of the sealing ring
② Version A: Set screw on the long hub side
③ Version B: Set screw on the short hub side

The following table contains the values for the diameter of the threaded hole depending on the coupling size and the finished bore D and the axial position of the threaded hole on the hub.

Coupling size	Finished bore D		Threaded hole d1	Tightening torque TA	Width A/F internal hexagon	e1	e2
	Over	Up to					
	mm	mm		Nm	mm	mm	mm
87	20	22	M5	3	2.5	7	10
	22	30	M6	4	3		
	30	38	M8	8	4		
	38	50	M10	15	5		
114	20	22	M5	3	2.5	9	13
	22	30	M6	4	3		
	30	38	M8	8	4		
	38	65	M10	15	5		
	65	70	M12	25	6		
134	25	30	M6	4	3	10	19
	30	38	M8	8	4		
	38	65	M10	15	5		
	65	80	M12	25	6		
160	25	30	M6	4	3	16	26
	30	38	M8	8	4		
	38	65	M10	15	5		
	65	95	M12	25	6		
	95	100	M16	70	8		

Coupling size	Finished bore D		Threaded hole d1	Tightening torque TA	Width A/F internal hexagon	e1	e2
	Over	Up to					
	mm	mm		Nm	mm	mm	mm
191	-	30	M6	4	3	13	25
	30	38	M8	8	4		
	38	65	M10	15	5		
	65	95	M12	25	6		
	95	110	M16	70	8		
	110	120	M20	130	10		
219	40	65	M10	15	5	19	32
	65	95	M12	25	6		
	95	110	M16	70	8		
	110	140	M20	130	10		
257	50	65	M10	15	5	17	34
	65	95	M12	25	6		
	95	110	M16	70	8		
	110	150	M20	130	10		
	150	160	M24	230	12		
282	80	95	M12	25	6	22	41
	95	110	M16	70	8		
	110	150	M20	130	10		
	150	180	M24	230	12		
317	90	95	M12	25	6	25	47
	95	110	M16	70	8		
	110	150	M20	130	10		
	150	200	M24	230	12		
358	-	110	M16	70	8	33	58
	110	150	M20	130	10		
	150	230	M24	230	12		
390	120	150	M20	130	10	36	63
	150	250	M24	230	12		
458	160	300	M24	230	12	42	76

Table 5-2 : Diameter and axial position of the threaded hole, tightening torque and width A/F

Apply the specified tightening torques as listed in Section Tightening procedure (Page 72).

Position of the threaded hole with respect to the parallel keyway

Position the threaded hole for the set screw on the parallel keyway.

Selection of set screw

⚠ CAUTION

Risk of injury from protruding set screw

There is a risk of injury if the set screw protrudes out of the hub.

- Please observe the information about selecting the set screw.

Use set screws with hexagon socket and cup point in accordance with ISO 4029. The size of the set screw is determined by the threaded hole made. The set screw should fill out the threaded hole as much as possible and not protrude beyond the hub.

5.1.4 Balancing the coupling

NOTE

Property damage to the hub (1) or (2)

If you damage the gear or the sealing surface for the sealing ring (12) on the hub (1) or (2), the hub (1) or (2) is no longer permitted for use in operation.

- Observe the specifications for machining the balancing bore.

- Select the balancing quality according to the application (but at least G16 in accordance with DIN ISO 21940).
- Observe the balancing specification according to DIN ISO21940-32.
- Machine the balancing bore on a large radius with adequate clearance to the bores and the outer circumference.
- Carefully deburr the balancing bore.

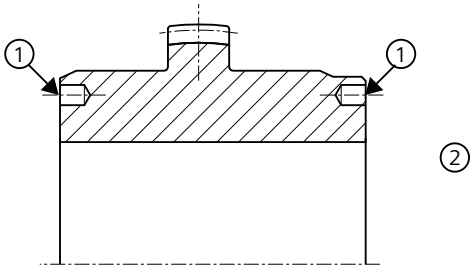


Figure 5-3: Balancing bore for two-plane balancing

① Balancing bore
② Hub (1) or (2)

5.2 Mounting the coupling

NOTE

Property damage due to improper handling

Improper handling can damage the shaft ends, coupling and/or parallel keys.

- Ensure that you do not damage the bores and the sealing surfaces of the sealing ring with hoisting gear or similar equipment.
- Ensure that the sealing rings do not come into contact with cleaning agents.
- Follow the handling instructions regarding assembling the coupling parts.

Assembly of the coupling comprises the following steps:

- Mounting hubs with shaft-hub connection using a parallel key (Page 33)
- Assembling hubs with shaft-hub connection via a pressurized oil interference fit (Page 34)
- Assembling the coupling (Page 35)

5.2.1 Mounting hubs with shaft-hub connection using a parallel key

Procedure

1. Clean the bores and shaft ends.
2. Coat the shaft ends with suitable mounting paste (e.g. Castrol Optimol Paste White T).
3. Lubricate the cleaned flanged sleeve groove (5) using suitable mounting paste (e.g. Castrol Optimol Paste White T).
4. Position the sealing ring (12) in the flanged sleeve groove.
5. Lubricate the sealing ring (12) with suitable mounting paste (e.g. Castrol Optimol Paste White T).
6. Lubricate the gear of the flanged sleeves (5) with a suitable lubricant, see section Fill with lubricant (Page 39).
7. Place the flanged sleeves (5) onto the shaft before mounting hubs (1) and (2). Pay careful attention to the mounting position.
8. Ensure that the sealing ring (12) cannot be damaged when fitting hubs (1) and (2).
9. Unscrew the set screw until a collision with the parallel key or the shaft is no longer possible.
10. Mount the hub (1) and (2) on the shaft.



⚠ DANGER

Risk of explosion from incorrectly mounted hub with conical bore

If you do not observe the information stipulated here when assembling the hub with a conical bore, then this can cause the coupling to burst in operation. There is a risk of fatal injury from flying fragments. Bursting of the coupling can lead to an explosion in potentially explosive atmospheres.

- Mount the hubs with conical bore and parallel keyway on the shaft in the cold condition.
- Apply sealing compound (50) to the front of the hub on the shaft face.
- Secure the hubs with suitable end plates without pulling the hubs further onto the taper (fitting dimension = 0) or according to the dimension drawing provided.

Information

Hubs with cylindrical bore

To make assembly easier, you can heat the hub with a cylindrical bore up to a maximum of 80 °C if required.

- Ensure that the area is not at risk of explosion.
- Protect adjacent components against damage and impermissible heating.

11. Secure the hubs using a set screw or an end plate.
    If secured with a set screw, the shaft must not protrude or be set back from the inner side of the hub. Remove the set screws once they have cooled to room temperature. Fill the threaded hole for the set screw 2/3 full with sealing compound (50) to prevent the lubricant from escaping through the parallel keyway. Insert the set screw and tighten again. Tighten the set screw to the specified tightening torque T_A (for the set screw, please see section Machining an axial locking mechanism (Page 29)). Remove any sealing compound (50) that has escaped from under the parallel keyway.
    When securing with an end plate, coat the hub face on the shaft face with sealing compound (50). Screw on the end plate. Tighten the screw to attach the end plate to a suitable tightening torque T_A.

5.2.2 Assembling hubs with shaft-hub connection via a pressurized oil interference fit

Procedure

1. Remove screw plugs (22) from hubs (1) and (2).
2. Clean, degrease, de-oil and dry the bores and shaft ends.
3. Clean and dry the oil channels and the oil circulation grooves.
4. Lubricate the cleaned flanged sleeve groove (5) using suitable mounting paste (e.g. Castrol Optimol Paste White T).
5. Position the sealing ring (12) in the flanged sleeve groove.
6. Lubricate the sealing ring (12) with suitable mounting paste (e.g. Castrol Optimol Paste White T).

7. Lubricate the gear of the flanged sleeves (5) with a suitable lubricant, see section Fill with lubricant (Page 39).
8. Place the flanged sleeves (5) onto the shaft before mounting hubs (1) and (2). Pay careful attention to the mounting position.
9. Ensure that the sealing ring (12) cannot be damaged when fitting hubs (1) and (2).
10. Protect adjacent components against damage and impermissible heating.
11. Heat up hubs (1) and (2) to the temperature specified in the dimension drawing.
    Make sure that no dirt or contaminants can soil the bores again during the heating process.
12. Mount hubs (1) and (2) quickly on the shaft according to the instructions in the dimension drawing.
13. Secure hubs 1 (1) and 2 (2) to stop them from moving until they have cooled down.
14. Allow hubs 1 (1) and 2 (2) to cool down to ambient temperature.
15. Use an end plate to secure hubs 1 (1) and 2 (2) that have a non-self-locking, tapered pressurised oil interference fit.
16. In order to protect the oil channels of hubs (1) and (2) against corrosion, fill them with a suitable pressurised oil. Close the oil channels using the screw plugs (22). Tighten the screw plugs (22) with the specified tightening torque T_A (see Chapter Tightening torques and widths A/F (Page 71)).

5.2.3 Assembling the coupling

Procedure

1. Lubricate the gear of the hubs (1) and (2) with suitable lubricant, see Section Fill with lubricant (Page 39).
2. Lubricate around the circumferences of hubs (1) and (2) in the area surrounding the chamfers to make it easier to mount the sealing ring (12). Use suitable mounting paste (e.g. Castrol Optimol Paste White T).
3. Push the flanged sleeves (5) onto the gear of hubs (1) and (2). Hold the flanged sleeves (5) or support them.
4. Move the machines to be coupled close to one another. Observe the clearance S (see Clearance S (Page 69)).
5. Align the coupling (see Chapter Aligning the coupling (Page 36)).
6. For model XNN, coat the sealing surface of the flanged sleeve (5) on the flange side with sealing compound (50). Coating thickness of min. 2 mm.
7. For model XNNA, coat the recess of both flanged sleeves (5) and the sealing surface of the flanged sleeve (5) on the flange side with sealing compound (50). Coating thickness of min. 2 mm.
   Place the retaining ring (51) in the recess of the flanged sleeves (5).
8. For models XNZS and XNZA, coat the recess of the flanged sleeves (5) and the sealing surfaces of the flanged sleeves (5) on the flange side with sealing compound (50). Coating thickness of min. 2 mm.
   Position the X-sleeve (4) between the flanged sleeves (5). Hold the X-sleeve (4) or support it.

9. Align the fitting holes of the flanges. Observe any markings that might be provided.
10. Insert the fitting bolts (8) and tighten the nuts (9) to the specified tightening torque T_A (see Chapter Tightening torques and widths A/F (Page 71)).

5.3 Aligning the coupling

5.3.1 Purpose of alignment

The components that are joined by the coupling (e.g. shafts, flanges) 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
- Reduced restoring forces
- Misalignment reserves for operation of the coupling

To achieve the longest possible coupling service life, Flender recommends aligning the coupling with 10% of the permitted misalignments during operation (see Possible misalignment (Page 37)).

The recommended alignment values are specified as numerical values in Section Distances between teeth VA and recommended alignment values (Page 70). Do not align the coupling more accurately than this, as the lubrication film formation will then be compromised.

5.3.2 Possible misalignment

The following types of misalignment can occur:

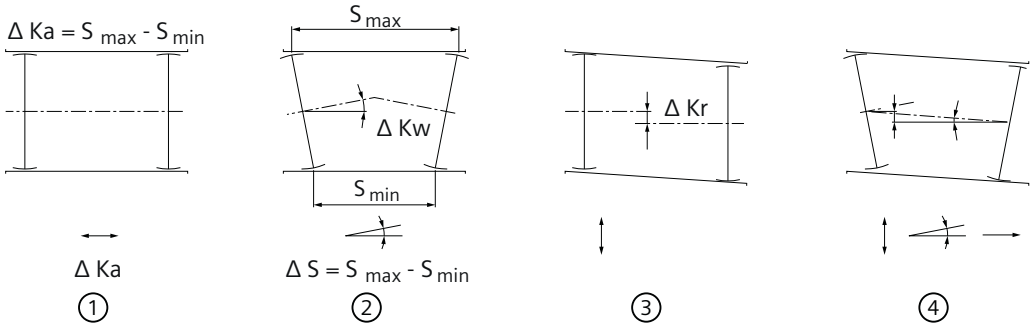


Figure 5-4: Possible misalignment

① Axial misalignment (ΔKa)
② Angular misalignment (ΔKw)
③ Radial misalignment (ΔKr)
④ Axial, angular and radial misalignment

5.3.2.1 Axial misalignment

Set the axial misalignment ΔKa to a value within the permissible tolerance range of the S clearance.

You can find the values for clearance S under Clearance S (Page 69).

5.3.2.2 Angular misalignment

The XNN andXNZS models compensate for position deviations of the shaft ends to be connected up to a maximum angular misalignment of ΔKw = 0.8°.

The XNNA and XNZA models compensate for position deviations of the shaft ends to be connected up to a maximum angular misalignment of ΔKw = 0.2°.

Take into account the corrective factors as described in Section Correction factor, misalignment values (Page 38)

Determine the value ΔS ($\Delta S = S_{max} - S_{min}$).

XNN, XNNV, XNZS, XNZV models:
$\Delta S = S_{max} - S_{min} \leq ND \times \tan 0.8° \approx ND / 75$

XNNA, XNZA models:
$\Delta S = S_{max} - S_{min} \leq ND \times \tan 0.2° \approx ND / 300$

ND1 or ND2 is to be used in mm for ND. You can find the values for ND1 or ND2 in Section Speeds, geometry data and weights (Page 65).

The alignment value for ΔS can be found in Section Distances between teeth VA and recommended alignment values (Page 70).

5.3.2.3 Radial misalignment

For the XNN, XNNV, XNZS and XNZV models, the maximum possible radial misalignment ΔKr_{max} corresponds to a maximum angular deviation for each coupling half of $\Delta Kw_{max} = 0.8°$.

For the XNNA and XNZA models, the maximum possible radial misalignment ΔKr_{max} corresponds to a maximum angular deviation for each coupling half of $\Delta Kw_{max} = 0.2°$.

Determine the value ΔKr.

XNN, XNNV, XNZS, XNZV models:
$\Delta Kr \leq VA \times \tan 0.8° \approx VA / 75$

XNNA, XNZA models:
$\Delta Kr \leq VA \times \tan 0.2° \approx VA / 300$

The values for VA and the alignment value for ΔKr can be found in Section Distances between teeth VA and recommended alignment values (Page 70).

5.3.2.4 Angular and radial misalignment

Angular and radial misalignment can occur at the same time. Comply with the following condition:

XNN, XNNV, XNZS and XNZV models:
$\arctan (\Delta Kr / VA) + \Delta Kw \leq 0.8°$

XNNA and XNZA models:
$\arctan (\Delta Kr / VA) + \Delta Kw \leq 0.2°$

You can find the values for VA in Distances between teeth VA and recommended alignment values (Page 70).

5.3.3 Correction factor, misalignment values

In the event of higher torque and/or higher speed, reduce the permitted angular misalignment in order to avoid any overloading of the tooth contact.

Take into account corrective factors FKL and FKN:

$\Delta Kw_{perm.} = \Delta Kw \times FKL \times FKN$

$\Delta Kr_{perm.} = \Delta Kr \times FKL \times FKN$

Use the correction factors in the following table:

	$T_N \div T_{KN}$			
	100%	95%	90%	≤ 85%
Correction factor FKL	0.77	0.85	0.92	1

Table 5-3 : Correction factor to reduce the permitted misalignment value in the event of increased torque

	$n_{max} \div n_{Kmax}$											
	100%	83%	71%	59%	50%	42%	36%	31%	27%	24%	22%	≤ 20%
Correction factor FKN	0.15	0.23	0.31	0.39	0.46	0.54	0.62	0.69	0.77	0.85	0.92	1

Table 5-4 : Correction factor to reduce the permitted misalignment value in the event of increased speed

5.4 Fill with lubricant

5.4.1 Lubricant



⚠ DANGER

Risk of explosion due to an unsuitable lubricant

Using a lubricant that is not approved for use in potentially explosive atmospheres will cause an explosion.

- Use a lubricant that is approved for use in potentially explosive atmospheres.
- Observe country-specific regulations.
- Observe the manufacturer's instructions on handling the lubricant.
- Observe all lubricant specifications.

NOTE

Coupling damage due to impairment of the lubricant characteristics

Do not mix different lubricants.

If you still want to mix different lubricants, ask the manufacturer about how compatible the lubricants are with each other. Contact the supplier of the new lubricant to confirm the compatibility of the new lubricant with the old one in writing.

NOTE

The quality and purity of the lubricant dictate the service life of the sealing rings.

Lubricant requirements

For N-ZAPEX couplings, only greases which contain active substances for improving corrosion protection and resistance to ageing as well as reducing wear in the mixed friction area are permitted.

- Only use greases that are suitable for sealing rings made of elastomer materials NBR, FKM and FPM.
- Only use greases that are suitable for liquid seals made from Loctite5922.

Special grease requirements:

- Greases must be produced using mineral oil.
- Use greases of viscosity class NLGI 00 or NLGI 0 according to DIN 51818.
- Use greases of viscosity class NLGI 00 or NLGI 0 at an ambient temperature of -10 °C to +80 °C.

List of lubricants

To make it easier for users to select lubricants, Flender recommends products which have been properly tested and that satisfy Flender requirements.

The recommended lubricants are available on the following link:
https://www.flender.com/de/approvedlubricants

- The list of greases with viscosity class NLGI 00 or NLGI 0 according to DIN 51818 can be found in the document “K SEMI-FLUID GREASES”.

An excerpt from the table can be found here:

Lubricant recommendation – greases

Manufacturer	**Ambient temperature -10 °C to +80 °C**
	Type
ARAL	Aralub FDP 00
BP	Energrease LS-EP 00
Castrol	Tribol GR 100 - 00 PD
Flender	Flender high-performance grease
Fuchs	Renolit SO-GFB
	Grafloscon C-SG 500 Plus
ExxonMobil	Mobilux EP004
Shell	Gadus S2 V220 00
TotalEnergies	Multis EP 00

5.4.2 Filling quantity



⚠ DANGER

Danger of explosion due to incorrect quantity of lubricant

Lubricant shortage can lead to sparking. There is a risk of burns. The coupling becomes a source of ignition. In a potentially explosive atmosphere, a burst coupling and flying sparks can result in an explosion. There is a risk to life.

- Observe the prescribed filling quantities.

The following table lists the grease filling quantities for the XNN, XNNA, XNZS and XNZA models. Apply the lubricant quantities noted in the table as well as the initial lubrication described in Chapter Mounting the coupling (Page 33).

Coupling size	Lubricant quantity	
	XNN dm^3	XNNA, XNZS, XNZA [1] dm^3
87	0.05	0.02
114	0.075	0.035
134	0.15	0.065
160	0.23	0.1
191	0.38	0.16
219	0.51	0.21
257	0.85	0.38
282	1.1	0.47
317	1.7	0.75
358	2.3	1
390	2.7	1.2
458	3.8	1.6

Table 5-5 : Lubricant quantities for models XNN, XNNA, XNZS and XNZA

[1] For models XNNA, XNZS and XNZA, the lubricant filling quantities apply for one coupling side

5.4.3 Fill with lubricant

⚠ CAUTION

Risk of injury and danger to the environment from spilled lubricant

There is a risk of injury from slipping. The lubricant may be harmful to the environment.

- Make sure you capture any lubricant that might escape.
- Dispose of the lubricant in accordance with applicable regulations.

Procedure

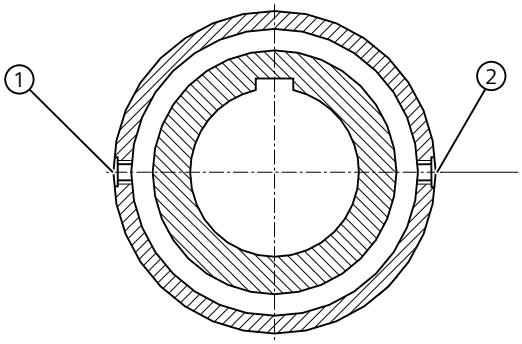


Figure 5-5: Fill with lubricant

① Filling hole
② Venting hole

1. Rotate the coupling until it reaches the position of the screw plugs (6) according to the illustration. Remove both screw plugs (6) located on the sides.
2. Measure the correct quantity of lubricant. The lubricant quantities can be found in Section Filling quantity (Page 41).
3. Fill the lubricant into one of the holes for the screw plugs (6). Use a grease gun for this, if required.
4. Screw the screw plugs (6) back in again. Tighten the screw plugs (6) with the specified tightening torque TA (see Chapter Tightening torques and widths A/F (Page 71)).

NOTE
Injuries due to protruding screw plug For sizes 87 to 191, ensure that the screw plug is fully screwed into the flanged sleeve. The screw plug must not protrude.

5. For models XNNA, XNZS and XNZA, repeat the filling process for the second coupling side.

Commissioning 6



DANGER

Risk of explosion due to ignition of deposits

When used in potentially explosive atmospheres, deposits from heavy metal oxides (rust) can ignite due to friction, impact or friction sparks and lead to an explosion. There is a risk to life.

- Ensure through the use of an enclosure or other suitable measures that heavy metal oxide (rust) deposits on the coupling are not possible.

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

Inspections before commissioning



DANGER

Risk of explosion due to overload conditions during commissioning

The coupling can burst. There is a risk of fatal injury from flying fragments. If a coupling bursts in an area at risk of explosion, then this can result in an explosion.

- Carry out the tests prior to commissioning.
- Do not touch the rotating coupling.

1. Check the tightening torques of the screws of the coupling in accordance with Section Tightening torques and widths A/F (Page 71).
2. Check the tightening torques of the foundation bolts of the coupled machines.
3. Check whether the enclosures (ignition protection, 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 direction of rotation checks.

Operation 7

7.1 Normal operation of the coupling

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

7.2 Fault – causes and correction

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
- Lubricant leakage

7.2.1 Procedure in the event of malfunctions



⚠ DANGER

Risk of explosion if any faults occur

The coupling can burst. There is a risk of fatal injury from flying fragments. Bursting of the coupling can lead to an explosion in potentially explosive atmospheres.

- Switch off the unit at once if any faults occur.
- Note during the repair work the possible causes of faults and the notes on rectifying them.

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

1. Turn the drive off 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 from one of our Customer Service locations.

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.



⚠ WARNING

Risk of being pulled in by rotating parts

There is a danger of being caught or pulled in by rotating or moving parts and being injured as a result.

- Only carry out work on the coupling when it is at a standstill.
- Secure the drive aggregate against unintentional startup.
- Attach an information notice to the start switch stating clearly that work is being carried out on the coupling.
- Before starting any work, make sure that the unit is free from loads.

Intended use

The coupling is only approved for the applications specified in these instructions. Please observe the specifications in Section Intended use (Page 17).

7.2.2.1 Possible faults

Fault	Cause	Rectification
Sudden changes in the noise level and/ or sudden occurrences of shocks	Lubricant shortage	Follow the instructions given in Section Fill with lubricant (Page 39).
	Alignment changes	Follow the instructions given in Section Correcting the changed alignment (Page 49).
	Coupling not suitable for the operating conditions. Check the possible causes given in section Unsuitable coupling (Page 48).	Use a coupling that is suitable for the operating conditions.
	Incorrect coupling assembly. Check the possible causes given in sections Assembly-related causes (Page 48) and Specific assembly-related and maintenance-related causes (Page 49).	Reassemble the coupling in compliance with these instructions. Please observe all the stipulations and requirements given in chapter Assembly (Page 27).
	Incorrect maintenance of the coupling. Check the possible causes given in sections Maintenance-related causes (Page 48) and Specific assembly-related and maintenance-related causes (Page 49).	Please observe all the stipulations and requirements given in chapter Maintenance (Page 51).
Presence of vibrations	Coupling not suitable for the operating conditions. Check the possible causes given in section Unsuitable coupling (Page 48).	Use a coupling that is suitable for the operating conditions.
	Incorrect coupling assembly. Check the possible causes given in sections Assembly-related causes (Page 48) and Specific assembly-related and maintenance-related causes (Page 49).	Reassemble the coupling in compliance with these instructions. Please observe all the stipulations and requirements given in chapter Assembly (Page 27).
	Incorrect maintenance of the coupling. Check the possible causes given in sections Maintenance-related causes (Page 48) and Specific assembly-related and maintenance-related causes (Page 49).	Please observe all the stipulations and requirements given in chapter Maintenance (Page 51).

Table 7-1 : Table of faults

7.2.2.2 Possible causes

7.2.2.2.1 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.

7.2.2.2.2 Assembly-related causes

- Damaged component 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.

7.2.2.2.3 Maintenance-related causes

- Stipulated maintenance intervals not adhered to.
- Replacement parts that were used were not original replacement 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.

7.2.2.2.4 Specific assembly-related and maintenance-related causes

- O-rings (12) or HO-rings (12) not fitted.
- O-rings (12) or HO-rings (12) heated up excessively when applying heat to the hubs.
- Sealing surfaces smeared or damaged.
- Lubricant not applied correctly.
- Missing sealing compound (50) in the set screw hole.

7.2.3 Resolving faults

7.2.3.1 Resolving lubricant shortage

Lubricant shortage is caused by the coupling leaking or overaged lubricant.

Procedure

1. Drain the lubricant in accordance with Lubricant replacement (Page 51).
2. Correct the cause of the leakage.
3. Carry out a visual inspection of the gears and the seals for damage.
4. Check the locking elements that prevent axial movement and correct these as required.
5. Realign the coupling.
6. Fill with new lubricant according to Fill with lubricant (Page 39).

7.2.3.2 Correcting the changed alignment

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

Procedure

1. Correct the cause for the change in alignment.
2. Carry out a visual inspection of the coupling for damage.
3. Check the locking elements that prevent axial movements and correct these as required.
4. Realign the coupling.

Maintenance 8

8.1 Maintenance intervals



⚠ DANGER

Risk of explosion if maintenance intervals are not adhered to

The coupling can burst. There is a risk of fatal injury from flying fragments. If a coupling bursts in an area at risk of explosion, then this can result in an explosion.

- Please observe all the specifications for coupling maintenance in this section.



⚠ DANGER

Danger of explosion due to incorrect quantity of lubricant

Lubricant shortage can lead to sparking. There is a risk of burns. The coupling becomes a source of ignition. In a potentially explosive atmosphere, a burst coupling and flying sparks can result in an explosion. There is a risk to life.

- Observe the prescribed filling quantities.



⚠ WARNING

Risk of being pulled in by rotating parts

There is a danger of being caught or pulled in by rotating or moving parts and being injured as a result.

- Only carry out work on the coupling when it is at a standstill.
- Secure the drive aggregate against unintentional startup.
- Attach an information notice to the start switch stating clearly that work is being carried out on the coupling.
- Before starting any work, make sure that the unit is free from loads.

Check the coupling every 3 months for any for leakage, heating and change in noise level.

8.2 Lubricant replacement

Replace the lubricant at the specified maintenance intervals.

Operating temperature/ Special measures	Maximum operating hours	Maximum years of use
to 70 °C	8,000	2
above 70 °C	3,000	1

Table 8-1 : Operating temperatures, operating hours and years of use

⚠ CAUTION

Risk of injury and danger to the environment from spilled lubricant

There is a risk of injury from slipping. The lubricant may be harmful to the environment.

- Make sure you capture any lubricant that might escape.
- Dispose of the lubricant in accordance with applicable regulations.

If fitted, support the flanged sleeves (5) and the X-sleeve (4).

If you open the coupling or the screw plugs (6), collect the lubricant in suitable containers.

Procedure

1. Rotate the coupling so that the screw plugs (6) are positioned under a coupling half.
2. Remove the bottom screw plug, and then the top screw plug.
3. Make sure you capture any lubricant that might escape.
4. Repeat the process for the other coupling half.
5. Remove the fitting bolts (8) and nuts (9). Dismantle or push the flanged sleeves (5) until you can clean the gear of the flanged sleeves (5) and the hubs (1) and (2). Thoroughly clean the parts.
6. Check the gear for any damage.
7. Disposal of the lubricant. When doing this, carefully observe applicable regulations.
8. Fill with new lubricant, see section Fill with lubricant (Page 39).

8.3 Replacing the sealing ring

NOTE

Property damage

Risk of damage to sealing rings from cleaning agents.

- Ensure that the sealing rings do not come into contact with cleaning agents.

Information

If dimensions Q and P from Speeds, geometry data and weights (Page 65) are complied with, you can replace the sealing rings (12) with cut sealing rings (12) without having to move the coupling apart.

Drain the lubricant according to Section Lubricant replacement (Page 51).

Procedure

1. Prop up the flanged sleeves (5) and, if fitted, the X-sleeve (4).
2. Loosen the fitting bolt connection (8, 9).

3. Slide the flanged sleeves (5) off the gear teeth and off the hub until you can remove the sealing ring (12).
4. Clean the sealing compound (50) from the flanged sleeves (5) and the X-sleeve (4).
5. If there is sufficient installation space, replace the sealing ring (12) without cutting it. Be sure to use edge protection on the gear in order to prevent any damage to the sealing rings (12). Slide the sealing ring (12) over the gear teeth of hub (1) or (2).
6. If there is insufficient room, radially cut through the new sealing ring (12) at one point.
7. Coat the cut ends with adhesive Loctite 401.
8. Place the sealing ring (12) around the shaft and join the cut ends evenly.
9. Lubricate the flanged sleeve groove, the hub sealing surface and the sealing ring (12).
10. Lay the sealing ring (12) into the groove.
11. Coat the sealing surfaces of the flanged sleeves (5) and X-sleeve (4) with sealing compound (50).
12. Align the fitting holes of the flanges. Observe any markings that might be provided.
13. Insert the fitting bolts (8) and tighten the nuts (9) to the specified tightening torque T_A (see Section Tightening torques and widths A/F (Page 71)).
14. Fill with grease as described in Section Fill with lubricant (Page 39).

8.4 Dismantling the coupling

Procedure

1. Drain the lubricant in accordance with Section Lubricant replacement (Page 51).
2. Prop up the flanged sleeves (5) and, if fitted, the X-sleeve (4).
3. Loosen the fitting bolt connection (8; 9).
4. Move the coupled machines apart for models without an X-sleeve (4).
5. Pull the flanged sleeves (5) off the hub and prop up the flanged sleeves (5) over the shaft.
6. Remove the X-sleeve (4) and the retaining ring (51), if fitted.
7. Pull apart hubs (1) and (2). Observe the instructions provided in Section Disassembling hubs with shaft-hub connection through a parallel key (Page 54) or section Disassembling the shaft-hub connection via a pressurised oil interference fit (Page 54).
8. Remove the flanged sleeves (5). Remove the sealing ring (12).
9. Check the gears, seals, sealing surfaces, hub bores and shafts for damage.
10. Replace damaged parts.
11. Protect the gears, sealing surfaces, hub bores and shafts against corrosion.

When reinstalling, please observe the information in Chapters Assembly (Page 27) and Commissioning (Page 43).

8.4.1 Disassembling hubs with shaft-hub connection through a parallel key



⚠ DANGER

Risk of explosion from burners and hot hub

Risk of burns due to burners and hot surfaces. Burners or hot hubs can lead to an explosion in potentially explosive atmospheres. There is a risk to life.

- Wear suitable protective equipment (gloves, safety glasses).
- Ensure that the area is not at risk of explosion.

Procedure

1. Secure the hubs to prevent them from falling.
2. Remove the axial locking element (set screw, end plate).
3. Use a suitable pulling fixture.
4. Heat up the hubs (1) and/or (2) using a burner above the parallel keyway along its length to maximum of 80 °C.
5. Pull off hubs (1) and/or (2). Use suitable lifting gear when doing this.
6. Continue with Section Dismantling the coupling (Page 53).

8.4.2 Disassembling the shaft-hub connection via a pressurised oil interference fit



⚠ DANGER

Risk of explosion if oil pressure exceeds maximum permissible value

The coupling can burst. There is a risk of fatal injury from flying fragments. If a coupling bursts in an area at risk of explosion, then this can result in an explosion.

- Do not exceed the maximum oil pressure specified in the dimension drawing.
- Keep the oil pressure constant in all oil channels during the entire procedure.



⚠ DANGER

Risk of explosion due to improper handling

Failure to handle fixtures and pumps properly can result in injuries. The coupling can burst. There is a risk of fatal injury from flying fragments. In an area at risk of explosion, a burst coupling may result in an explosion.

- Use the fixtures and pumps as intended.
- Follow the manufacturer’s instructions for handling the pulling fixtures and the pumps.

⚠ WARNING

Risk of injury as a result of the hub or the pulling fixture suddenly releasing.

Falling hubs or pulling fixtures can cause crushing, serious injury and death. The hubs can be damaged.

- Use suitable hoisting gear to secure the hubs and the pulling fixture.
- Attach an axial locking element if the pressurised oil interference fit is tapered.

⚠ CAUTION

Risk of injury and danger to the environment from spilled lubricant

There is a risk of injury from slipping. The lubricant may be harmful to the environment.

- Make sure you capture any lubricant that might escape.
- Dispose of the lubricant in accordance with applicable regulations.

Tools required

- One oil pump with pressure gauge (at least 2,500 bar) per oil channel.
  Or: One motor-driven oil pump. One connection that can be closed independently is required for each oil channel.
  Refer to the dimension drawing for the number of oil channels.
- With a stepped bore:
  A motor-driven oil pump at the oil channel located at the point of transition from the smaller to the larger bore. A large quantity of oil per unit of time is needed here.
- Suitable connections and pipes.
- Suitable pulling fixture.
  Or: Retaining plate with retaining screws or threaded spindles with nuts. Material of the screws and spindles must have at least strength class 10.9; material of the nuts depending on the material of the screws or spindles.
- Hydraulic cylinder with oil pump. Note displacement and pressure of the hydraulic cylinder. Refer to the dimension drawing for the required axial force.

Procedure

1. Use a suitable pulling fixture.
2. Secure the hub (1) and/or (2) and the pulling fixture against falling.
3. Remove the screw plugs (22) from the oil channels.
4. De-aerate an oil pump and connect it to the oil channels in the centre.
5. Pressurise the oil pump to the pressure specified in the dimension drawing until oil starts to escape from the adjacent connections or the front faces. Keep the pressure constant.
6. Deaerate the next oil pump and connect it to the adjacent oil channel.
7. Repeat steps 5 and 6 for the remaining oil ducts.
8. If so much oil escapes when pressure is applied that the pump cannot maintain the pressure, use a higher-viscosity oil.
9. Pressurise the hydraulic cylinder if oil escapes from both front faces as a closed oil ring. Make sure that the hub (1) and/or (2) is immediately pulled off in a swift, smooth movement.

NOTE

Removal in several strokes

If several strokes of the hydraulic cylinder are required, make sure that the shaft end is positioned between two oil channels at the end of the stroke.

10. Remove the oil pumps and pulling fixture.
11. Continue with Section Dismantling the coupling (Page 53).

Service and support

9

9.1 Contact

When ordering replacement parts, requesting a customer service technician or if you have any technical queries, 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

Flender GmbH (http://www.flender.com/)

More information

Further information about service and support can be found on the Internet:

Service & Support (https://www.flender.com/service)

Disposal

10

Disposal of the coupling

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

Replacement parts 11

11.1 Ordering replacement 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.

Use only original spare parts from Flender. Flender only accepts liability for original spare parts from Flender.

You can find the available spare parts for the coupling described here at Spare parts drawing and spare parts list (Page 62).

You can find our contact information for ordering spare parts at Service and support (Page 57).

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 62))
- 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
- Any special properties of the replacement 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 Spare parts list

Part number	Designation	XNN	XNNA	XNZS	XNZA
1	Hub	x	x	x	x
2	Hub	x	x	x	x
4	X-sleeve			x	x
5	Flanged sleeve	x	x	x	x
6	Screw plug	x	x	x	x
8	Fitting bolt	x	x	x	x
9	Hexagon nut	x	x	x	x
12	Sealing ring [1)]	x	x	x	x
22	Screw plug [2)]				
50	Sealing compound (Liquid plastic Loctite 5922)	x	x	x	x
51	Retaining ring		x		

Table 11-1 : Spare parts list for models XNN, XNNA, XNZS, XNZA

[1)] Sealing ring (12) is an O-ring up to size 317, and an HO-ring from size 358.

[2)] Screw plugs (22) are only used in combination with hydraulic interference fit.

Information

You can find a description of the screw plug (22) in Section Screw plug (Page 64).

11.2.2 Spare parts drawing for models XNN and XNNA

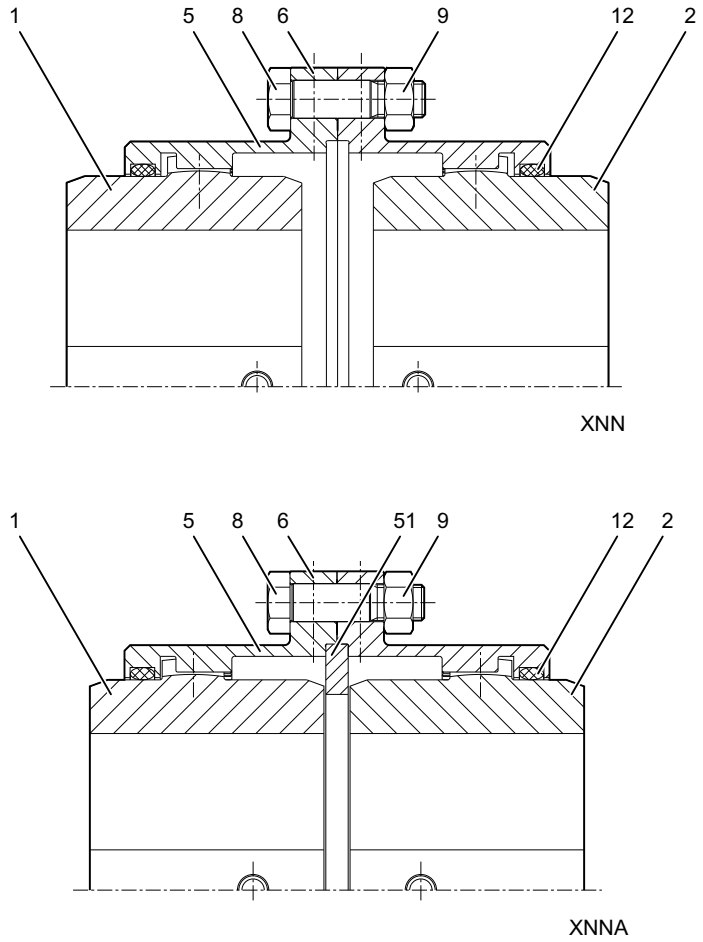


Figure 11-1: Spare parts drawing for models XNN and XNNA

11.2.3 Spare parts drawing for models XNZS and XNZA

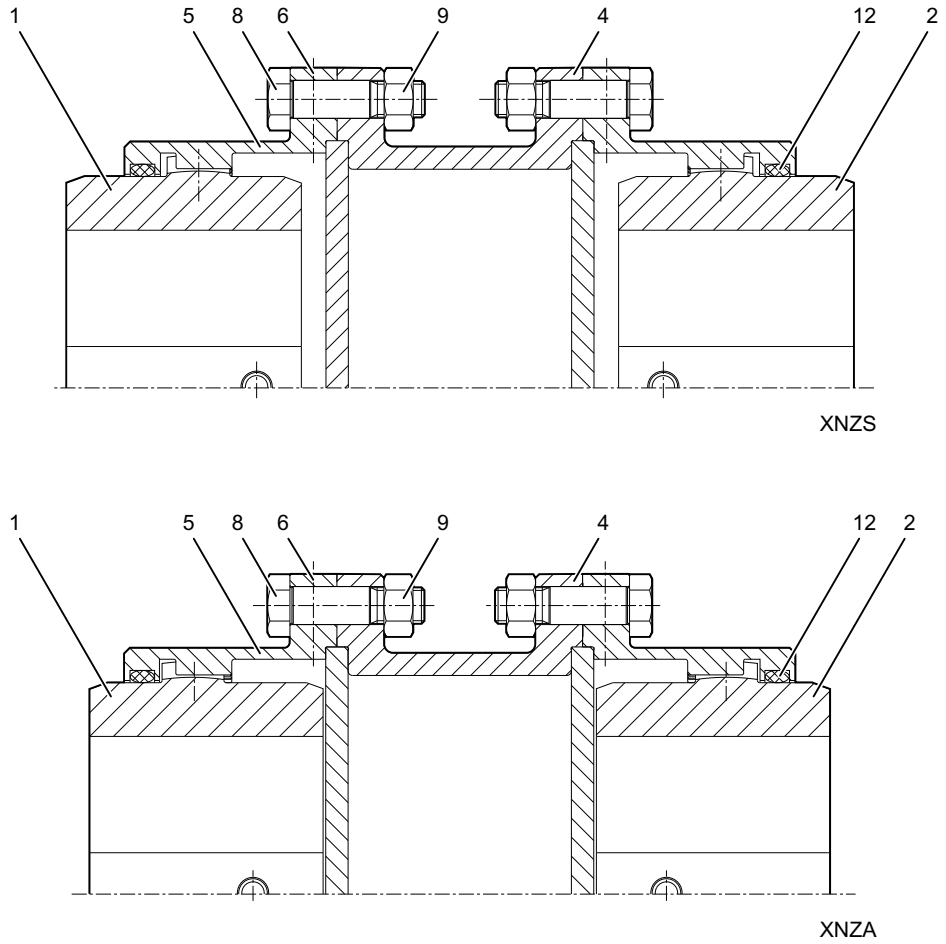


Figure 11-2: Spare parts drawing for models XNZS and XNZA

11.2.4 Screw plug

The diagram below shows the screw plug (22):

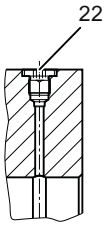


Figure 11-3: Screw plug (22)

Technical specifications

A

A.1 Speeds, geometry data and weights

In this chapter you can find dimension drawings and technical specifications for N-ZAPEX couplings of the following models:

- Dimension drawing for models XNN and XNNA (Page 66)
- Dimension drawing for models XNZS and XNZA (Page 67)
- Dimension table (Page 68)

A.1.1 Dimension drawing for models XNN and XNNA

The XNNA model is only produced in version A (S16). For clearance S1, S2, S3 and S16, refer to Chapter Clearance S (Page 69).

You can find the dimension table in Chapter Dimension table.

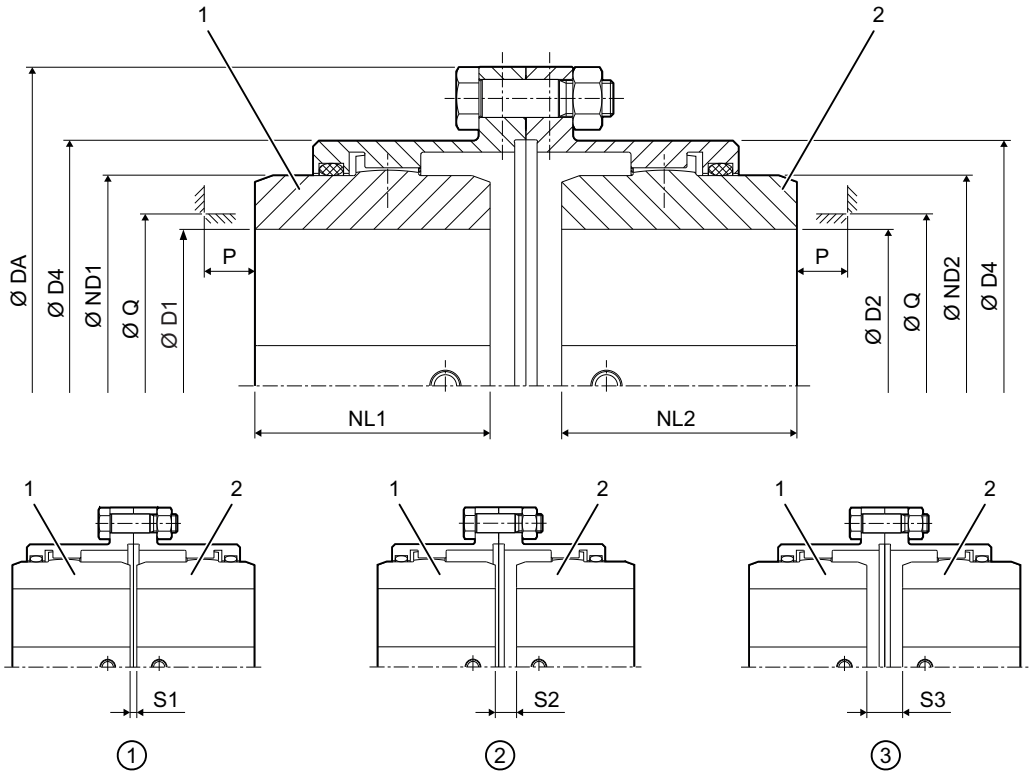


Figure A-1: Dimension drawing for model XNN

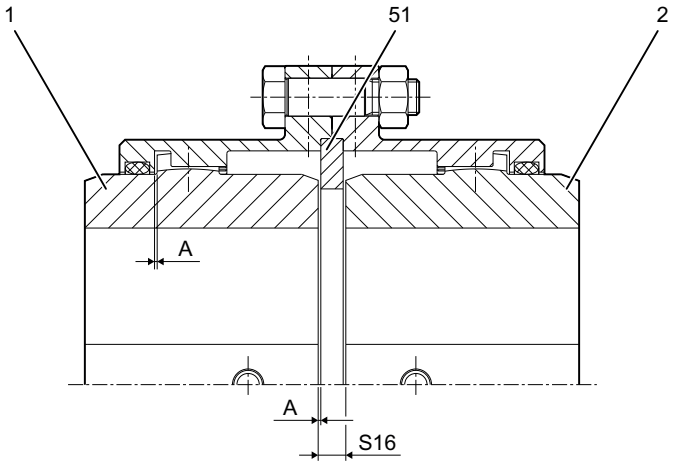


Figure A-2: Dimension drawing for model XNNA

①	Variant A	1	Hub 1
②	Variant AB	2	Hub 2
③	Version B	51	Retaining ring

A.1.2 Dimension drawing for models XNZS and XNZA

The XNZS model is only available in version B (S8) and model XNZA is only produced in version A (S17). For clearance S8 and S17, refer to Chapter Clearance S (Page 69).

S - Dimensions according to the order specifications.

You can find the dimension table in Chapter Dimension table.

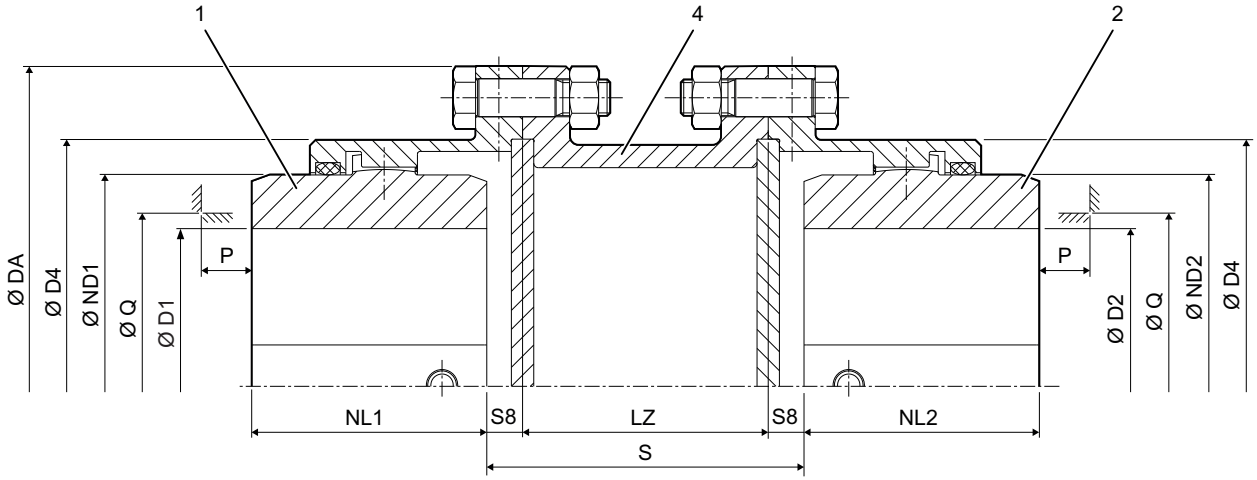


Figure A-3: Dimension drawing for model XNZS

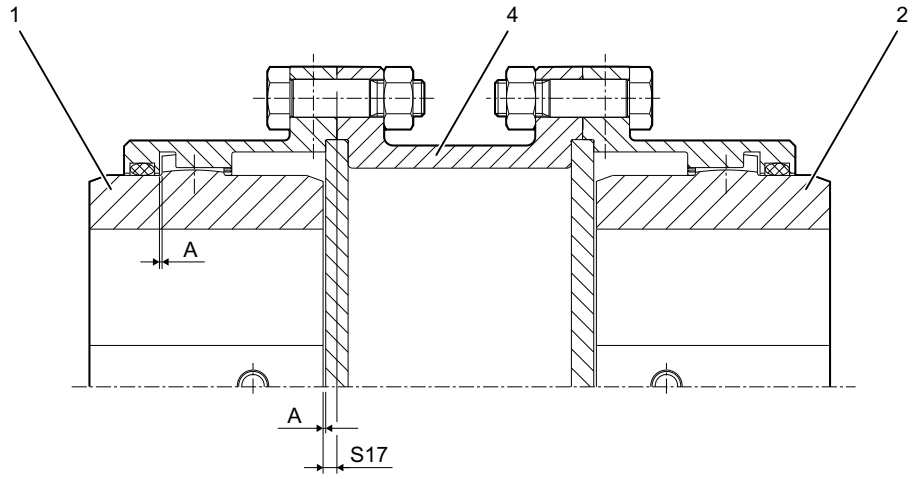


Figure A-4: Dimension drawing for model XNZA

1	Hub 1
2	Hub 2
4	Spacer

A.1.3 Dimension table

Size	Rated torque T_{KN} [1]	Speed n_{Kmax}	Bore D1, D2		DA	ND1 ND2	NL1 NL2	D4	Axial back-lash A	Q [3]	P [3]	LZ min.	weight [4] m
			of	up to [1]									
	Nm	rpm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
87	1,400	11,400	20	50	114	68	43	87	0.5	52	30	65	2.8
114	3,200	8,700	20	70	150	95	50	114	0.5	74	35	65	5.3
134	5,200	7,200	25	80	179	110	62	134	0.5	85	42	75	9.3
160	9,800	6,200	25	100	213	134	76	160	0.5	110	50	90	15
191	17,500	5,400	30	120	243	161	90	191	0.5	130	60	90	24
219	27,200	4,600	40	140	286	188	105	219	0.5	155	70	110	37
257	42,000	4,000	50	160	326	218	120	257	1	175	75	110	57
282	57,000	3,700	80	180	350	243	135	282	1	195	80	110	72
317	78,000	3,300	90	200	399	267	150	317	1	220	90	120	100
358	110,000	3,000	110	230	443	307	175	358	1	250	105	120	142
390	138,000	2,800	120	250	473	335	190	390	1	275	125	120	179
458	245,000	2,400	160	300	561	400	220	458	1	320	140	140	286

Table A-1 : Speeds, geometry data and weights

[1] The specified torques refer to the coupling and **not** the shaft-hub connection. This must be checked separately.

[2] Maximum bore for parallel keyway in accordance with DIN 6885/1

[3] Space required for aligning the hubs, replacing the sealing rings (12) and tightening the set screws.

[4] Weight applies to one coupling model XNN with maximum bore.

A.2 Clearance S

The following table lists the clearances S for models XNN (S1, S2, S3), XNNA (S16), XNZS (S8) and XNZA (S17).

You can find an illustration of the models in Section Speeds, geometry data and weights (Page 65).

NOTE

Property damage due to non-compliance with the S clearance and the permitted deviations

Comply with the S dimensions and permitted deviations.

For models XNNA (S16) and models XNZA (S17), deviations of the S clearance of ±0.1 mm are permitted due to the axial backlash limitation.

Size	S1	S2	S3	Perm. deviation S1, S2, S3	S8	Perm. deviation S8	S16	S17
	mm	mm	mm	mm	mm	mm	mm	mm
87	3	6	9	±1	4.5	± 0.5	5	2.5
114	3	7	11	±1	5.5	± 0.5	5	2.5
134	3	12	21	±1	10.5	± 0.5	5	2.5
160	5	15	25	±1	12.5	± 0.5	9	4.5
191	5	17	29	±1	14.5	± 0.5	11	5.5
219	6	19	32	±1	16	± 0.5	11	5.5
257	6	23	40	±1	20	± 0.5	12	6
282	8	27	46	±1	23	± 0.5	14	7
317	8	30	52	± 1.5	26	± 0.75	17	8.5
358	8	33	58	± 1.5	29	± 0.75	17	8.5
390	8	35	62	± 1.5	31	± 0.75	17	8.5
458	10	44	78	± 1.5	39	± 0.75	22	11

Table A-2 : Clearance S

A.3 Distances between teeth VA and recommended alignment values

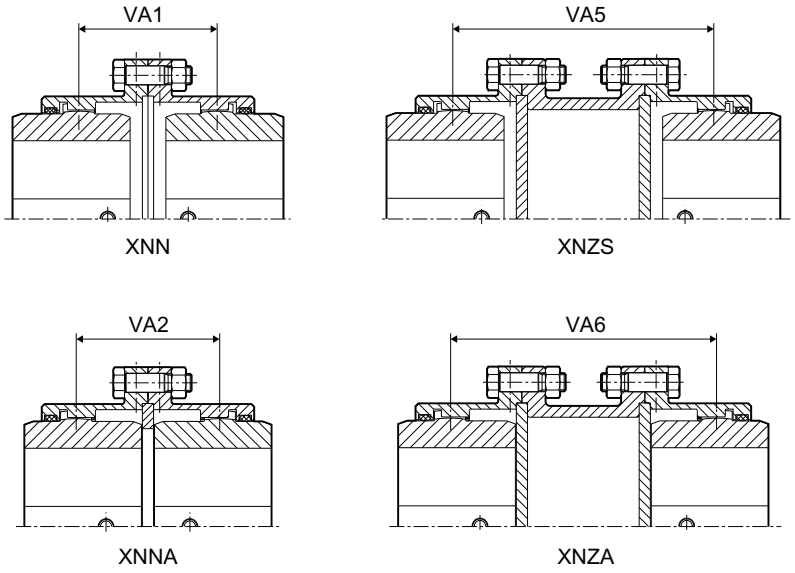


Figure A-5: Distances between teeth

The following table contains the distances between teeth VA and recommended alignment values for angular and radial misalignment:

> ***NOTE***
>
> As a result of the limited axial backlash, halve the alignment values for XNNA and XNZA models.

Size	Distance between teeth				Alignment values for radial misalignment ΔKr			Alignment values for angular misalignment ΔS
	VA1 mm	VA5 mm	VA2 mm	VA6 mm	for VA1 mm	for VA2 mm	for VA5 or VA6 mm	mm
87	49	VA1 + LZ	51	VA2 + LZ	0.08	0.09	ΔKr = VA5 × tan 0.1°	0.12
114	57		59		0.1	0.1	ΔKr = VA6 × tan 0.1°	0.17
134	74		76		0.13	0.13		0.19
160	91		95		0.16	0.17		0.23
191	107		113		0.19	0.2		0.28
219	124		129		0.22	0.23		0.33
257	143		149		0.25	0.26		0.38
282	162		168		0.28	0.29		0.42
317	180		189		0.31	0.33		0.47
358	208		217		0.36	0.38		0.54
390	225		234		0.39	0.41		0.58

Size	Distance between teeth				Alignment values for radial misalignment ΔKr			Alignment values for angular misalignment ΔS
	VA1 mm	VA5 mm	VA2 mm	VA6 mm	for VA1 mm	for VA2 mm	for VA5 or VA6 mm	mm
458	264	VA1 + LZ	276	VA2 + LZ	0.46	0.48	ΔKr = VA5 × tan 0.1° ΔKr = VA6 × tan 0.1°	0.7

Table A-3 : Distances between teeth VA and recommended alignment values for radial and angular misalignment

A.4 Tightening torques and widths A/F

Apply the specified tightening torques as listed in Section Tightening procedure (Page 72).

Use screws/bolts of strength class 8.8.

Size	Tightening torque TA Part no.		Width A/F SW Part no.	
	6 Nm	9 Nm	6 [1] mm	9 [2] mm
87	8	8	4	10
114	8	25	4	13
134	8	49	4	17
160	14	86	5	19
191	14	86	5	19
219	13	210	5	24
257	13	210	5	24
282	13	210	5	24
317	13	410	5	30
358	13	410	5	30
390	13	410	5	30
458	13	710	5	36

Table A-4 : Tightening torques and widths A/F

[1] Hexagon socket

[2] Hexagon head

Screw plug Part 22	Tightening torque TA Nm	Width A/F SW mm
G 1/8 A	13	5
G 1/4 A	30	6

Screw plug Part 22	Tightening torque TA Nm	Width A/F SW mm
G 3/8 A	60	8
G 1/2 A	80	10

Table A-5 : Tightening torques and widths A/F for part 22, for pressurised oil interference fit

A.5 Tightening procedure

Tightening torques must be observed taking into account the following table:

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 %	• Hydraulic tightening with mechanical screwdriver • Torque-controlled tightening with a torque wrench or a torque wrench that gives a signal • Tightening with a precision mechanical screwdriver with dynamic torque measurement

Table A-6 : Tightening procedure

Information

The tightening torques apply to:

- Screws with untreated surfaces that are not oiled or are only lightly oiled. Use of lubricant coating or lubricant is not permitted.
- Screws that should be used with screw locking agent.

A.6 Sealing rings

A.6.1 Use and storage of the O-rings (12) and HO-rings (12)

Note the following concerning the use and storage of the O-rings (12) and HO-rings (12)

- 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
- Protect the O-rings (12) and HO-rings (12) from becoming deformed during storage
- Do **not** mount the HO-rings (12) and O-rings (12) for storage onto hub (1) or (2)

A.6.2 O-rings and HO-rings

Material	Hardness	Comment	Marking	Ambient temperature	Approved for explosion group
NBR 70	70 Shore A	Standard	black	-30 °C to +100 °C	IIA, IIB, IIC

Table A-7 : O-rings and HO-rings

Declaration of conformity

B

EU Declaration of Conformity

Product:

FLENDER N-ZAPEX® couplings
Models XNN, XNNA, XNZS, XNZA

Name and address of the manufacturer:

Flender GmbH
Schlavenhorst 100
46395 Bocholt
Germany

This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

This declaration refers to the product mentioned above.

The object of the declaration described above is in conformity with the relevant EU harmonisation legislation:
– Directive 2014/34/EU, Official Journal L 96, 29 March 2014, Pages 309-356

Harmonised standards or other technical specifications on which the Declaration of Conformity is based:

EN 1127-1	: 2019
EN 1127-2	: 2014
EN ISO 80079-36	: 2016
EN ISO 80079-37	: 2016
EN ISO/IEC 80079-38	: 2016

Notified Body, DEKRA Testing and Certification GmbH (0158) has received the technical documentation.

Signed for and on behalf of:

Flender GmbH



Bocholt, 2026-04-07

Dr Dennis Geers, President, Business Unit Couplings

FLENDER COUPLINGS

N-ZAPEX
Operating instructions M3563-01en
Version 04/2026

Flender GmbH
Alfred-Flender-Strasse 77
46395 Bocholt
Germany