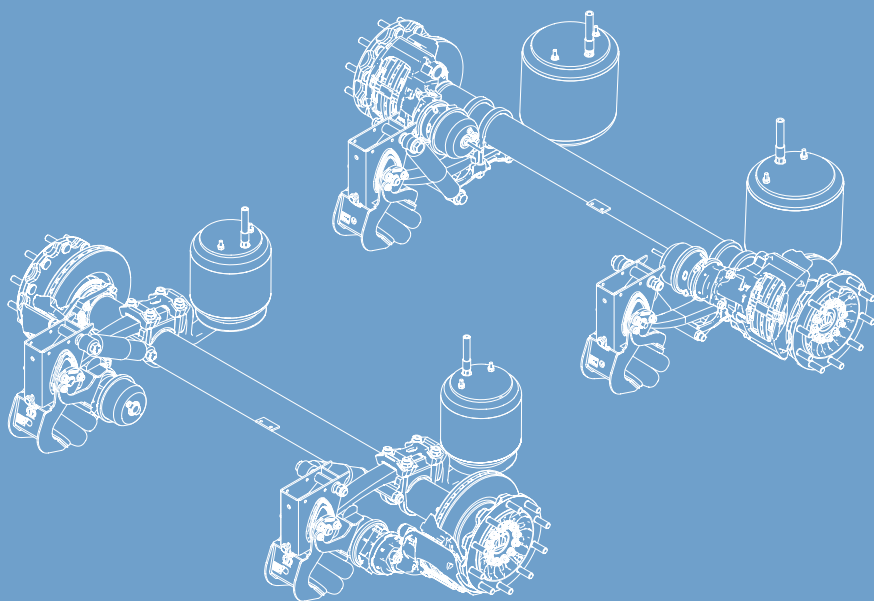




MAINTENANCE INSTRUCTIONS KRONE TRAILER AXLES

Disc brake



515098436-06 EN

Dear customer,

These are the maintenance instructions for the KRONE Trailer Axles.

These maintenance instructions contain important information for the proper use and safe operation of the axles.

If these maintenance instructions should become completely or partially useless for any reason, you can order a replacement using one of the numbers listed below for your axle.

Customer Service

Telephone: +49 (0) 59 51 / 209-320

Fax: +49 (0) 59 51 / 209-367

email: kd.nfz@krone.de

Spare Parts

Telephone: +49 (0) 59 51 / 209-302

Fax: +49 (0) 59 51 / 209-238

Email: Ersatzteile.nfz@krone.de



www.krone-trailer.com



www.krone-trailerparts.com

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1 Information about this document

1.1 Introduction

These maintenance instructions apply to KRONE Trailer Axles with DOKTX1/DOKTX2/DNOKTX2 disc brakes with the "top air spring link" and "bottom air spring link" air suspension unit types. The relevant differences between the versions have been indicated in the corresponding text passages and illustrations. Otherwise, the illustrations are to be considered as examples.

These maintenance instructions are intended for the operator of the KRONE Trailer Axles with DOKTX1/DOKTX2/DNOKTX2 disc brakes and its personnel as well as the driver. For better readability, the axles will be referred to as the "KRONE Trailer Axle" in the following. The maintenance instructions are designed to help you to familiarise yourself with the Krone Trailer Axle and to use it within its intended scope of application.

Maintenance and repairs serve to maintain the operational readiness and to prevent premature wear.

Maintenance is divided into:

- Maintenance and
- Repair

The maintenance instructions contain important information on how to operate the KRONE Trailer Axle in a safe, proper, and economical manner. Compliance with the instructions assists in the prevention of accidents and in the reduction of repair cost and downtimes, as well as in enhancing the reliability and service life of the KRONE Trailer Axle. Read the maintenance instructions carefully and attentively. Fahrzeugwerk Bernard KRONE GmbH & Co. KG does not accept any liability for damage or malfunctions that result from failure to observe these maintenance in-

structions. The warranty conditions can be found in our general terms and conditions of business.

- These maintenance instructions should be supplemented by applicable national rules and regulations concerning accident prevention and environmental protection.
- Ensure that the maintenance instructions are always available where the KRONE Trailer Axle is being used.

The maintenance instructions must be read, understood and applied by every person who is tasked with the following work:

- Servicing the KRONE Trailer Axle (maintenance and repair),
- Disposing of working materials and auxiliary materials.
- In addition to the maintenance instructions, the following must be observed:
 - The binding regulations concerning accident prevention which exist in the country of use and the place of use,
 - The accepted technical rules for safe and proper working.
- Pay special attention to the following:
 - The "safety" section (see "2 Safety", pg. 8).
 - The warnings found in the individual chapters/sub-chapters,
 - The supplier documentation that is included with the delivery.

1.2 Other applicable documents

The main part of the maintenance instructions for the KRONE Trailer Axle consists of the repair and maintenance instructions for the components used. Safe and fault-free maintenance and repair of the KRONE Trailer Axle is not possible without detailed knowledge of the individual components.

- Become fully familiar with all the applicable documents.

- If a reference document is missing, please contact customer service (see "7.2 Customer service and support", pg. 81)

1.3 Product identification and type plate

The item number and serial number are engraved on the axle body next to the type plate. This is to identify the axle if the type plate is lost or is not sufficiently legible.

The type plate and the engraving for product identification of the KRONE Trailer Axle are attached at the following location:

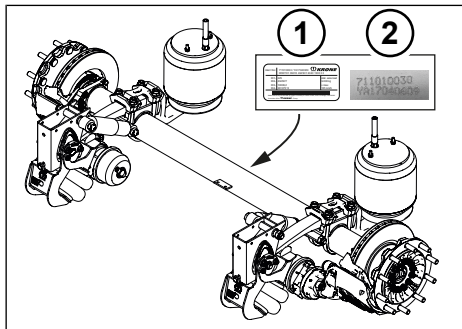


Fig. 1-1: Type plate position

- 1 Type plate
- 2 Engraving

The following information is presented on the type plate:

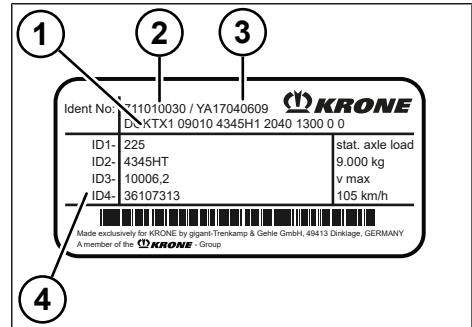


Fig. 1-2: Type plate example

- 1 Axle designation
- 2 Item number
- 3 Serial number
- 4 ID test log

1.4 Retention of documents

- Store these instructions and all other applicable documents in a safe place.
- Pass the complete documentation on to the next driver or owner.

1.5 Symbols used in these instructions

Various markings and symbols are used in the text in these instructions. These are explained below.


- Bullet list
 - Sub-list
- 1. Numbered list
- ☑ Prerequisite for action
- Action step
 - ⇒ Intermediate action result
- ✓ Result of the action

Name of the software buttons

- Visual inspection
- Work step
- Visual inspection and work steps

INFO

Additional information and tips.

 : Also observe the enclosed supplier documentation.

1.6 Copyright

These instructions represent an official document within the meaning of laws against unfair competition. They incorporate texts and drawings which, in their entirety or partly, without written consent of the manufacturer, are not to be

- copied (except attached copy originals),
- published, or
- made public by other means.

The copyright to these instructions remains with

Fahrzeugwerk Bernard KRONE

GmbH & Co. KG, D-49757 Werlte

Violations oblige compensation for damages.

2 Safety

This manual contains instructions for your safety and for safe operation.

The basic safety instructions include instructions that fundamentally apply to the safe use or the maintenance of the safe condition of the axles.

The action-related warnings warn you about residual hazards and are found before a dangerous action.

- Follow all the instructions to prevent personal injury, environmental or property damage.

2.1 Warnings

Design and structure

The action-related warnings are structured as follows:

WARNING

Type and source of the danger!

Explanation of the type and source of the danger.

- Measures to avert the danger.

Hazard level

The warnings are classified according to the severity of the danger. The following explains the danger levels with their associated signal words and warning symbols.

DANGER

Direct danger to life or serious injuries

WARNING

Possible danger to life or serious injuries

CAUTION

Possible slight injuries, environmental damage or property damage

NOTE

Possible environmental damage or property damage

2.2 Intended use

The KRONE Trailer Axle has been manufactured according to state-of-the-art technology and in compliance with all applicable safety-related laws, rules and regulations. Nevertheless, its use may result in danger to life and limb of the user or third parties or damage to the KRONE Trailer Axle and other property.

- Only use the KRONE Trailer Axle when it is in technically perfect condition.
- Only operate the KRONE Trailer Axle for its intended purpose, while aware of safety and risks and in accordance with the operating instructions.

The KRONE Trailer Axle is only to be used as intended within the manufacturer's specifications as prescribed by Fahrzeugwerk Bernard KRONE GmbH & Co. KG. and in compliance with mandatory statutory regulations.

The owner is responsible for complying with the intended use.

Intended use includes the observance of all operating and maintenance instructions supplied with the KRONE Trailer Axle as well as the observance of the maintenance intervals and conditions prescribed therein.

Any use going beyond proper usage is considered improper.

Improper use also includes exceeding the technically permitted weights, axle and drawbar loads as well as exceeding the permitted maximum speed.

Fahrzeugwerk Bernard KRONE GmbH & Co. KG is not liable for damage resulting from improper or unauthorised use. Risks deriving from such infractions are exclusively borne by the user.

Authorised/proper usage also includes compliance with the maintenance and repair instructions.

Operational reliability of the KRONE Trailer Axle is guaranteed only if all applicable instructions, settings and performance limitations are fully complied with.

2.3 Personnel qualification and requirements

KRONE Trailer Axles may only be maintained and repaired by persons who are appropriately qualified and who have read and understood the maintenance instructions. These maintenance instructions differ between the operator and the skilled craftsman.

2.3.1 Operator

The operator is responsible for proper use of the KRONE Trailer Axle.

The operator must:

- Have reached a statutory minimum age of 21,
- Ensure that the KRONE Trailer Axle is checked and serviced once a year at an authorised specialist workshop.

2.3.2 Skilled craftsmen

The skilled craftsmen of a specialist workshop are authorised to perform the maintenance work (maintenance and repair). Authorised skilled craftsmen must have a recognised qualification or have the relevant knowledge of their specialised area required to meet the relevant regulations, rules and guidelines.

2.4 Personal protective equipment

PPE is used to prevent injuries. During maintenance and repair work, poisonous and corrosive materials can be used which can irritate or injure the eyes, respiratory organs and skin.

- ▶ Wear suitable protective gloves and safety shoes when operating and servicing the KRONE Trailer Axle.

2.5 Additional hazards

- ▶ Only used tested operating materials, special consumables and accessories.

- ▶ When combined with other products (e.g. tyres), note that this results in an enhanced axle system. This increases the potential risk.

2.6 Notes about legal regulations

The KRONE Trailer Axle is built according to the applicable regulations at the time of the delivery.

- ▶ Observe compliance with the nationally prescribed monitoring inspections and time intervals.
- ▶ Ensure compliance with the nationally prescribed permitted weights, axle and drawbar loads, which may be lower than those technically possible.

Changes to the KRONE Trailer Axle compared to the data provided in the registration documents result in the operating permit becoming invalid.

- ▶ Do not make any unauthorised changes or manipulations.
- ▶ Only use proper and approved tyres.
- ▶ Only used approved and suitable spare parts (*see "7.1 Spare parts", pg. 81*).

2.7 Warranty and liability

The "General terms and conditions of sale and delivery" from Fahrzeugwerk Bernard KRONE GmbH & Co. KG fundamentally apply.

Warranty and liability claims for personal and property damage are excluded if they are due to one of more of the following causes:

- Improper use (*see "2.2 Intended use", pg. 8*),
- Failure to follow the instructions, requirements and prohibitions of the maintenance instructions,
- Unauthorised structural changes to the KRONE Trailer Axle.
- Inadequate monitoring of wear parts,

- Improper maintenance or repairs not being carried out in good time,
- Use of non-approved and unsuitable spare parts (see "7.1 Spare parts", pg. 81).

You can find the warranty conditions at www.krone-trailer.com.

2.8 Original spare parts

Only use spare parts that are suitable for the KRONE Trailer Axle .

The use of unsuitable or non-approved spare parts can interfere with safety and lead to a loss of the operating licence and warranty. You can find KRONE spare parts at www.krone-trailer.com.

2.9 Environmental hazards

- ▶ During maintenance and repair work, always observe environmental protection.
- ▶ Avoid the release of operating materials into nature and the environment.
- ▶ Dispose of operating materials and other chemicals in accordance with the applicable national regulations.

3 KRONE Trailer Axle overview

3.1 Components

3.1.1 Axle body

The KRONE Trailer Axle is fitted with an axle body. The axle body is used to transfer force and connects all other components of the KRONE Trailer Axle.

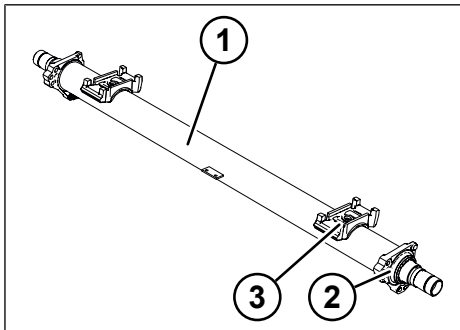


Fig. 3-1: Axle body components (top air spring link)

- 1 Axle body
- 2 Brake bracket
- 3 Axle plate

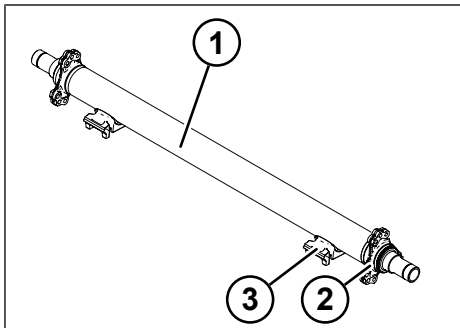


Fig. 3-2: Axle body components (bottom air spring link)

- 1 Axle body
- 2 Brake bracket
- 3 Axle plate

The self-steering axle is characterised by its axle body. On the self-steering axle, the middle axle body has two axle stubs, onto which the steering knuckle is fastened with a steering pin. In addition, the axle body of the self-steering axle is equipped with a tie rod, locking and stabilisation unit.

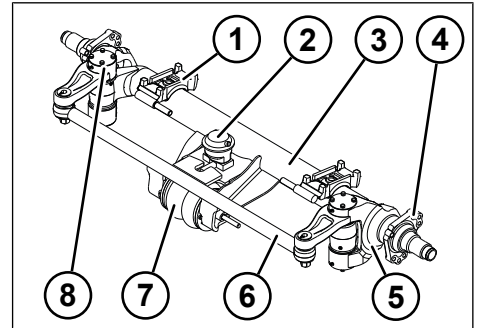


Fig. 3-3: Axle body components of the self-steering axle

- 1 Axle plate
- 2 Locking unit
- 3 Axle body with axle stubs
- 4 Brake bracket
- 5 Axle stub
- 6 Tie rod unit
- 7 Stabilisation unit
- 8 Steering pin unit

3.1.2 Integration

The KRONE Trailer Axle is fitted with an integration. The integration connects the axle body and the air suspension.

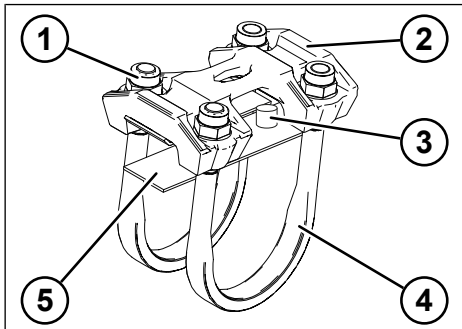


Fig. 3-4: Integration components (top air spring link)

- 1 Retainer nut/flat washer
- 2 Clamp plate
- 3 Heart stud
- 4 Spring clip
- 5 Shim

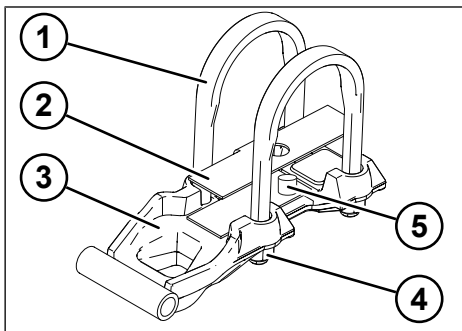


Fig. 3-5: Integration components (bottom air spring link)

- 1 Spring clip
- 2 Shim
- 3 Clamp plate
- 4 Retainer nut/flat washer
- 5 Heart stud

3.1.3 Air suspension

The KRONE Trailer Axle is fitted with air suspension.

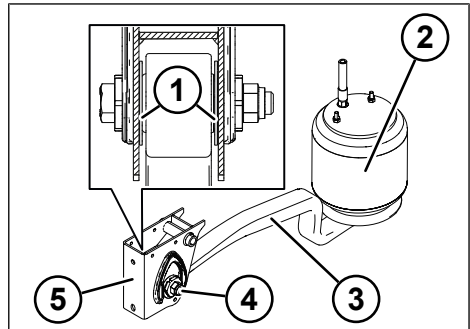


Fig. 3-6: Air suspension components

- 1 Thrust washers
- 2 Air spring bellow
- 3 Air spring link
- 4 Link fitting
- 5 Air spring bracket

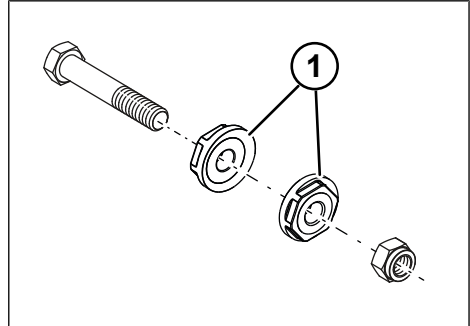


Fig. 3-7: Link fitting with eccentric nuts Generation 1

- 1 Eccentric nuts

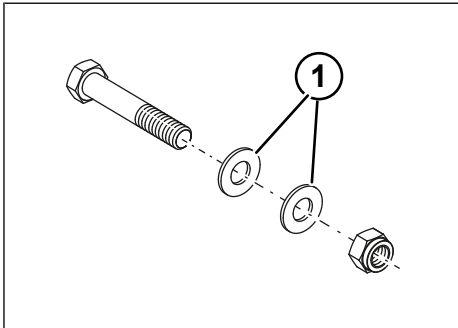


Fig. 3-8: Link fitting with washers
Generation 2

- 1 Washers

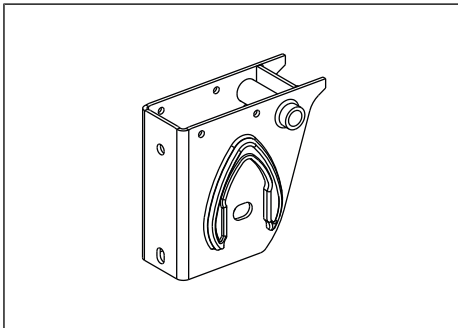


Fig. 3-9: Air spring bracket
Generation 1

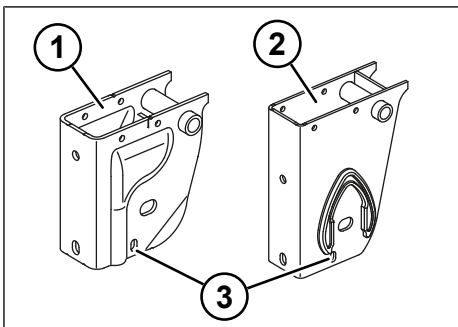


Fig. 3-10: Air spring bracket
Generation 2

- 1 T-bracket
- 2 M-bracket/O-bracket
- 3 Slot for track setting

3.1.4 Shock absorber

The KRONE Trailer Axle is fitted with two shock absorbers.

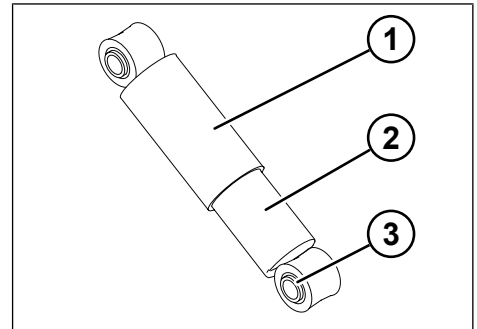


Fig. 3-11: Shock absorber components

- 1 Protective tube
- 2 Container
- 3 Silent block

3.1.5 Air spring bellow

The KRONE Trailer Axle is fitted with two air spring bellows. The air spring bellows are used to adjust the air suspension. The air spring bellow is split in two parts for rail loading.

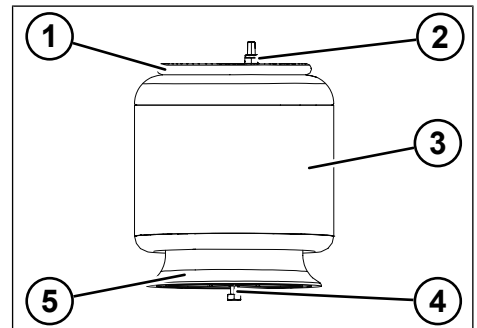


Fig. 3-12: Air spring bellow components

- 1 Crimped plate
- 2 Crimped plate retainer nut
- 3 Air spring bellow
- 4 Screwed fitting on the piston
- 5 Piston

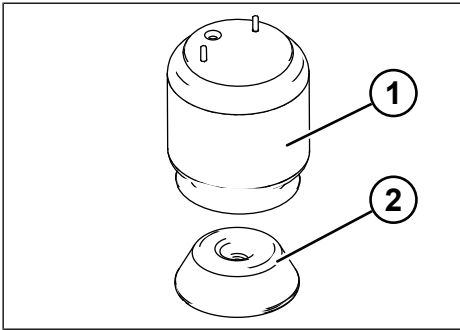


Fig. 3-13: Air spring bellow rail loading components

- 1 Air spring bellow
- 2 Cone

3.1.6 Brake

The KRONE Trailer Axle is equipped with a disc brake.

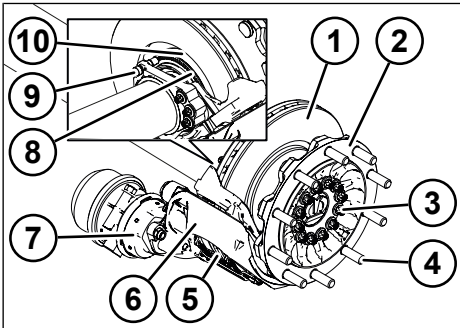


Fig. 3-14: Brake components

- 1 Brake disc
- 2 Wheel flange
- 3 Torx screws
- 4 Bolt
- 5 Brake pads
- 6 Brake calliper
- 7 Brake cylinder
- 8 ABS magnet wheel
- 9 ABS sensor
- 10 Wheel bearing unit

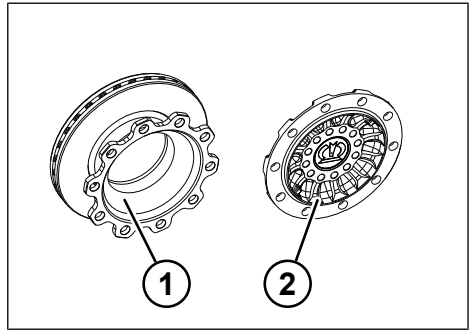


Fig. 3-15: Brake disc and wheel flange DOKTX1

- 1 Brake disc
- 2 Wheel flange

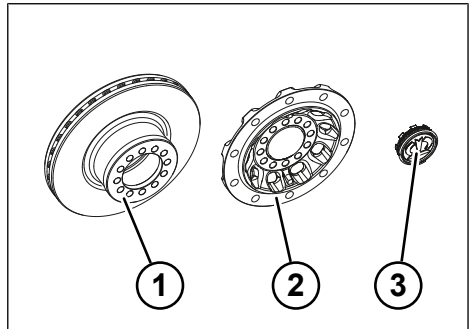


Fig. 3-16: Brake disc and wheel flange D(N)OKTX2

- 1 Brake disc
- 2 Wheel flange
- 3 Hub cap

3.1.7 Brake cylinder

The KRONE Trailer Axle is fitted with brake cylinders. The brake is operated using the brake cylinder.

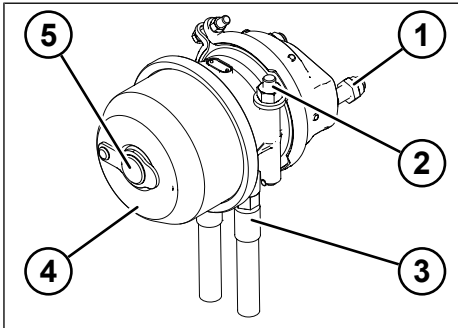


Fig. 3-17: Brake cylinder components

- 1 Retainer nuts
- 2 Bracket with emergency release screw
- 3 Compressed air line
- 4 Brake cylinder
- 5 Protective cap

3.1.8 Twinlift

As an option, the KRONE Trailer Axle is fitted with a Twinlift. The Twinlift helps with low loading of the axle.

Krone makes a distinction between two generations here. Generation 1 has a two-part mount on the steering pin with an anchor plate. Generation 2 has closed mounts on the steering pin.

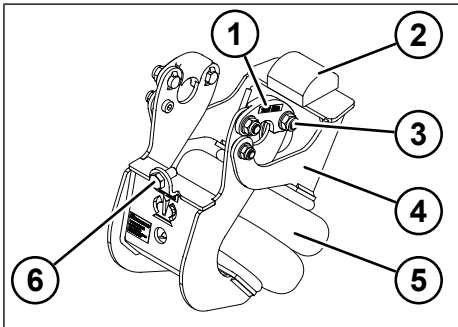


Fig. 3-18: Generation 1 Twinlift components

- 1 Anchor plate
- 2 Wear block
- 3 Anchor plate fitting

- 4 Lift lever
- 5 Two-fold bellow
- 6 Screw

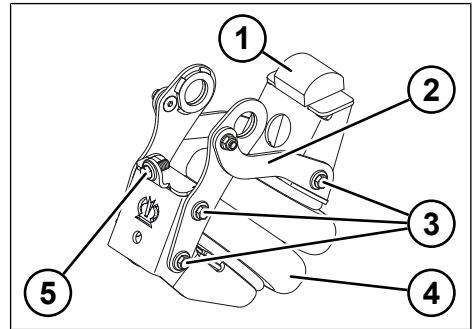


Fig. 3-19: Generation 2 Twinlift components

- 1 Wear block
- 2 Lift lever
- 3 Clamping screws
- 4 Two-fold bellow
- 5 Screw

3.1.9 Control device

The control device for the air suspension and the brake system is normally found behind the axle assembly on the left-hand side of the vehicle in the direction of travel on a common bracket.

4 Maintenance

⚠ WARNING

Risk of accident and property damage caused by improperly performed or lack of maintenance!

Improperly performed or lack of maintenance work and incorrect replacement parts affect safety.

- ▶ Observe the national accident prevention regulations.
- ▶ Only have maintenance work performed by an authorised specialist workshop in compliance with the KRONE maintenance and repair instructions.
- ▶ Only use original spare parts.
- ▶ Observe the maintenance instructions for the installed supplied components (e.g. brake cylinder).

⚠ WARNING

Risk of accident due to instability and rolling away!

Unintentional trailer movements can cause serious injury and property damage.

- ▶ Secure the trailer against rolling away by applying the parking brake.
- ▶ Use the wheel chocks to prevent the trailer from rolling away.
- ▶ Park the trailer on a solid surface to avoid sinking in or tipping.

⚠ WARNING

Risk of accident due to defective components!

A failure or defect can lead directly to an accident.

- ▶ Only use the KRONE Trailer Axle with components which are in perfect condition.
- ▶ Do not operate the KRONE Trailer Axle if there is a defect or any wear beyond the wear limits.
- ▶ Take the trailer out of operation if there are defective components.

NOTE

Environmental damage due to chemicals and improper disposal!

During maintenance, lubricants and operating substances may end up in the waste water and damage the environment.

- ▶ Do not allow lubricants or other chemicals to escape into drains, sewers or to seep into the ground.
- ▶ Ensure that lubricants, operating materials and components are disposed of properly and in an environmentally-friendly way.
- ▶ Observe the nationally applicable environmental protection regulations.
- ▶ Observe the applicable environmental protection measures.

The aim of maintenance is:

- that the commissioned KRONE Trailer Axle is kept operating safely and performing properly during use,
- to prevent downtimes,
- to keep the costs of operational readiness reasonable and financially justifiable,
- and to limit unavoidable repair expenditures.

4.1 Preparatory work

⚠ WARNING

Risk of accident caused by pressurised lines!

Loosening lines that are pressurised can cause serious injuries.

- ▶ Disconnect the compressed air supply and ensure that it does not inadvertently power on.

Depending on the scope of the repairs, preparatory work is required to allow safe repair work and to prevent accidents.

Carry out the following preparatory work:

- ▶ Use wheel chocks to prevent the trailer from rolling away.
- ▶ Use supports on the vehicle frame.
- ▶ Secure the axle or components that you are working on using a height-adjustable jack or similar.
- ▶ Depressurise the brake system or the air suspension system.
- ▶ Remove the wheels on the axle that you are working on.

4.2 Maintenance intervals

In addition to the general safety inspections in accordance with statutory regulations, for KRONE axle assemblies there is the visual inspection of the components and threaded unions. This maintenance work may only be performed by an authorised specialist workshop. For the check, the threaded unions should be checked visually as specified and if necessary, checked for firm seat with the torque spanner. With regards to the maintenance, replace the screw fittings, if necessary, and tighten them to the prescribed torque

(among other things, rust and settling signs can be an indication of loose fittings). Also observe the maintenance instructions of the installed supplied components.

In the maintenance intervals, you will find the maximum maintenance work for the vehicle when used on the road. The maintenance intervals are shortened accordingly when using the vehicle off-road or depending on the driving style, and must be adjusted individually. To ensure proper operating condition of the KRONE Trailer Axle, the following maintenance work must be carried out:

- ▶ Perform regular visual inspections.
- ▶ Observe the maintenance intervals.
- ▶ Observe the applicable current national and international regulations.
- ▶ Report any safety faults determined to the operator.
- ▶ Take the KRONE Trailer Axle out of service in the event of poor operational safety.
- ▶ If there is a fault, have the KRONE Trailer Axle repaired by an authorised specialist workshop.
- ▶ Properly performed maintenance work must be documented in the maintenance master data sheet in the operation instructions.

All maintenance intervals and work are listed on the following page and shown in an overview.



Visual inspection












Work step









Visual inspection and work steps


Maintenance intervals for the authorised specialist workshop


Air suspension	Maintenance work	Monthly	Every 3 months	Every 6 months	Yearly
Air spring bracket Pos. 1					X
Shock absorber Pos. 3					X
Integration Pos. 4					X
Air spring bellow Pos. 5					X
Thrust washers Pos. 6					X
Silent block Pos. 12					X
Link fitting Pos. 15					X

Wheel bearing unit	Maintenance work	Monthly	Every 3 months	Every 6 months	Yearly
Wheel bearing unit Pos. 2		When changing a brake disc			
Torx screws Pos. 7		When fitting the wheel flange and after every brake disc change, tighten up after 100 km.			

Brake	Maintenance work	Monthly	Every 3 months	Every 6 months	Yearly
Wheel nuts Pos. 8	 	During initial commissioning and after every wheel change, tighten up after 100 km.			
Brake disc Pos. 9				X	
Brake pad Pos. 10			X		
Brake calliper* Pos. 11					X
Brake cylinder Pos. 14				X	



* Observe the maintenance instructions from the manufacturer.

Twinlift	Maintenance work	Monthly	Every 3 months	Every 6 months	Yearly
All components Pos. 16				X	

Axle body	Maintenance work	Monthly	Every 3 months	Every 6 months	Yearly
All components Pos. 13				X	

Self-steering axle	Maintenance work	Monthly	Every 3 months	Every 6 months	Yearly
Steering pin Pos. 17					X
Steering pin Pos. 18			X		
Tie rod end Pos. 19					X

Maintenance intervals for the driver

Brake	Maintenance work	Monthly	Every 3 months	Every 6 months	Yearly
Wheel nuts Pos. 8	 	Visual inspection for wear and damage before each trip. After each wheel change, tighten up after 100 km. Tightening torque: 630 Nm +/- 30 Nm Test torque: 600 Nm			

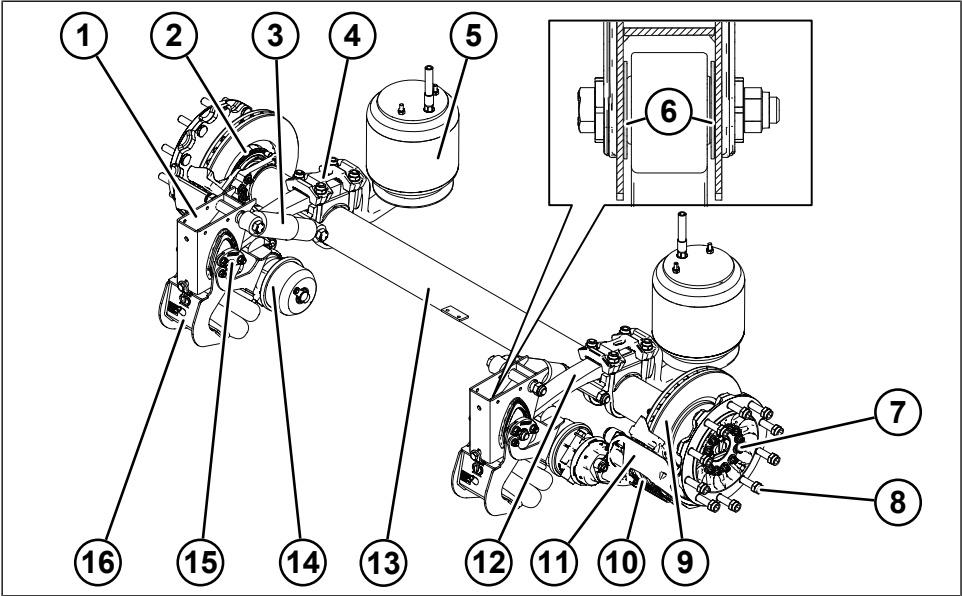


Fig. 4-1: Maintenance overview (top air spring link)

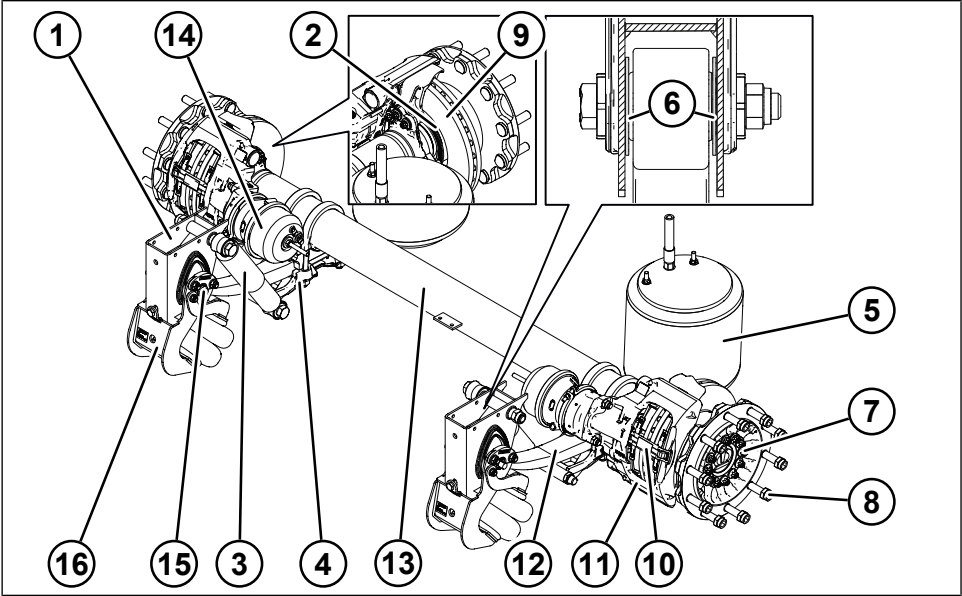


Fig. 4-2: Maintenance overview (bottom air spring link)

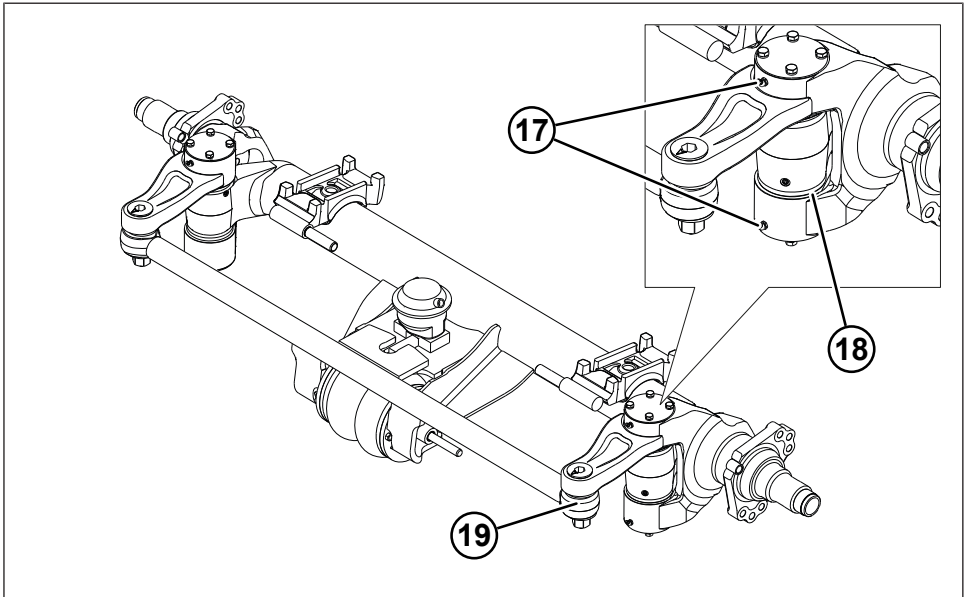


Fig. 4-3: Additional maintenance overview for self-steering axles

INFO

Wear must be assessed by an authorised specialist workshop. Only specialists with expert knowledge can evaluate the wear and implement the corresponding measures.

4.3 Maintenance work

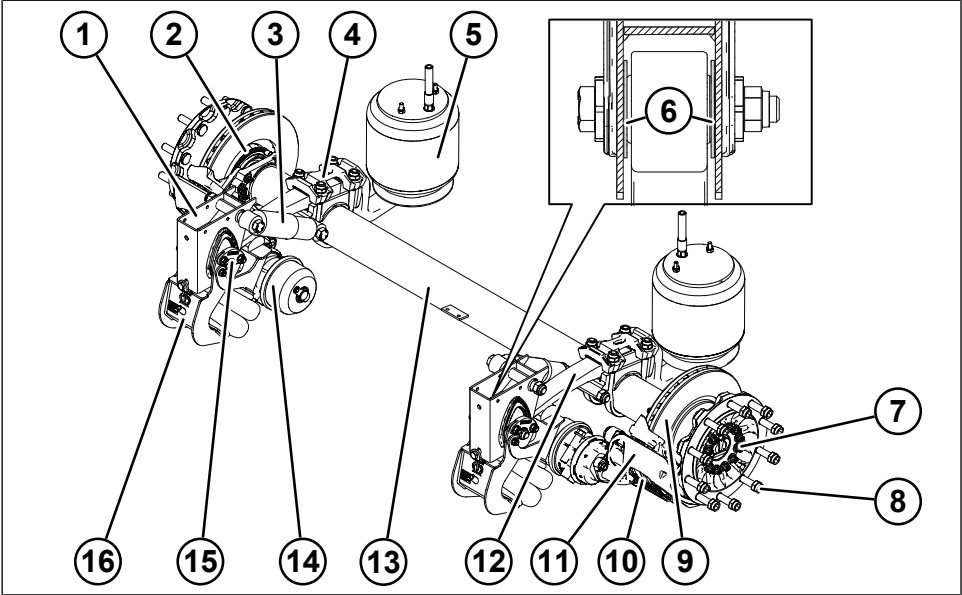


Fig. 4-4: Maintenance overview (top air spring link)

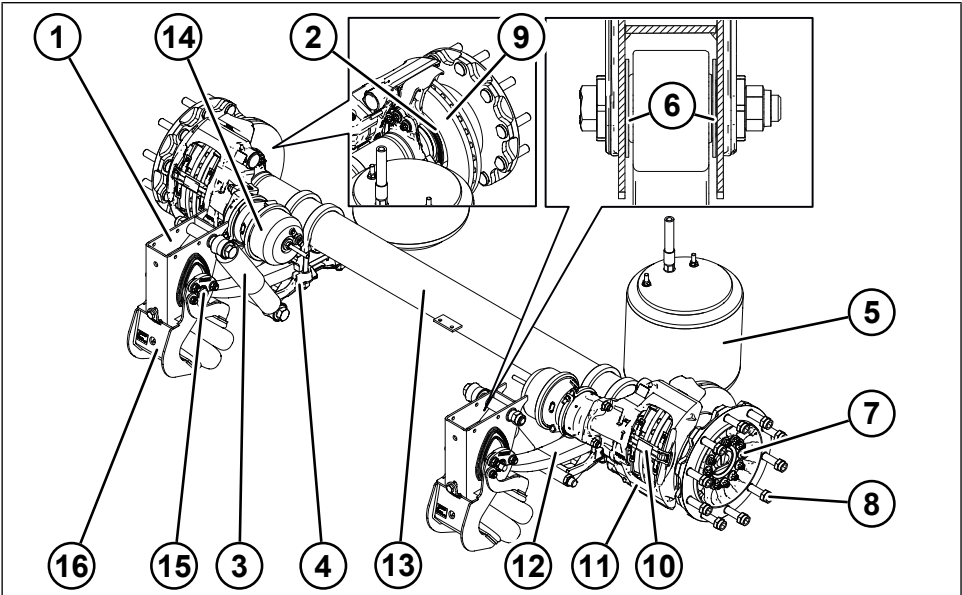


Fig. 4-5: Maintenance overview (bottom air spring link)

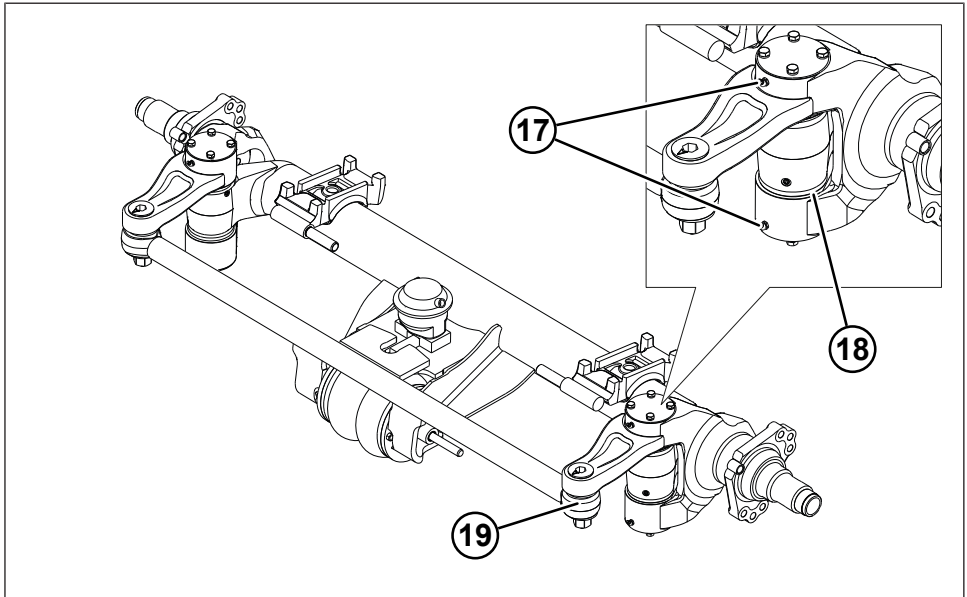


Fig. 4-6: Additional maintenance overview for self-steering axles

Perform the following maintenance work:

- Carry out preparatory work (see "4.1 Preparatory work", pg. 17).
- Perform a visual inspection of all individual parts for wear and damage.
- Replace damaged components.

Component	Item number	Maintenance work
Air spring bracket	1	Check for damage.
Wheel bearing unit	2	Check for leaking grease, noises and, if necessary, check the axial clearance*.
Shock absorber	3	Check for damage, wear and excessive oil loss. A "slight sweat" is allowed. Perform a twist test of the rubber bushings.
Integration	4	Check for tight fitting.
Air spring bellow	5	Check the screw fittings on the crimped plate and the link for tightness. Check for correct fitting, cracks and any trapped foreign bodies.
Thrust washers	6	Check for wear (if the thrust washer thickness is < 2 mm, the thrust washers must be replaced).
Torx screws	7	Check tightening torque.
Wheel nuts	8	Check tightening torque.
Brake disc	9	Check for cracks, damage or wear (Check the thickness of the brake disc).
Brake pads	10	Check for wear (check the minimum thickness).
Brake calliper	11	Check for smooth operation, function and the seals.

Component	Item number	Maintenance work
Silent block in the link eye	12	Check the wear of the silent bearing.
Axle body	13	Check for damage.
Brake cylinder	14	Check for damage and functionality.
Link fitting	15	Check the screw fitting for tightness.
Twinlift	16	Check the screw fitting for tightness. Check the two-fold bellow for cracks and any trapped foreign bodies.
Steering pin in the steering knuckle	17	Lubricate until grease emerges.
Steering knuckle	18	Check the vertical clearance (see "" pg. 24).
Silent block in the tie rod	19	Check the wear of the silent bearing.
* When the warranty on the wheel bearing unit has expired or if there are any abnormalities, we recommend checking the axial clearance.		

Check the vertical clearance

☑ The self-steering axle is loaded.

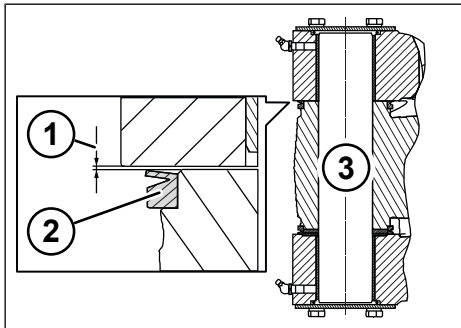


Fig. 4-7: Check the vertical clearance

- 1 Vertical clearance
- 2 V-seal
- 3 Steering knuckle

- ▶ Press down the sealing lips of the upper V-seal. Ensure that sealing lips are not damaged while you do this.
- ▶ Position the feeler gauge between the axle stub and the steering knuckle.
- ▶ Measure the vertical clearance. If the measured value is greater than 2.4 mm, replace the thrust washer.
- ▶ Remove the feeler gauge and carefully reposition the sealing lips.
- ▶ The vertical clearance is checked.

4.4 Testing and tightening torques

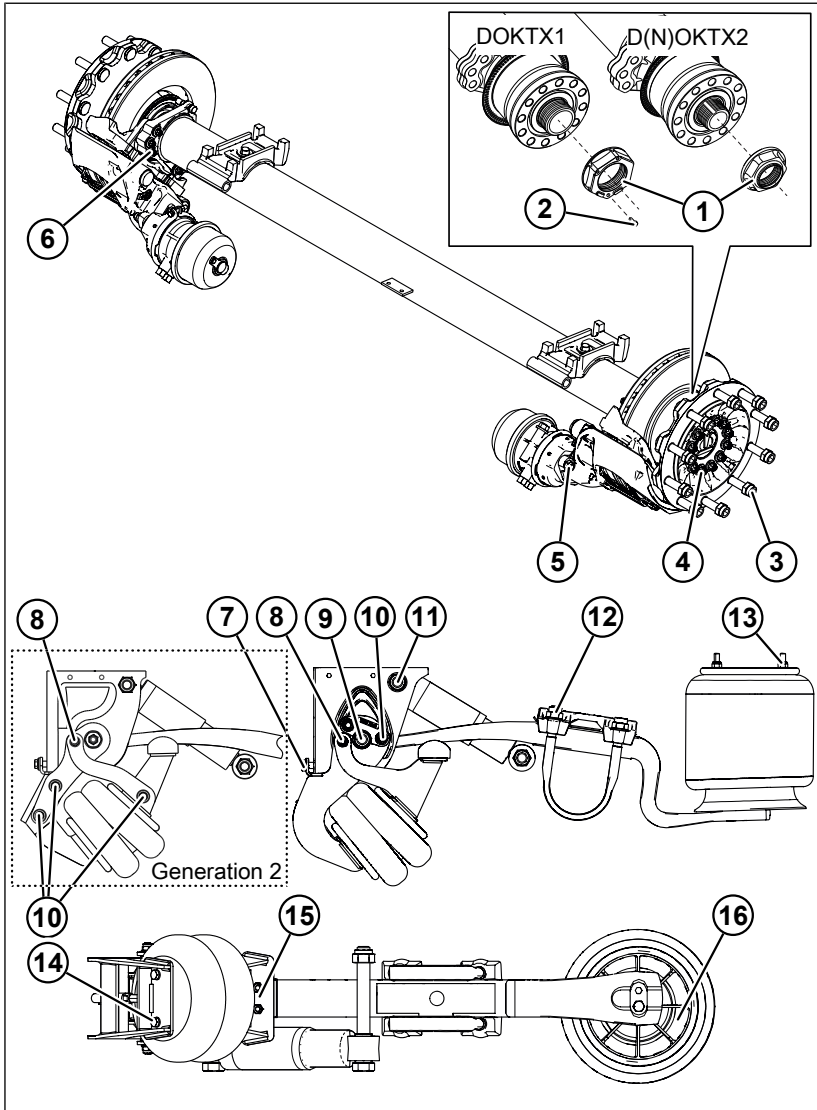


Fig. 4-8: Overview of testing and tightening torques (top air spring link)

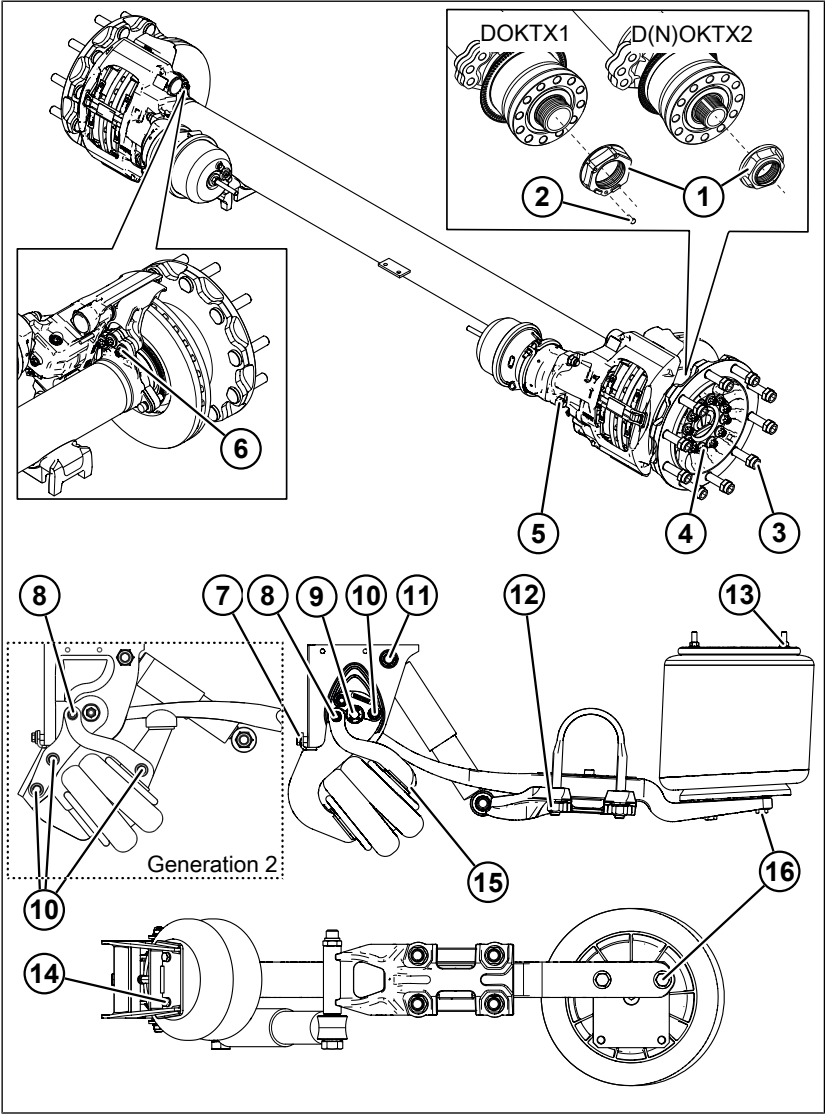


Fig. 4-9: Overview of testing and tightening torques (bottom air spring link)

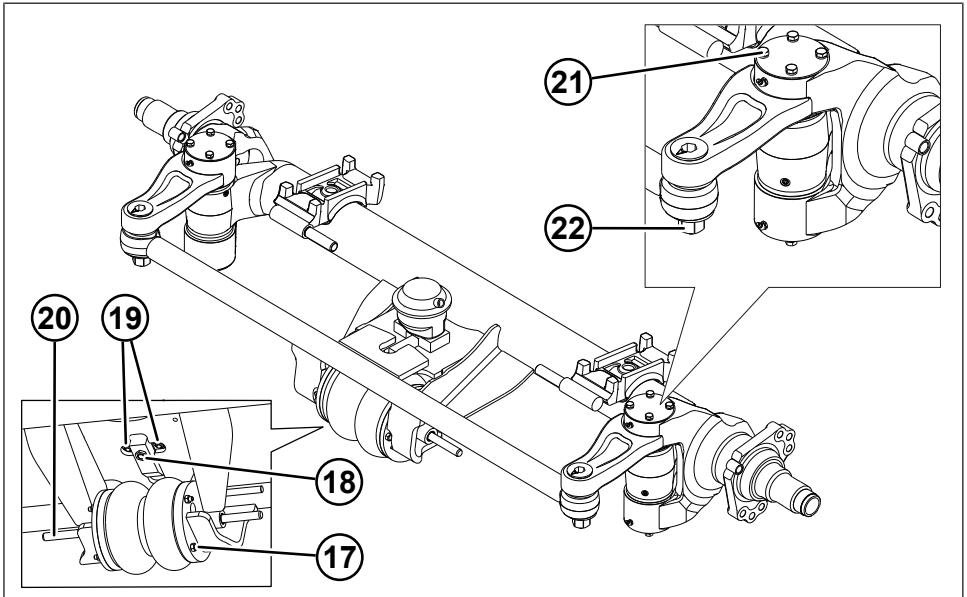


Fig. 4-10: Overview of testing and tightening torques for self-steering axle

Perform the following maintenance work:

► Carry out preparatory work.

► Check the prescribed testing torques according to the table.

Screw connection	Item number	Size	Torque	
			Testing torque	Tightening torque (pre-tensioning torque)
Axle nut DOKTX1	1	M68 x 1.5	N/A	700 Nm +/- 25 Nm for axle nut label 709400535/...536. 480 Nm +/- 20 Nm for axle nut label 703016070. The label (material number) is specified on the axle nut.
Axle nut D(N)OKTX2	1	M56 x 1.5	N/A	100 Nm + 30° Secure the axle nut by pressing in the flange.
Retainer bolt	2	M10	N/A	15 Nm
Wheel nuts	3	M22 x 1.5	600 Nm	630 Nm +/- 30 Nm
Torx screws DOKTX1	4	M18 x 1.5		470 Nm +/- 25 Nm
Torx screws D(N)OKTX2	4	M18 x 1.5		50 Nm + 150°
Brake cylinder nuts	5	M16 x 1.5	175 Nm	220 Nm +/- 10 Nm* (pre-tensioning torque: 120 Nm*)

MAINTENANCE

Screw connection	Item number	Size	Torque	
Torx screws	6	M16 x 1.5		190 Nm + 60° (pre-tensioning torque: 25 Nm)
Fastening bolts	7	M14 x 2.0 L = 30 mm	80 Nm	80 Nm +/- 5 Nm
Retainer nut	8	M12	N/A	100 Nm +/- 10 Nm Loctite 2701
Steering pin	9	M24	680 Nm	340 Nm + 90° (pre-tensioning torque: 200 Nm, set the eccentric nut to Neutral)
Retainer nut	10	M14 x 2.0	N/A	120 Nm +/- 10 Nm
Fastening bolt	11	M24 x 3	480 Nm	530 Nm +/- 30 Nm
Retainer nut	12	M22 x1.5	600 Nm	700 Nm +/- 25 Nm
Retainer nut	13	M12	N/A	55 Nm +/- 5 Nm
Fastening bolts	14	M10	N/A	40 Nm +/- 5 Nm Loctite 243
Retainer nut	15	M10	N/A	40 Nm +/- 5 Nm
Fastening bolt	16	M12 with microencapsulation	45 Nm	82 Nm +/- 3 Nm
		M12 (10.9)	N/A	110 Nm +/- 10 Nm
		M16	200 Nm	280 Nm +/- 10 Nm
Retainer nut	17	M8	N/A	43 Nm +/- 3 Nm
Double nut	18	M16/M22 x 1.5	N/A	200 Nm +/- 20 Nm Loctite 2701
Retainer nut	19	M12	N/A	70 Nm +/- 15 Nm
Locking bolt	20	SW 27	N/A	Tighten firmly Loctite 2701
Screw	21	M10	N/A	45 Nm +/- 3 Nm
Nut	22	M24	N/A	550 Nm +/- 25 Nm
* The tightening torque only applies to WABCO brake cylinders. When using other brake cylinders, observe the manufacturer's specifications.				

4.5 Wear dimensions

4.5.1 Air suspension, brake and wheel bearing unit

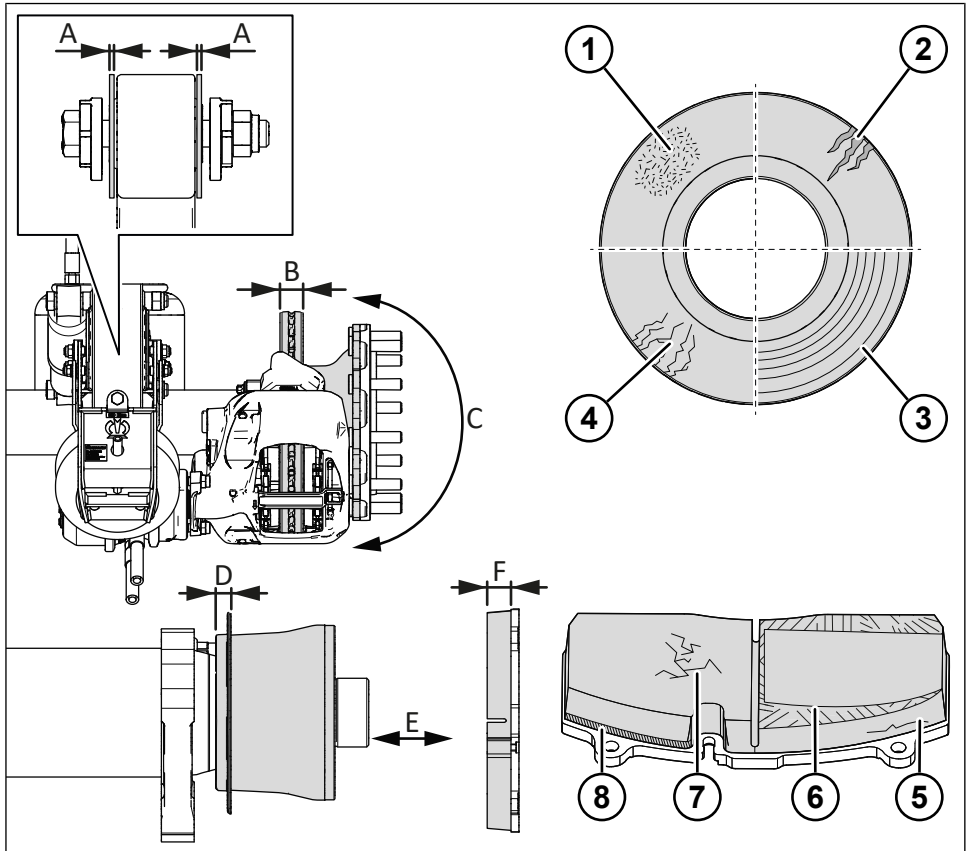


Fig. 4-11: Overview of wear and adjustment dimensions

Perform the following maintenance work:

- Carry out preparatory work (see "4.1 Preparatory work", pg. 17).
- Check the prescribed wear dimensions in accordance with the table.

INFO

When the wear dimension is reached or if the degree of wear is not permitted, the component must be replaced.

Position	Test parameters	Wear dimension
A	Thrust washers	Thickness < 2 mm
B	Brake disc thickness	Thickness < 37 mm
C	Brake disc side stop	> 0.5 mm
D	ABS magnetic wheel parallelism	Parallelism <= 0.2 mm
E	Wheel bearing unit axial play	Axial play < 0.2 mm

Position	Test parameters	Wear dimension
F	Brake pad thickness	Thickness < 2 mm
1	Net-like crack formation on the surface of the brake disc	Permitted
2	Crack formation on the brake disc Crack length < 75% of the brake surface Crack width/depth < 1.5 mm	Permitted
3	Unevenness on the disc surface	< 1.5 mm permitted
4	Radial cracks starting from the outer edge and continuous cracks	Not permitted
5	Pad breaks < 2 mm to the brake pad holder	Not permitted
6	Breaks on the edge area at a distance of 10 mm to the top pad corner and 3 mm to the other peripheral edges	< 10 % are permitted
7	Cracks parallel to the pad holder and at a distance < 2 mm to the pad holder	Not permitted
8	Cracks in the pad surface at a distance > 10 mm to the edge	Permitted

4.5.2 Shock absorber wear

INFO

When the wear dimension is reached or if the degree of wear is not permitted, the component must be replaced.

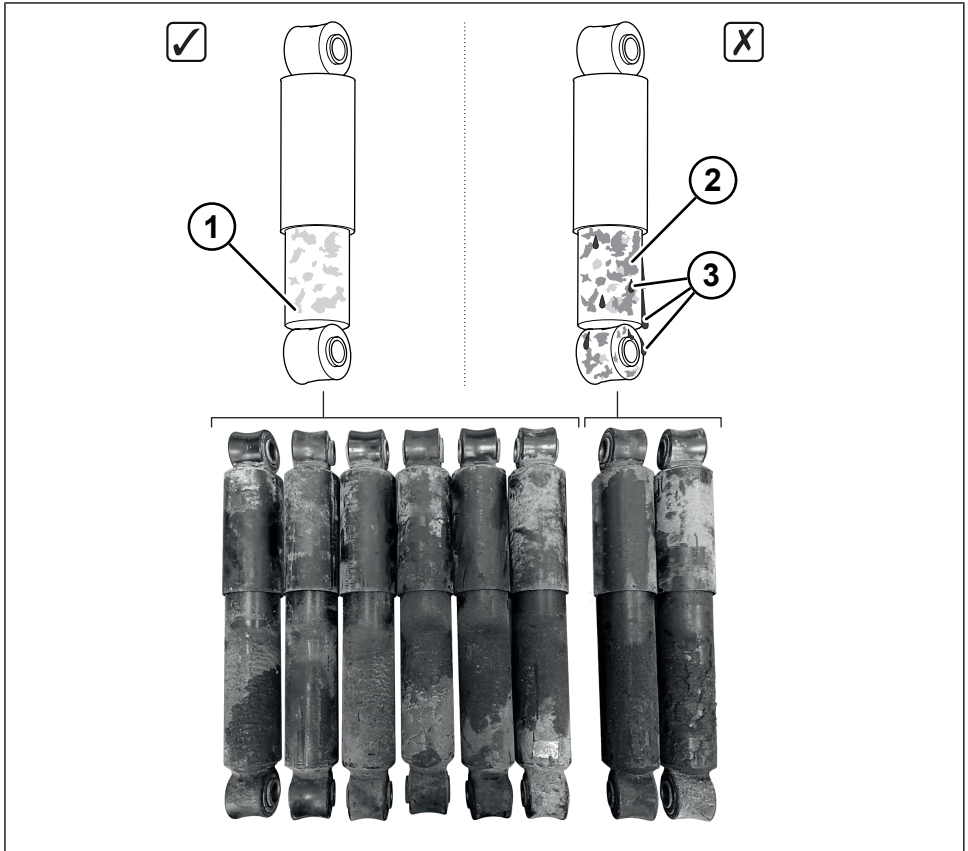


Fig. 4-12: Examples of shock absorber defects

Perform the following maintenance work:

- Carry out preparatory work (see "4.1 Preparatory work", pg. 17).

- Check the prescribed degree of wear in accordance with the table.

Position	Degree of wear	Assessment
1	Slight sweating: Visible greasy and dry surface of the container	Permitted
2	Severe sweating: Visible greasy and wet surface of the container including the shock absorber bracket	Not permitted
3	Oil dropping from the shock absorber	Not permitted

5 Repair

DANGER

Risk of accident due to unintended vehicle movements!

Unintended vehicle movements can cause serious injury.

- ▶ Use wheel chocks to prevent the trailer from rolling away.
- ▶ Park the trailer on solid and level ground to avoid sinking in or tipping.
- ▶ During maintenance and repair work, observe the stability of the trailer.
- ▶ Observe the applicable national accident prevention regulations.

CAUTION

Risk of injury due to unexpected component movements!

Pneumatically or electrically driven components may move unexpectedly and injure people.

- ▶ Fully depressurise the pneumatic system and disconnect the electrical connections before beginning maintenance work. Ensure that the system cannot be switched on again.

WARNING

Risk of accident and material damage caused by improperly performed troubleshooting and repair work!

Improperly performed troubleshooting and repair work affect safety and may lead to serious injuries and property damage.

- ▶ Only have necessary repair work performed by an authorised specialist workshop.
- ▶ Only use original spare parts and spare parts authorised by KRONE.
- ▶ Observe the instructions concerning troubleshooting issued by the suppliers of the installed components.
- ▶ Verify functionality after installing/repairing components.

WARNING

Risk of accident due to defective components!

A failure or defect can lead directly to an accident.

- ▶ Only use the KRONE Trailer Axle with components which are in perfect condition.
- ▶ Do not operate the KRONE Trailer Axle if there is a defect or any wear beyond the wear limits.
- ▶ Take the trailer out of operation if there are defective components.

NOTE

Environmental damage due to chemicals and improper disposal!

During maintenance, lubricants and operating substances may end up in the waste water and damage the environment.

- ▶ Do not allow lubricants or other chemicals to escape into drains, sewers or to seep into the ground.
- ▶ Ensure that lubricants, operating materials and components are disposed of properly and in an environmentally-friendly way.
- ▶ Observe the nationally applicable environmental protection regulations.
- ▶ Observe the applicable environmental protection measures.

Repair work includes the replacement and the repair of components and is only required when components are damaged by wear or other external circumstances.

The following applies to the specialist workshop:

- The necessary repair work must be performed professionally, according to the rules of engineering and in accordance with the applicable regulations.
- Do not repair worn or damaged components using a makeshift repair.

- Only use original or approved spare parts for repairs (see "7.1 Spare parts", pg. 81).
- Always replace any removed seals with new seals.
- Welding work on the frame, chassis and on bearing parts may only be performed after consultation with KRONE customer service and KRONE construction.

5.1 Preparatory work

⚠ WARNING

Risk of accident caused by pressurised lines!

Loosening lines that are pressurised can cause serious injuries.

- ▶ Disconnect the compressed air supply and ensure that it does not inadvertently power on.

Depending on the scope of the repairs, preparatory work is required to allow safe repair work and to prevent accidents.

Carry out the following preparatory work:

- ▶ Use wheel chocks to prevent the trailer from rolling away.
- ▶ Use supports on the vehicle frame.
- ▶ Secure the axle or components that you are working on using a height-adjustable jack or similar.
- ▶ Depressurise the brake system or the air suspension system.
- ▶ Remove the wheels on the axle that you are working on.

5.2 Brake

5.2.1 Wheel nuts

Removing the wheel nuts

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Loosen the wheel nuts.

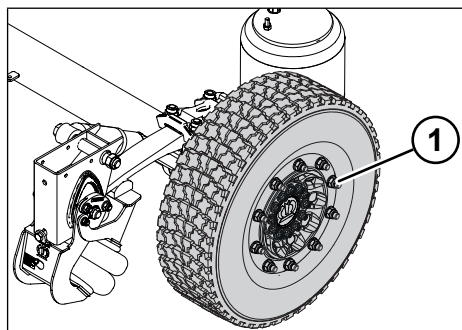


Fig. 5-1: Wheel nuts

1 Wheel nuts

- ▶ Remove any rust or dirt from the bolts and wheel nuts.
- ▶ Replace any worn or defective bolts and wheel nuts.
- ✓ The wheel nuts are removed.

Fitting the wheel nuts

⚠ WARNING

Risk of accident caused by loose wheel nuts!

Wheel nuts that are not tightened correctly will come loose during travel, possibly leading to serious accidents.

- ▶ Tighten the wheel nuts with the appropriate tightening torque.
- ▶ Check the tightness of the wheel nuts after each wheel change, and again shortly after the first laden journey.

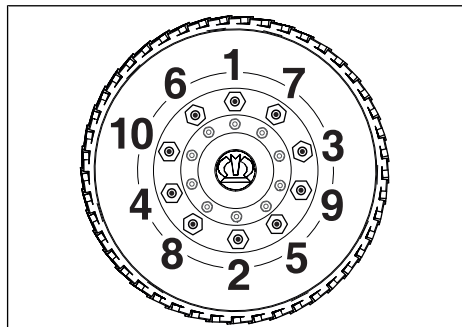


Fig. 5-2: Wheel nut tightening sequence

INFO

On initial commissioning and after every wheel change, tighten up the wheel nuts after 100 km.

- ▶ Tighten up the wheel nuts with a tightening torque of 630 Nm +/- 30 Nm. Ensure that the wheel nuts are tightened in the tightening sequence.
- ✓ The wheel nuts are fitted.

5.2.2 Hub cap

Remove the hub cap

- ▶ Lever out the hub cap in the hub cap groove provided.

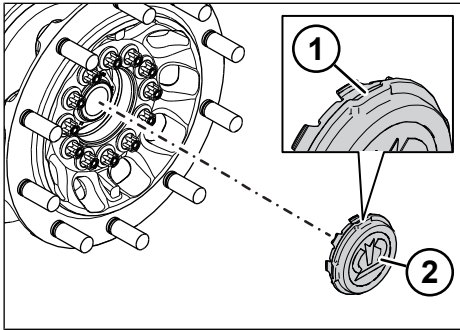


Fig. 5-3: Hub cap DOKTX2

- 1 Hub cap groove
- 2 Hub cap

- ✓ The hub cap is removed.

Installing the hub cap

- ▶ Insert the hub cap by turning it backwards and forwards to ensure that the sealing ring is securely seated.
- ▶ Carefully tap the hub cap firmly into place using a plastic hammer until the hub cap is seated flush.
- ✓ The hub cap is installed.

5.2.3 Brake cylinder

Removing the brake cylinder

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).

- ▶ Mark and remove the compressed air lines.

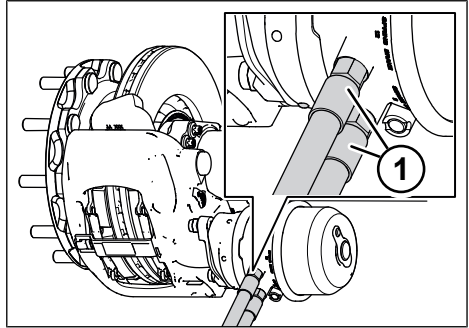


Fig. 5-4: Compressed air lines of the brake cylinder

- 1 Compressed air lines

- ▶ Loosen the retainer nut and flat washer.
- ▶ Remove the emergency release screw from the holder.

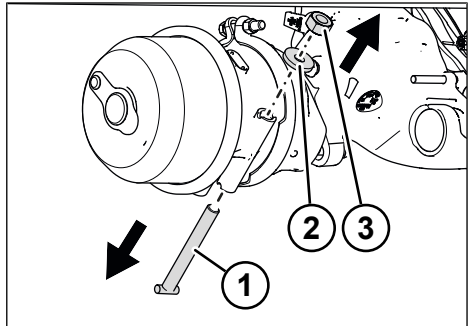


Fig. 5-5: Removing the emergency release screw

- 1 Retainer nut
- 2 Flat washer
- 3 Emergency release screw

- ▶ Open the cap.
- ▶ Insert the emergency release screw.

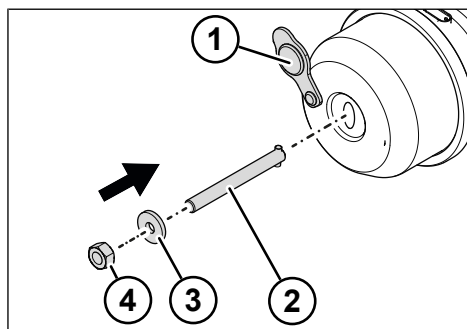


Fig. 5-6: Install the emergency release screw

- 1 Protective cap
- 2 Emergency release screw
- 3 Flat washer
- 4 Retainer nut

- Turn the emergency release screw clockwise (90°) until it engages.
- Screw the retainer nut and flat washer onto the emergency release screw.
- Tighten up the retainer nut until the brake cylinder releases and is mechanically secured.
- Loosen the nuts and dispose of them.

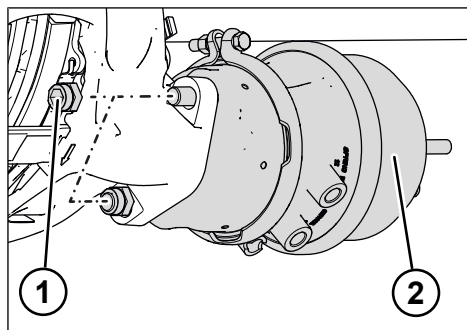


Fig. 5-7: Removing the brake cylinder

- 1 Nuts
- 2 Brake cylinder

- Remove the brake cylinder.
- ✓ The brake cylinder is removed.

Fitting the brake cylinder

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Clean the connecting joint.
- Check that the connecting joint is flat.

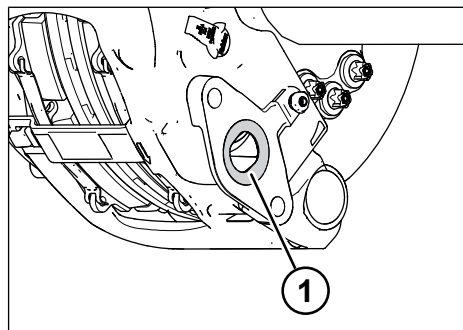


Fig. 5-8: Checking the brake cylinder carrier

- 1 Connecting joint

- Loosen the retainer nut and flat washer.
- Remove the emergency release screw from the holder.

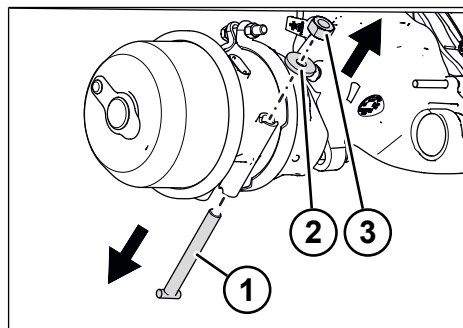


Fig. 5-9: Removing the emergency release screw

- 1 Emergency release screw
- 2 Flat washer
- 3 Retainer nut

- Open the cap.
- Insert the emergency release screw.

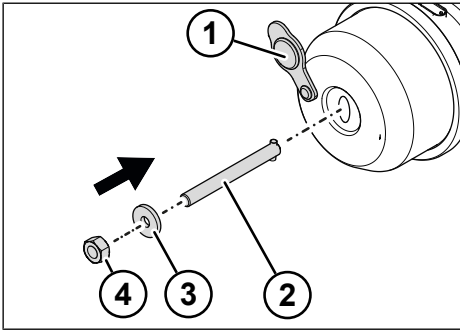


Fig. 5-10: Install the emergency release screw

- 1 Protective cap
- 2 Emergency release screw
- 3 Flat washer
- 4 Retainer nut

- ▶ Turn the emergency release screw clockwise (90°) until it engages.
- ▶ Screw the retainer nut and flat washer onto the emergency release screw.
- ▶ Tighten up the retainer nut until the brake cylinder releases and is mechanically secured.
- ▶ Tighten up the new nuts by hand until the brake cylinder is lying on the whole surface.
- ▶ Fasten the nuts with a pre-tensioning torque of 120 Nm* evenly and in a criss-cross pattern.
- ▶ Fasten the nuts with a tightening torque of 220 Nm +/- 10 Nm* evenly and in a criss-cross pattern.

INFO

* Compare the tightening torque of the brake cylinder with the corresponding manufacturer specifications.

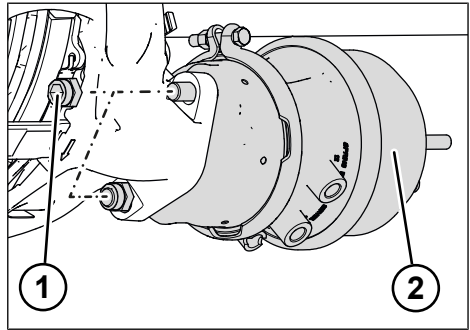


Fig. 5-11: Fitting the brake cylinder

- 1 Nuts
- 2 Brake cylinder

- ▶ Loosen and remove the retainer nut and flat washer.
- ▶ Turn the emergency release screw key counter-clockwise (90°) and disengage it.
- ▶ Remove the emergency release screw.

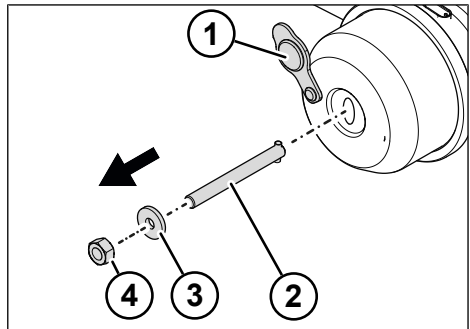


Fig. 5-12: Remove the emergency release screw

- 1 Protective cap
- 2 Emergency release screw
- 3 Flat washer
- 4 Retainer nut

- ▶ Close the cap.
- ▶ Insert the emergency release screw in its holder.

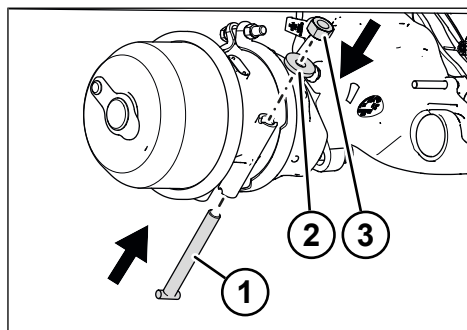


Fig. 5-13: Inserting the emergency release screw

- 1 Emergency release screw
- 2 Flat washer
- 3 Retainer nut

- Screw the retainer nut and flat washer onto the emergency release screw.
- Fasten the compressed air lines according to the markings.

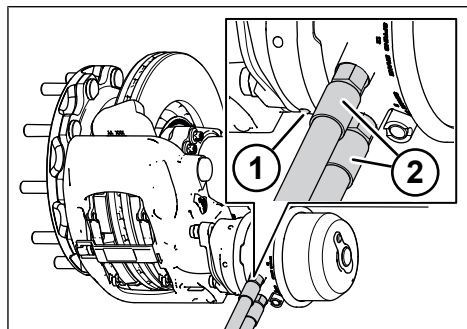


Fig. 5-14: Fasten the compressed air lines of the brake cylinder

- 1 Water drain plug
- 2 Compressed air lines

- Pull the lower water drain plug.
- ✓ The brake cylinder is fitted.

5.2.4 Brake disc

Removing the brake disc and wheel flange DOKTX1

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Check the bearing play of the wheel bearing unit (see "5.2.7 Wheel bearing unit", pg. 46).
- Remove the brake calliper (see "5.2.6 Brake calliper", pg. 44).
- Loosen the two opposite Torx screws and discard them.

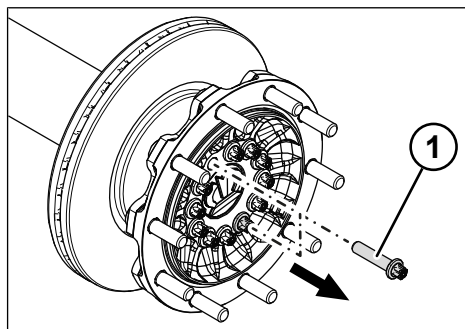


Fig. 5-15: Dispose of the 2 Torx screws

- 1 Torx screws

- Fasten two assembly bolts.

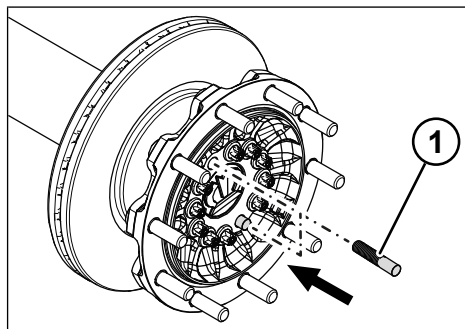


Fig. 5-16: Inserting assembly bolts

- 1 Assembly bolts

- Loosen and dispose of the remaining Torx screws.

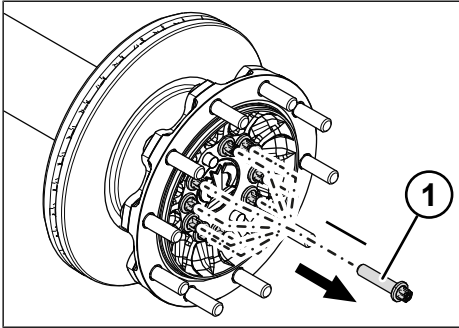


Fig. 5-17: Dispose of the Torx screws

- 1 Torx screws

- Remove the wheel flange with the brake disc from the wheel bearing unit.

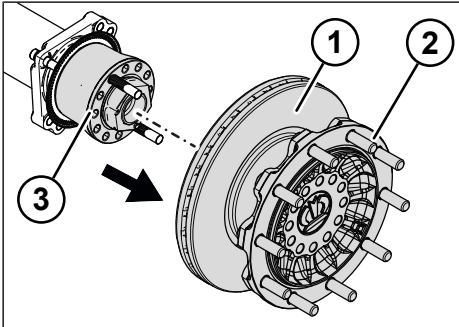


Fig. 5-18: Removing the brake disc

- 1 Brake disc
- 2 Wheel flange
- 3 Wheel bearing unit

- Using a suitable tool, drive the bolts out of the brake disc.

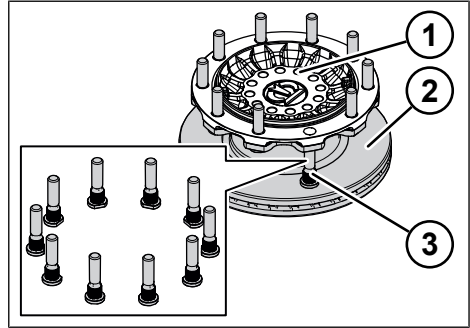


Fig. 5-19: Fasten/remove the bolts

- 1 Wheel flange
- 2 Brake disc
- 3 Bolt

- Separate the wheel flange from the brake disc.
- ✓ The brake disc and the wheel flange are removed.

Removing the brake disc and wheel flange D(N)OKTX2

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Check the bearing play of the wheel bearing unit (see "5.2.7 Wheel bearing unit", pg. 46).
- Remove the brake calliper (see "5.2.6 Brake calliper", pg. 44).
- Loosen the two opposite Torx screws and discard them.

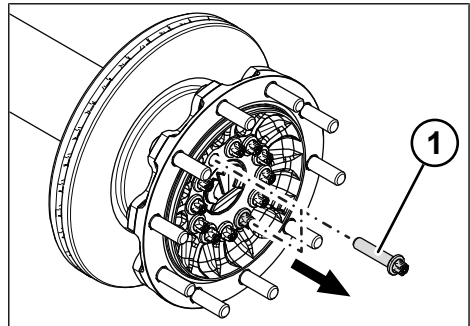


Fig. 5-20: Discard the 2 Torx screws

- 1 Torx screws

- Fasten two assembly bolts.

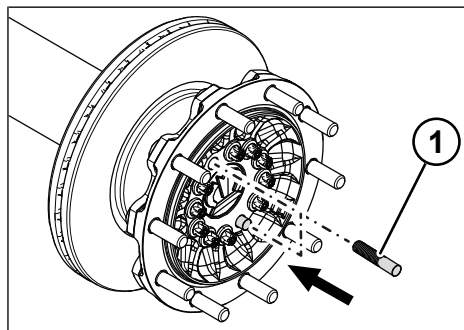


Fig. 5-21: Inserting assembly bolts

- 1 Assembly bolts

- Loosen and dispose of the remaining Torx screws.

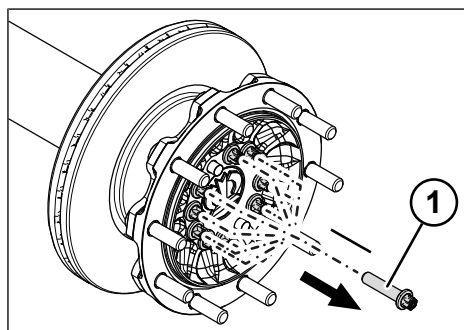


Fig. 5-22: Dispose of the Torx screws

- 1 Torx screws

- Remove the wheel flange and brake disc from the wheel bearing unit.

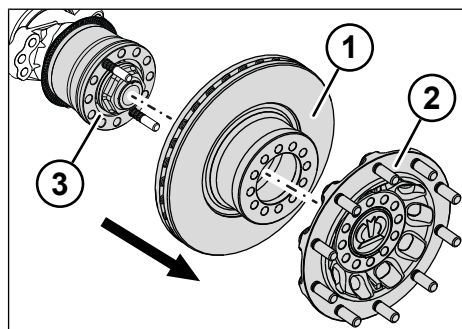


Fig. 5-23: Removing the brake disc

- 1 Brake disc
- 2 Wheel flange
- 3 Wheel bearing unit

- ✓ The brake disc and the wheel flange are removed.

Installing the brake disc and wheel flange DOKTX1

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Clean the wheel flange.
- Check the wheel flange.
- Using the bolts, fasten the wheel flange to the brake disc.

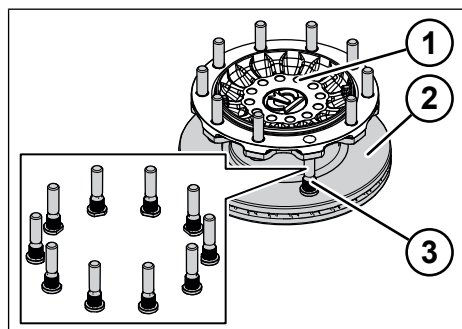


Fig. 5-24: Fastening the bolts

- 1 Wheel flange
- 2 Brake disc
- 3 Bolt

- Drive in the bolts using a suitable tool. While doing this ensure that the flattened head side of the bolt lies on the brake disc.
- Clean the contact surface of the wheel bearing unit.

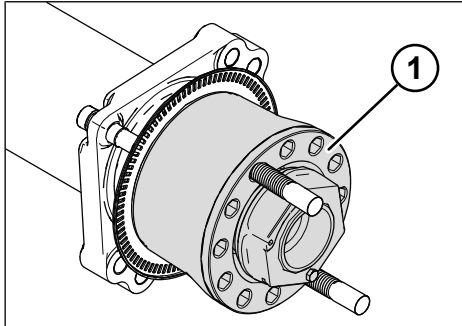


Fig. 5-25: Cleaning the wheel bearing unit

1 Wheel bearing unit

- Check the wheel bearing unit for leaking grease and noise (see "5.2.7 Wheel bearing unit", pg. 46).
- Push the wheel flange with the brake disc onto the wheel bearing unit.

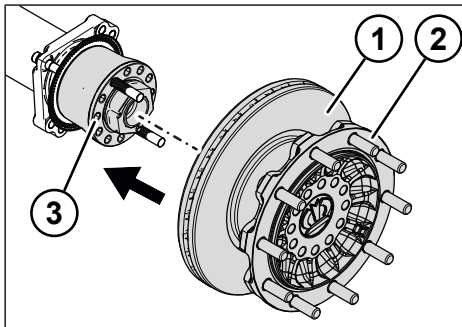


Fig. 5-26: Fastening the brake disc

1 Brake disc
2 Wheel flange
3 Wheel bearing unit

- Insert the new Torx screws into the brake disc.

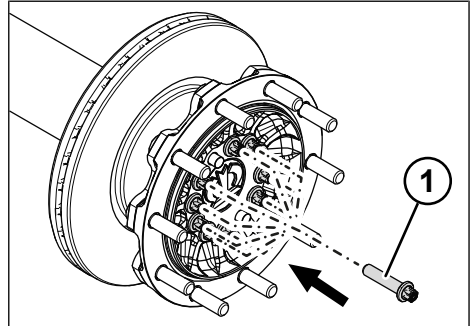


Fig. 5-27: Insert the new Torx screws

1 Torx screws

- Remove the assembly bolts.

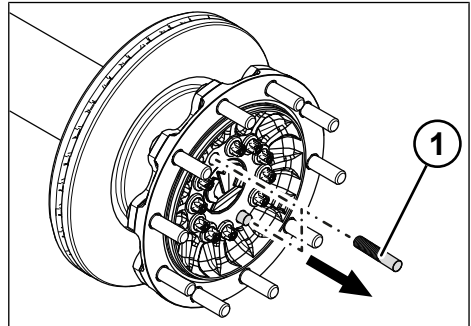


Fig. 5-28: Removing the assembly bolts

1 Assembly bolts

- Insert the remaining Torx screws.

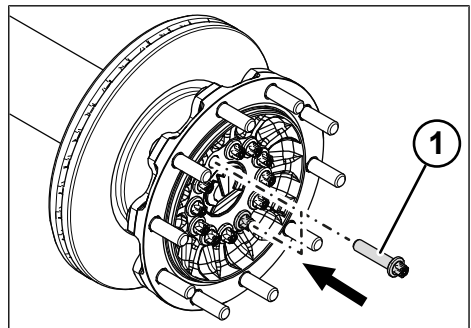


Fig. 5-29: Inserting the 2 new Torx screws

1 Torx screws

- ▶ Tighten up all the new Torx screws with a tightening torque of $470 \text{ Nm} \pm 25 \text{ Nm}$ in a criss-cross pattern.
- ▶ Install the brake calliper (see "5.2.6 Brake calliper", pg. 44).
- ✓ The brake disc is fitted.

Installing the brake disc and wheel flange D(N)OKTX2

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Clean the wheel flange.
- ▶ Check the wheel flange.
- ▶ Clean the contact surface of the wheel bearing unit.

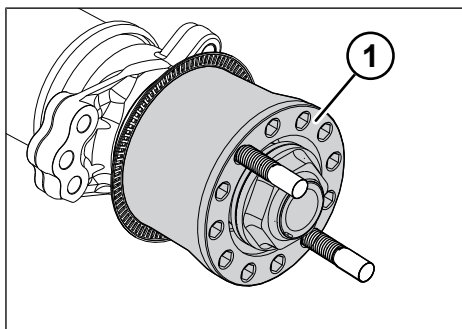


Fig. 5-30: Cleaning the wheel bearing unit

1 Wheel bearing unit

- ▶ Check the wheel bearing unit for leaking grease and noise (see "5.2.7 Wheel bearing unit", pg. 46).

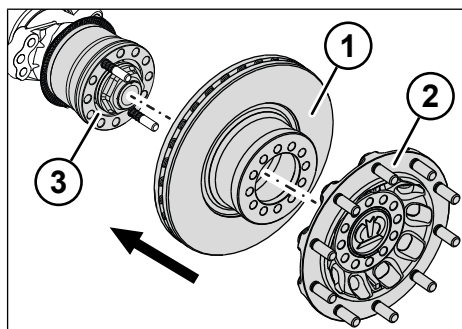


Fig. 5-31: Fastening the brake disc

- 1 Brake disc
- 2 Wheel flange
- 3 Wheel bearing unit

- ▶ Slide on the brake disc and wheel flange.
- ▶ Insert the new Torx screws into the brake disc.

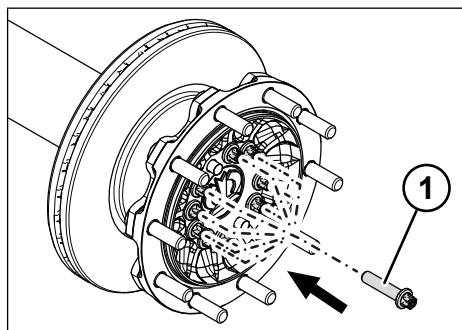


Fig. 5-32: Inserting the new Torx screws

1 Torx screws

- ▶ Remove the assembly bolts.

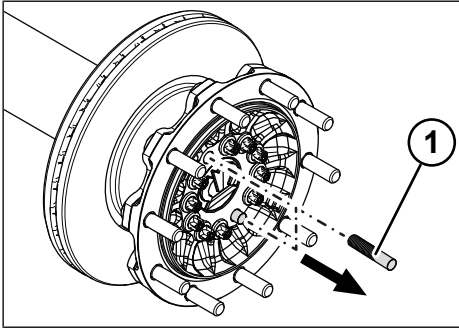


Fig. 5-33: Removing the assembly bolts

1 Assembly bolts

- Insert the remaining Torx screws.

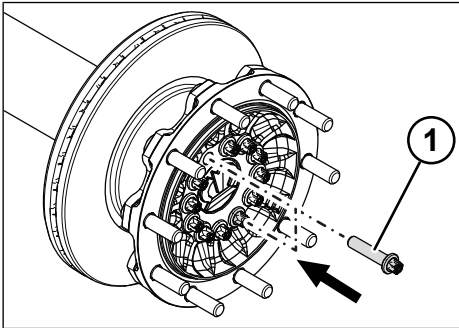


Fig. 5-34: Inserting the 2 new Torx screws

1 Torx screws

- Tighten up all the new Torx screws with a tightening torque of 50 Nm + 150 in a criss-cross pattern.
- Install the brake calliper (see "5.2.6 Brake calliper", pg. 44).
- ✓ The brake disc is fitted.

5.2.5 Brake pads

INFO

The description only applies to the HAL-DEX ModulT brake calliper. When using other brake callipers, observe the manufacturer's specifications.

Removing the brake pads

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Remove the brake cylinder (see "5.2.3 Brake cylinder", pg. 34).
- Remove the cap.

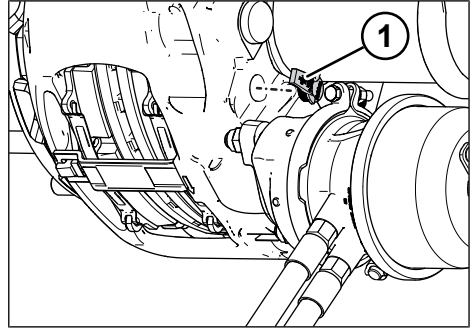


Fig. 5-35: Remove the cap

1 Protective cap

- Insert the Torx adapter.

INFO

Do not use an impact wrench to tighten the Torx adapter.

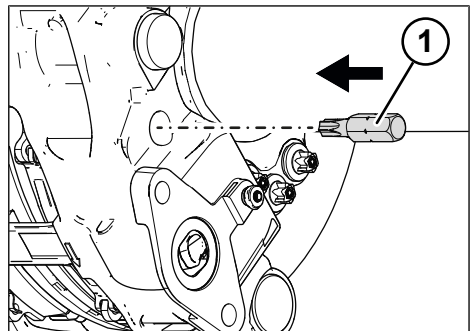


Fig. 5-36: Loosening the brake pads

1 Torx adapter

- Turn the return shaft with max. 20 Nm counter-clockwise to the stop. A clicking noise must be heard.

- ▶ Turn the Torx adapter 90° clockwise with max. 20 Nm and leave it inserted. The adjusting unit is overridden in the pulled out position.
- ▶ Push in the spring.

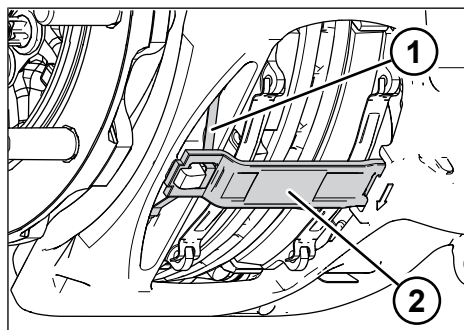


Fig. 5-37: Removing the pad holder clip

- 1 Spring
- 2 Pad holder clip

- ▶ Remove the pad holder clip.
- ▶ Remove the outer brake pad.

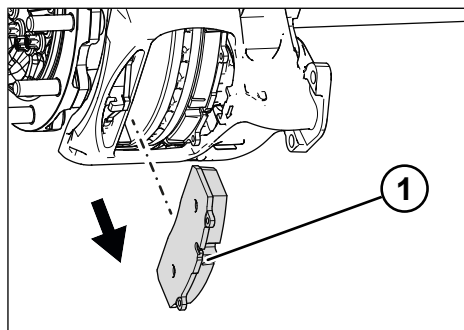


Fig. 5-38: Removing the brake pad

- 1 Brake pad

- ▶ Slide the brake calliper and remove the inner brake pad.
- ✓ The brake pads are removed.

Fitting the brake pads

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).

- ▶ Insert the inner brake pad. While doing this, ensure the brake pad locks into place.

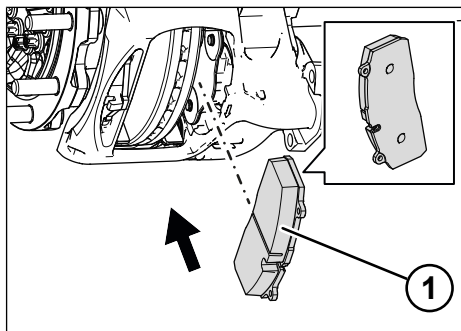


Fig. 5-39: Inserting the brake pads

- 1 Brake pad

- ▶ Insert the outer brake pad.
- ▶ Fasten the retainer plates.

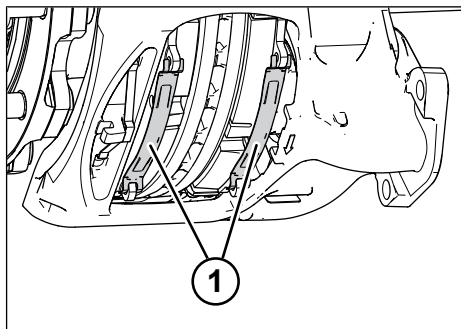


Fig. 5-40: Fastening the retainer plates

- 1 Retainer plate

- ▶ Insert the spring.
- ▶ Insert the pad holder clip until you hear it click into place.

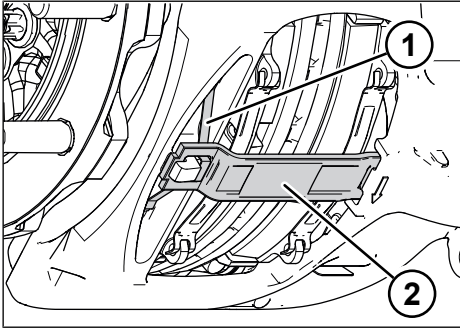


Fig. 5-41: Inserting the pad holder clip

- 1 Spring
- 2 Pad holder clip

- Fit the brake cylinder (see "5.2.3 Brake cylinder", pg. 34).
- Press the brake pedal fully down five times. While doing this, ensure that the Torx adapter turns clockwise each time the pedal is pressed.

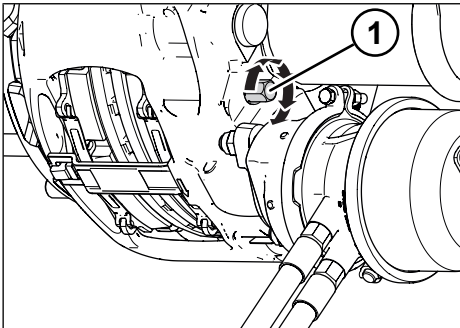


Fig. 5-42: Brake test

- 1 Torx adapter

- Remove the Torx adapter.
- Insert the cap.

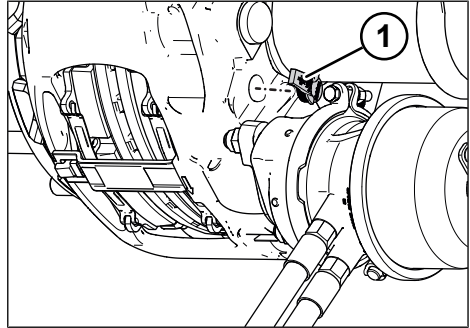


Fig. 5-43: Inserting the cap

- 1 Protective cap

✓ The brake pads are fitted.

5.2.6 Brake calliper

INFO

The description only applies to the HAL-DEX ModuT brake calliper. When using other brake callipers, observe the manufacturer's specifications.

Removing the brake calliper

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Remove the brake pads (see "5.2.5 Brake pads", pg. 42).
- Insert the spring.
- Insert the pad holder clip until you hear it click into place.

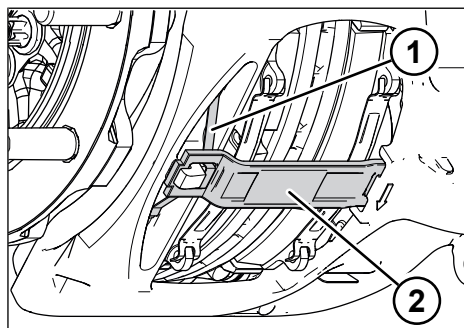


Fig. 5-44: Inserting/removing the pad holder clip

- 1 Spring
- 2 Pad holder clip

► Loosen the connecting bolts.

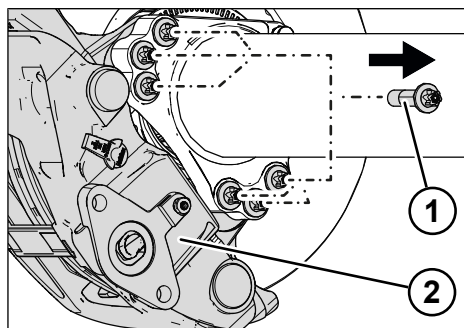


Fig. 5-45: Removing the connecting bolts

- 1 Connecting bolts
- 2 Brake calliper

► Remove the brake calliper.
 ✓ The brake calliper is removed.

Fitting the brake calliper

► Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
 ► Clean the contact surfaces.

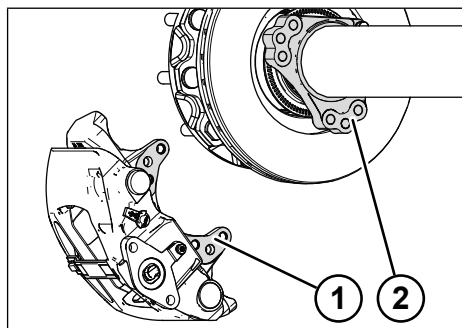


Fig. 5-46: Cleaning the contact surfaces

- 1 Brake calliper contact surface
- 2 Brake bracket contact surface

► Move the brake calliper to the correct position on the brake bracket. While doing this, ensure that the arrow points in the direction of travel.

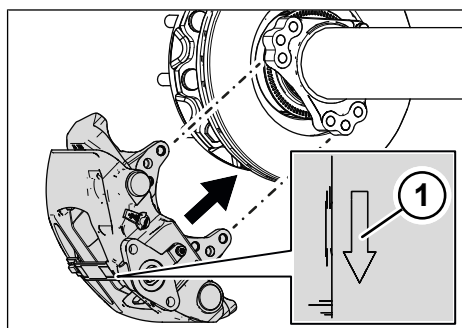


Fig. 5-47: Direction of travel

- 1 Direction of travel arrow

► Insert the fitting screw in position 1.

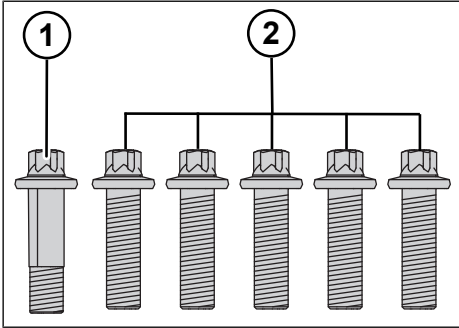


Fig. 5-48: Brake calliper screw types

- 1 Fitting screw
- 2 Connecting bolts

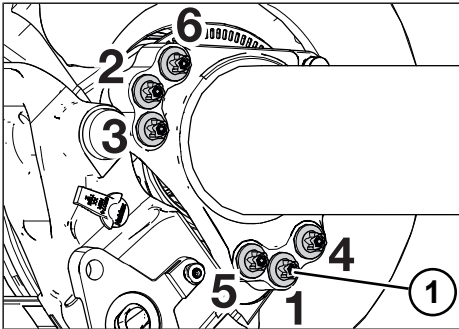


Fig. 5-49: Inserting the connecting bolts

- 1 Fitting screw installation position

- ▶ Align the brake calliper.
- ▶ Insert the connecting bolts and fasten lightly with a pre-tensioning torque of 25 Nm.
- ▶ Fasten the connecting bolts in the order shown and with a tightening torque of 190 Nm + 60°.
- ▶ Push in the spring.
- ▶ Remove the pad holder clip.

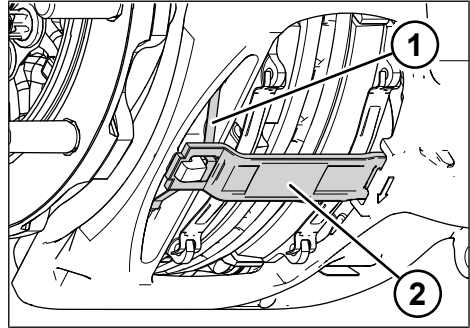


Fig. 5-50: Removing the pad holder clip

- 1 Spring
- 2 Pad holder clip

- ▶ Fit the brake pads (see "5.2.5 Brake pads", pg. 42).
- ✓ The brake calliper is fitted.

5.2.7 Wheel bearing unit

Noise check

INFO

The brake disc must rotate freely during the noise check.

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Check the wheel bearing unit for noise by turning it.
- ▶ Do not replace the wheel bearing unit if there is an audible "clicking" noise.
- ▶ Replace the wheel bearing unit if it is difficult to move and there is a "grinding" noise heard.
- ✓ The noise check is completed.

Checking the bearing play DOKTX1

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Check the bearing play of the wheel bearing unit with the tyre installed.
- ▶ Position the measuring gauge on the rear side of the brake disc at a distance of 100 mm from the axle tube.

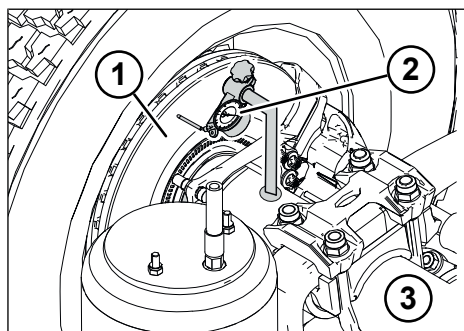


Fig. 5-51: Checking the bearing play

- 1 Brake disc
- 2 Measuring gauge
- 3 Axle tube

- ▶ Rotate the tyre five times.
- ▶ Reset the measuring gauge.
- ▶ Pull on the tyre lever while pressing the tyre to the rear.

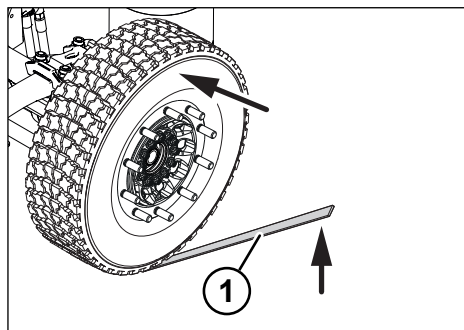


Fig. 5-52: Tyre lever

- 1 Tyre lever

- ▶ Record the measured value and remove the measuring gauge.
- ▶ Rotate the tyre by another 90° and repeat the measurement.
- ▶ Repeat the procedure three times until four measured values are obtained.

- ▶ Determine the average value for the measured data. If the average value is greater than 0.2 mm, replace the wheel bearing unit.
- ✓ The bearing play on the DOKTX1 is checked.

Checking the bearing play D(N)OKTX2

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Check the bearing play of the wheel bearing unit with the tyre installed.
- ▶ Remove the hub cap (see "5.2.2 Hub cap", pg. 34).
- ▶ Rotate the tyre five times.
- ▶ Fasten the magnetic base of the measuring gauge onto the spindle.

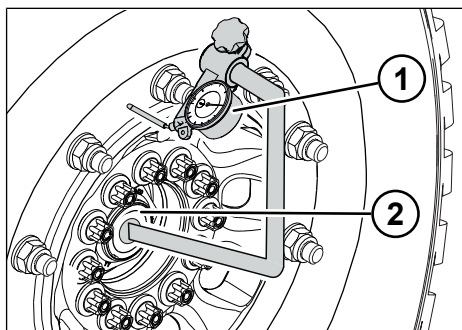


Fig. 5-53: Checking the wheel bearing play

- 1 Measuring gauge
- 2 Spindle

- ▶ Align the needle of the measuring gauge upwards at a 90° angle to the rim between the wheel bolts.
- ▶ Reset the measuring gauge.
- ▶ Pull on the tyre lever while pressing the tyre to the rear.

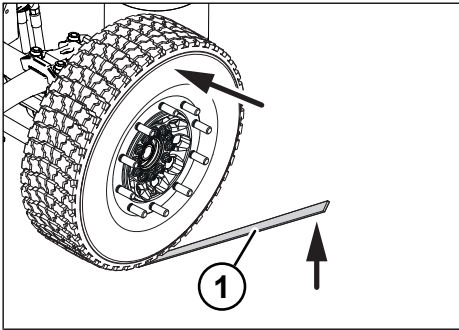


Fig. 5-54: Tyre lever

1 Tyre lever

- ▶ Record the measured value and remove the measuring gauge.
- ▶ Rotate the tyre by another 90° and repeat the measurement.

- ▶ Repeat the procedure three times until four measured values are obtained.
- ▶ Determine the average value for the measured data. If the average value is greater than 0.2 mm, replace the wheel bearing unit.
- ▶ Install the hub cap (see "5.2.2 Hub cap", pg. 34).
- ✓ The bearing play on the D(N)OKTX2 is checked.

Checking the grease leakage

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ DOKTX1: Remove the brake disc and wheel flange (see "5.2.4 Brake disc", pg. 37).
- ▶ D(N)OKTX2: Remove the hub cap (see "5.2.2 Hub cap", pg. 34).

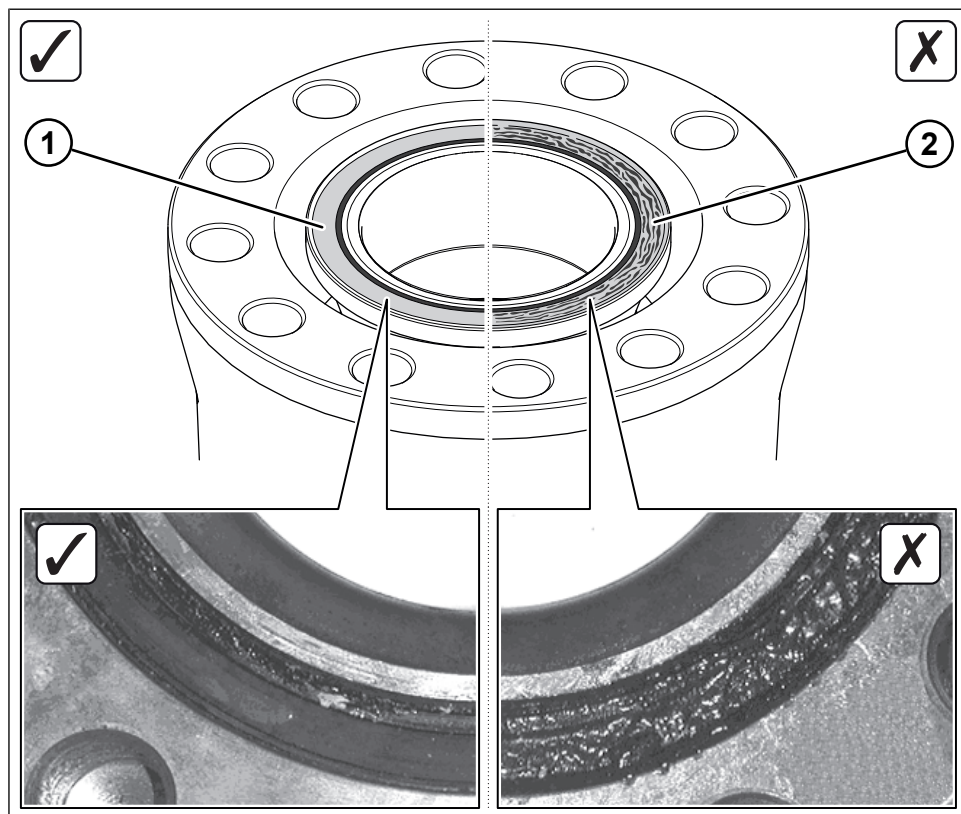


Fig. 5-55: Checking the wheel bearing unit for grease leaks

- 1 Normal grease leakage
- 2 Increased grease leakage/replace the wheel bearing unit

- ▶ Do not replace the wheel bearing unit when there is a little grease at the bottom of the seal.
- ▶ Replace the wheel bearing unit if there is grease on the inside of the wheel flange, the axle nut and the seal.
- ✓ The grease leakage is checked.
- ▶ Remove the assembly bolts.
- ▶ Remove the retainer bolt from the axle nut.
- ▶ Remove the axle nut.

INFO

Do not use an impact wrench to tighten or unscrew the axle nut.

Removing the wheel bearing unit DOKTX1

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Remove the brake disc (see "5.2.4 Brake disc", pg. 37).

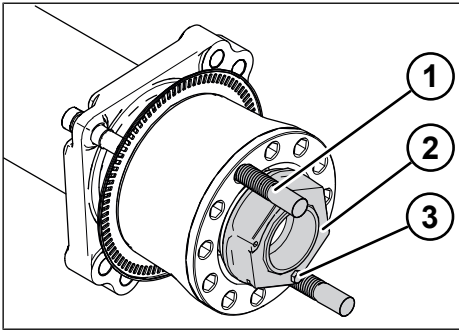


Fig. 5-56: Removing the wheel bearing unit

- 1 Assembly bolts
- 2 Axle nut
- 3 Retainer bolt

- Pull off the wheel bearing unit. If difficult to move, insert assembly bolts with the Torx adapter with M18 inside thread and use the puller tool to pull off.

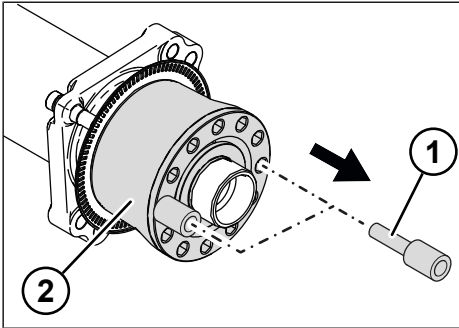


Fig. 5-57: Fitting the puller tool

- 1 Puller tool
- 2 Wheel bearing unit

- Remove the assembly bolts or Torx adapter.
- Clean the front side of the ABS sensor. Replace the ABS sensor with the ABS sensor bushing if it is hard to move or fitted tightly.
- ✓ The wheel bearing unit of the DNOKTX1 is removed.

Removing the wheel bearing unit D(N)OKTX2

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Remove the brake disc (see "5.2.4 Brake disc", pg. 37).
- Remove the assembly bolts.
- Pry the collar of the axle nut out of the groove of the spindle.

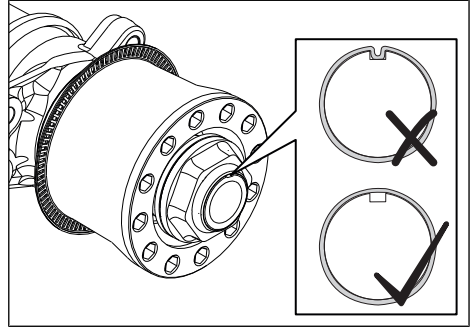


Fig. 5-58: Prying the axle nut collar open

- Unscrew and dispose of the axle nut.

INFO

Do not use an impact wrench to tighten or unscrew the axle nut.

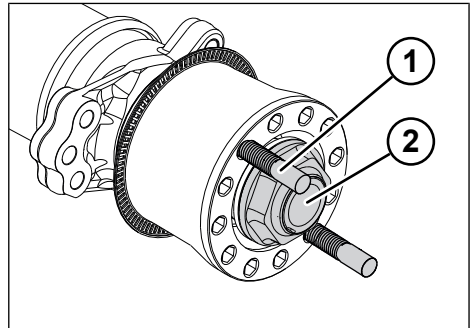


Fig. 5-59: Removing the wheel bearing unit

- 1 Assembly bolts
- 2 Axle nut

- Pull off the wheel bearing unit. If difficult to move, insert assembly bolts with the Torx adapter with M18 inside thread and use the puller tool to pull off.

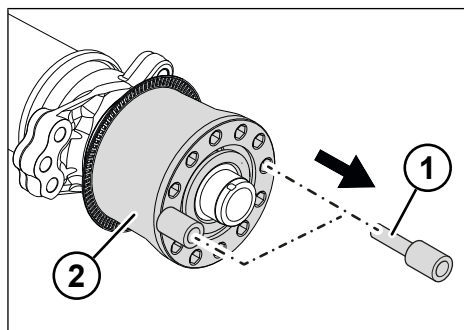


Fig. 5-60: Fitting the puller tool

- 1 Puller tool
- 2 Wheel bearing unit

- Remove the assembly bolts or Torx adapter.
- Clean the front side of the ABS sensor. Replace the ABS sensor with the ABS sensor bushing if it is hard to move or fitted tightly.
- ✓ The wheel bearing unit of D(N)OKTX2 is removed.

Installing the wheel bearing unit DOKTX1

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Check the parallelism of the ABS magnet wheel to the wheel bearing unit. Ensure that the maximum parallelism ($< 0.2 \text{ mm}$) is not exceeded.

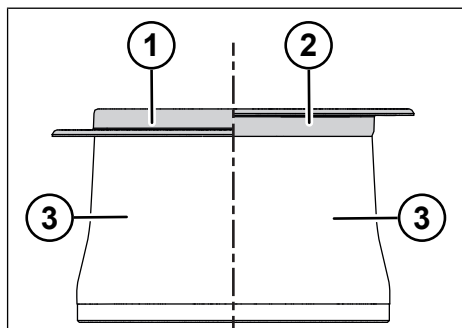


Fig. 5-61: ABS magnetic wheel parallelism

- 1 ABS magnet wheel version 1
- 2 ABS magnet wheel version 2
- 3 Wheel bearing unit

- Place the sealing ring in the wheel bearing unit.

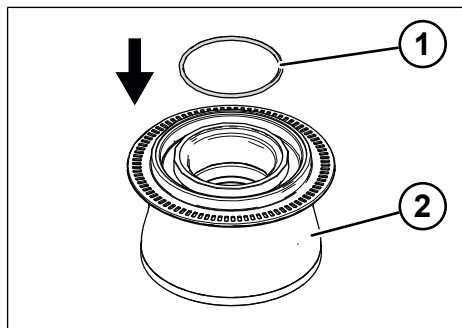


Fig. 5-62: Mounting the sealing ring and the ABS magnet wheel

- 1 Sealing ring
- 2 Wheel bearing unit

- Clean the surface of the spindle.
- Coat the bearing points with Molykote TP42 anti-fretting paste.

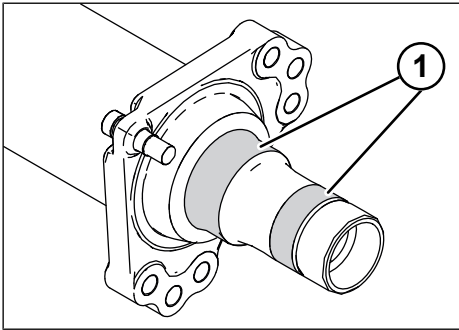


Fig. 5-63: Spindle

1 Spindle bearing points

INFO

The bearing shoulder contact surface and the surfaces between the upper surface must be free from anti-fretting paste.

- Push the wheel bearing unit onto the spindle to the stop. Ensure that the sealing ring is not damaged while you do this.

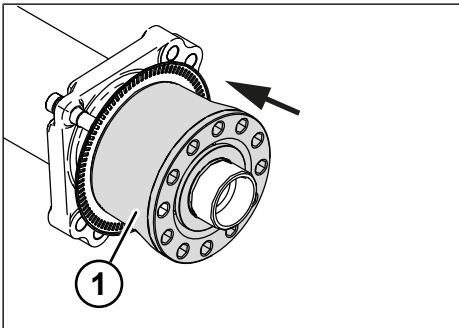


Fig. 5-64: Slide on the wheel bearing unit

1 Wheel bearing unit

- Apply Molykote TP42 anti-fretting paste to the contact surfaces of the axle nut.

INFO

Do not use an impact wrench to tighten or unscrew the axle nut.

- Fasten the axle nut to the corresponding tightening torque of 700 Nm \pm 25 Nm (for axle nut label 709400535, or ...536) or 480 Nm \pm 20 Nm (for axle nut label 703016070).
- Fasten the retainer bolt with a tightening torque of 15 Nm.
 - ⇒ The spindle is secured.
- Use a feeler gauge to set the distance between the ABS sensor and ABS magnet wheel to 0.15 mm.

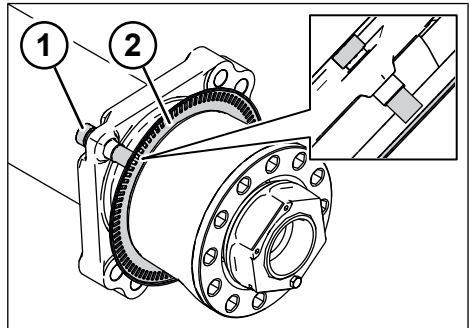


Fig. 5-65: Checking the ABS sensor

1 ABS sensor
2 ABS magnet wheel

- Fasten the assembly bolts.
- Fitting the brake disc and wheel flange (see "5.2.4 Brake disc", pg. 37).
- ✓ The wheel bearing unit of DNOKTX1 is installed.

Installing the wheel bearing unit D(N)OKTX2

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Check the parallelism of the ABS magnet wheel to the wheel bearing unit. Ensure that the maximum parallelism (< 0.2 mm) is not exceeded.

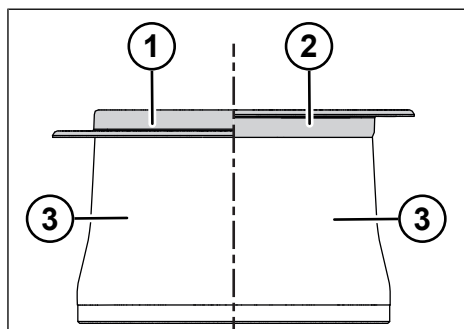


Fig. 5-66: ABS magnetic wheel parallelism

- 1 ABS magnet wheel version 1
- 2 ABS magnet wheel version 2
- 3 Wheel bearing unit

- Place the sealing ring in the wheel bearing unit.

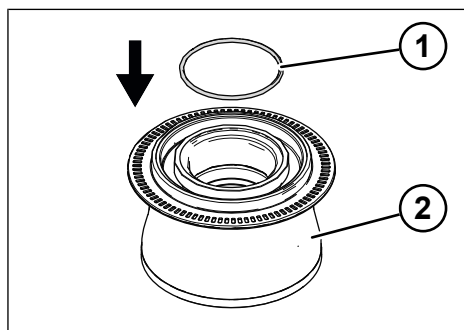


Fig. 5-67: Mounting the sealing ring and the ABS magnet wheel

- 1 Sealing ring
- 2 Wheel bearing unit

- Clean the surface of the spindle.
- Coat the bearing points with Molykote TP42 anti-fretting paste.

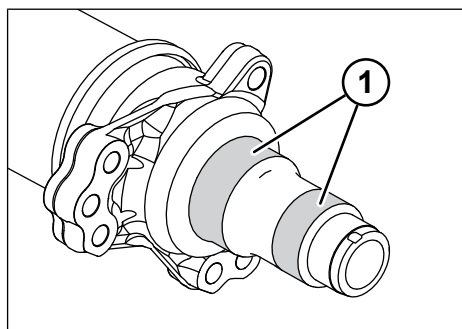


Fig. 5-68: Spindle

- 1 Spindle bearing points

INFO

The bearing shoulder contact surface and the surfaces between the upper surface must be free from anti-fretting paste.

- Push the wheel bearing unit onto the spindle to the stop. Ensure that the sealing ring is not damaged while you do this.

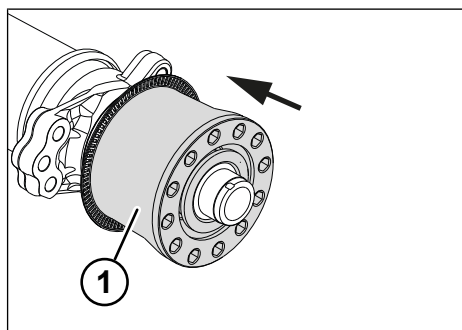


Fig. 5-69: Slide on the wheel bearing unit

- 1 Wheel bearing unit

- Apply Molykote TP42 anti-fretting paste to the contact surfaces of the axle nut. **WARNING! The thread of the axle nut must be free of grease!**

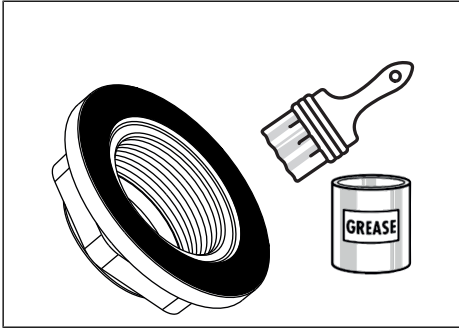


Fig. 5-70: Greasing the contact surface

- Screw the axle nut onto the grease-free thread by hand as far as it will go.

INFO

Do not use an impact wrench to tighten or unscrew the axle nut.

- Fasten the axle nut with the appropriate tightening torque of $100 \text{ Nm} + 30^\circ$ by turning the wheel bearing unit.
- Press the collar of the axle nut into the groove for a positive locking connection.
- The spindle is secured.

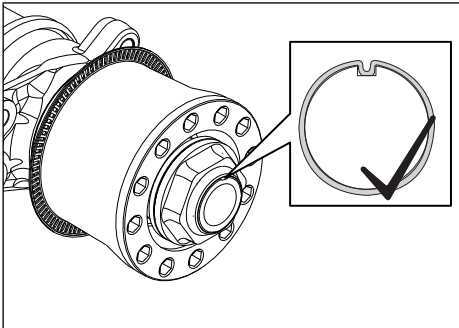


Fig. 5-71: Groove in the spindle

- Use a feeler gauge to set the distance between the ABS sensor and ABS magnet wheel to 0.15 mm.

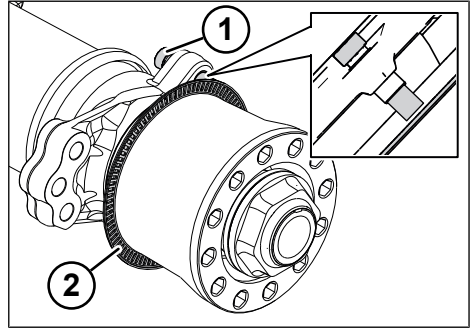


Fig. 5-72: Checking the ABS sensor

- 1 ABS sensor
- 2 ABS magnet wheel

- Fasten the assembly bolts.
- Fitting the brake disc and wheel flange (see "5.2.4 Brake disc", pg. 37).
- ✓ The wheel bearing unit of D(N)OKTX2 is installed.

5.2.8 ABS

Removing the ABS sensor

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Remove the ABS sensor from the ABS sensor bushing.
- Remove the ABS sensor bushing.

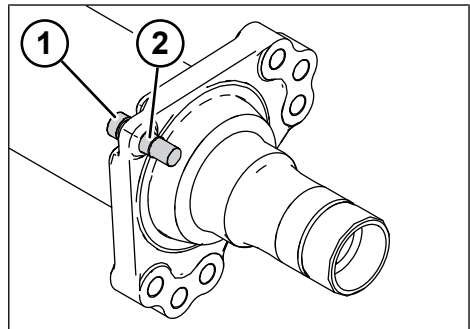


Fig. 5-73: Removing the ABS sensor

- 1 ABS sensor
- 2 ABS sensor bushing

Fitting the ABS sensor

⚠ WARNING

Risk of accident and damage to property by functional impairment of the brake!

Lubricants can land on brake parts and surfaces and affect the functionality of the ABS.

- ▶ Keep the front side of the ABS sensor free of grease.

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Lightly grease the ABS sensor bushing.
- ▶ Insert the ABS sensor bushing.
- ▶ Lightly grease ABS sensor and insert until the front side is visible. **WARNING! The front side of the ABS sensor must be free from lubricants.**
- ▶ Fit the wheel bearing unit.
- ▶ Use a feeler gauge to set the distance between the ABS sensor and ABS magnet wheel to 0.15 mm.

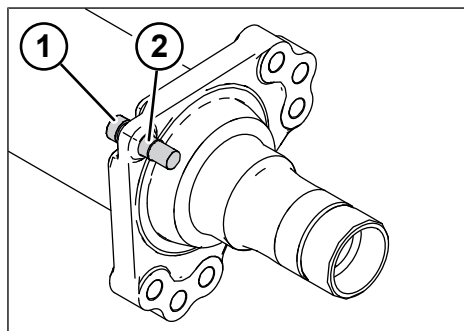


Fig. 5-74: Fitting the ABS sensor

- 1 ABS sensor
- 2 ABS sensor bushing

- ✓ The ABS sensor is fitted.

Removing the ABS magnet wheel

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).

- ▶ Remove the brake disc (see "5.2.4 Brake disc", pg. 37).
- ▶ Remove the wheel bearing unit (see "5.2.7 Wheel bearing unit", pg. 46).
- ▶ Pull out the ABS magnet wheel.
- ▶ Clean the contact surfaces.
- ✓ The ABS magnet wheel is removed.

Fitting the ABS magnet wheel

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Press the ABS magnet wheel fully onto the wheel bearing unit.
- ▶ Check that the ABS magnet wheel is correctly and securely seated.
 - ⇒ The ABS magnet wheel is resting flush on the rear side of the wheel bearing unit.

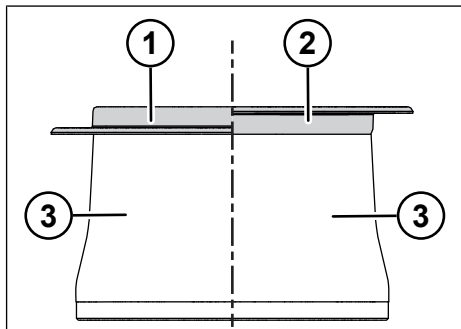


Fig. 5-75: ABS magnetic wheel parallelism

- 1 ABS magnet wheel version 1
- 2 ABS magnet wheel version 2
- 3 Wheel bearing unit

- ▶ Fit the wheel bearing unit (see "5.2.7 Wheel bearing unit", pg. 46).
- ▶ Fit the brake disc (see "5.2.4 Brake disc", pg. 37).
- ✓ The ABS magnet wheel is fitted.

5.3 Self-steering axle

⚠ WARNING

Risk of accident due to incorrectly set air pressure!

Incorrectly set air pressure in the stabilisation unit has a negative effect on the driving characteristics and can cause accidents.

- ▶ Adjust the air pressure to the loading conditions.
- ▶ Ensure a pressure of approx. 1 bar when in an empty state.

⚠ CAUTION

Risk of injury due to crushing!

Working on the self-steering axle can cause crushing injuries.

- ▶ Before working on the self-steering axle, disconnect the compressed air connection.
- ▶ Perform functional tests with sufficient distance from the hazard area.

INFO

Emergency safety device in case of pressure loss of the locking unit!

In case of pressure loss or a defective supply line, the locking unit goes into the locking function. As a result, the self-steering axle is permanently locked in the straight ahead position.

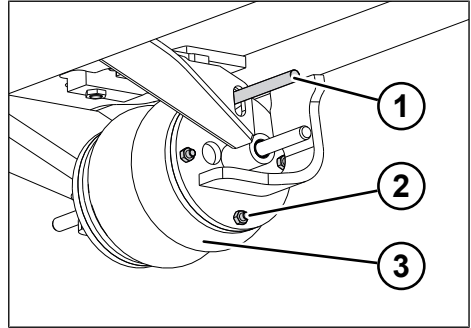


Fig. 5-76: Removing the bellows

- 1 Locking bolt
- 2 Retainer nuts
- 3 Bellows

- ▶ Loosen the nut on the locking bolt.
- ▶ Unscrew the locking bolt.
- ▶ Press the bellows together and remove.
- ▶ Clean the contact surfaces of the bellows.
- ✓ The bellows is removed.

Installing the bellows

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Clean the contact surfaces of the bellows.
- ▶ Secure the bellows on both sides with new retainer nuts.

5.3.1 Stabilisation unit

Removing the bellows

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ **WARNING! Make sure that there is no compressed air in the system.**
- ▶ Loosen and dispose of the retainer nuts on both sides.

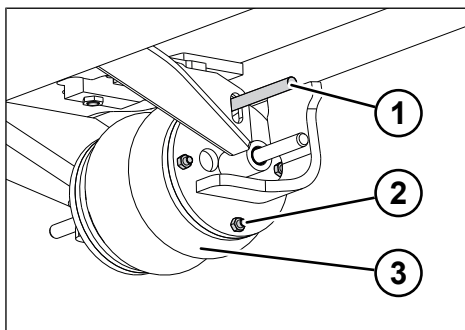


Fig. 5-77: Removing the bellows

- 1 Locking bolt
- 2 Retainer nuts
- 3 Bellows

- ▶ Coat the thread of the locking bolt with Loctite 2701 and tighten firmly.
- ▶ Fasten the retainer nuts with a tightening torque of $43 \text{ Nm} \pm 3 \text{ Nm}$.
- ✓ The bellows is installed.

Removing the bearing bushes

In case of damage or noticeable play in the guide flange, the bearing bushes need to be replaced.

- ✓ The bellows is removed.
- ▶ Remove the right guide flange.

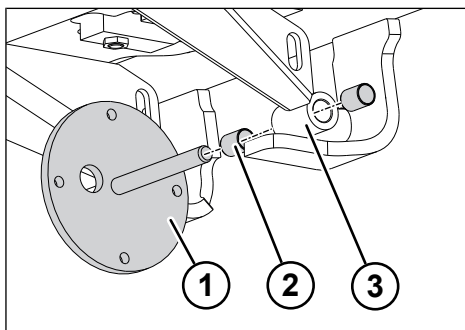


Fig. 5-78: Replacing the bearing bushes

- 1 Guide flange
- 2 Bearing bush
- 3 Bearing

- ▶ Drive the bearing bushes out of the bearing on the right and left (inner diameter 20 mm, outer diameter 22.5 mm).
- ▶ Clean the bearing seat.
- ▶ Repeat the process for the left guide flange.
- ✓ The bearing bushes are removed.

Installing the bearing bushes

- ✓ The bellows is removed.
- ▶ Clean the bearing seat.
- ▶ Drive the new bearing bushes into the bearing on the right and left (inner diameter 20 mm, outer diameter 22.5 mm).

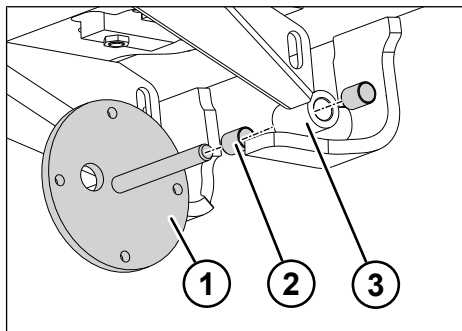


Fig. 5-79: Replacing the bearing bushes

- 1 Guide flange
- 2 Bearing bush
- 3 Bearing

- ▶ Insert the right guide flange.
- ▶ Repeat the process for the left guide flange.
- ✓ The bearing bushes are installed.

5.3.2 Locking unit

Removing the locking cylinder

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ **WARNING! Make sure that there is no compressed air in the system!**

- ▶ Loosen the double nut in the locking block.

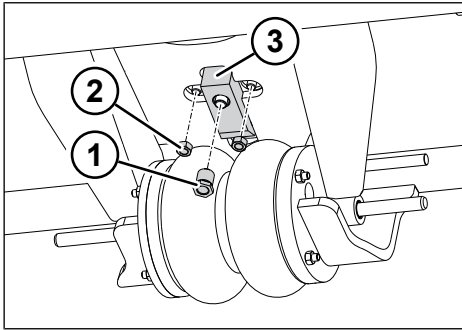


Fig. 5-80: Removing the locking cylinder

- 1 Double nut
- 2 Retainer nut
- 3 Locking block

- ▶ Loosen and dispose of the retainer nut of the locking cylinder.
- ▶ Remove the locking block.
- ▶ Remove the locking cylinder.

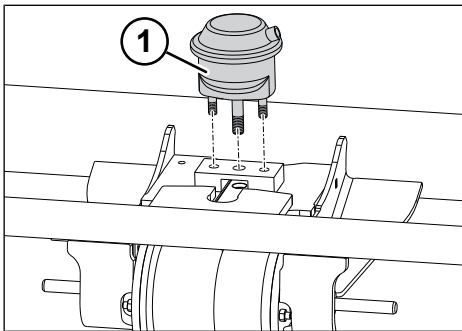


Fig. 5-81: Removing the locking cylinder

- 1 Locking cylinder

- ✓ The locking cylinder is removed.

Installing the locking cylinder

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Insert the locking cylinder.

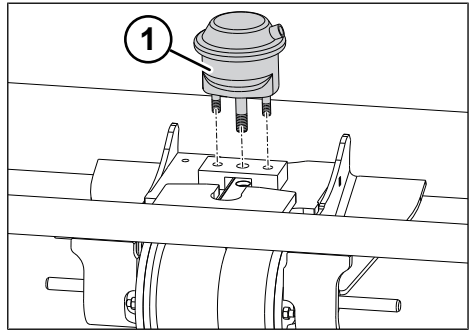


Fig. 5-82: Inserting the locking cylinder

- 1 Locking cylinder

- ▶ Insert the locking block.
- ▶ Fasten the locking cylinder alternately with the new retainer nuts with and a tightening torque of 70 Nm +/- 15 Nm.

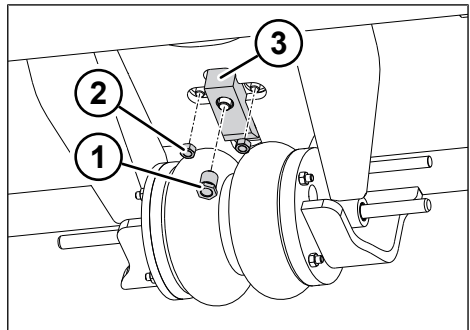


Fig. 5-83: Installing the locking cylinder

- 1 Double nut
- 2 Retainer nut
- 3 Locking block

- ▶ Apply 2-3 bar of assembly pressure on the locking cylinder, so that the piston rod is extended. **CAUTION! Risk of crushing by the extending piston rod!**
- ▶ Coat the double nut on the inside and outside with Loctite 2701.
- ▶ Place the double nut on the piston rod of the locking cylinder through the locking block (align the chamfer towards the locking plate).

- ▶ Fasten the double nut with a tightening torque of 200 Nm +/- 20 Nm.
- ▶ Apply compressed air to the system. Actuation pressure in the locking cylinder 6-8 bar.
- ▶ Check for proper function and tightness.
- ✓ The locking cylinder is installed.

5.3.3 Tie rod unit

Removing the tie rod

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
 - ▶ Remove the locking unit (see "5.3.2 Locking unit", pg. 57).
 - ▶ Loosen the locking nut of the eccentric bolt until no more thread is visible.
- NOTE! If the eccentric bolt is stuck, loosen it with a plastic hammer.**

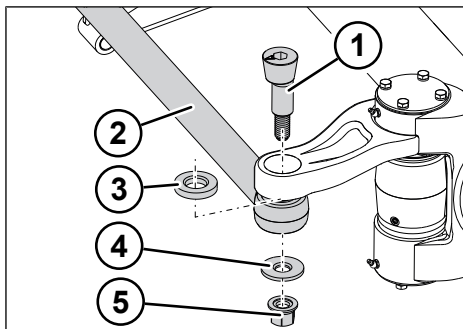


Fig. 5-84: Removing the tie rod

- 1 Eccentric bolt
- 2 Tie rod
- 3 Cone washer
- 4 Washer
- 5 Retainer nut

- ▶ Loosen the retainer nut and remove with the washer.
- ▶ Remove the eccentric bolt and cone washer.
- ▶ Repeat the steps on the other side.
- ▶ Remove the tie rod.

- ▶ The tie rod is removed.

Installing the tie rod

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Insert the tie rod.
- ▶ Insert the cone washer with the chamfer pointing up.
- ▶ Insert the eccentric bolt.

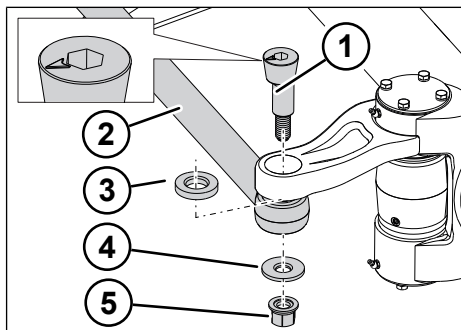


Fig. 5-85: Installing the tie rod

- 1 Eccentric bolt
- 2 Tie rod
- 3 Cone washer
- 4 Washer
- 5 Retainer nut

- ▶ Put on the retainer nut and washer and tighten with a pre-tightening torque of 10-15 Nm. Make sure that the arrow of the eccentric bolt points forward in the direction of travel.
- ▶ Install the locking unit (see "5.3.2 Locking unit", pg. 57).
- ▶ Apply 3 bar of assembly pressure on the stabilisation unit (see "5.3.1 Stabilisation unit", pg. 56).
- ▶ Set the toe-in by turning the eccentric bolt to 5 mm/m +/- 1 mm/m (0° 17' +/- 4').
- ▶ Tighten the retainer nut with 550 Nm +/- 25 Nm. Make sure that the eccentric bolt is not twisted.
- ▶ Repeat the steps on the other side.
- ✓ The tie rod is installed.

Removing the silent block

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Remove the tie rod.
- ▶ Press out the silent block with a standard tool.

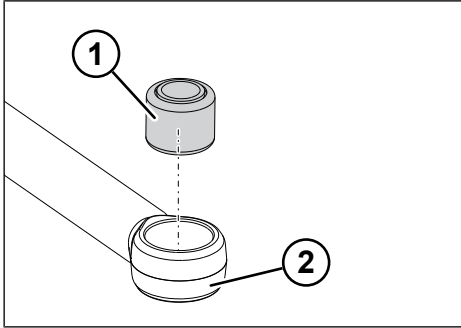


Fig. 5-86: Removing the silent block

- 1 Silent block
- 2 Tie rod

- ▶ Clean the bearing seat.
- ✓ The silent block is removed.

Installing the silent block

- ▶ Clean the bearing seat.
- ▶ Press in the silent block with a standard tool so that it protrudes equally on both sides. **NOTE! Lubricate the silent block only with a soap solution. Oils and greases are not permitted!**

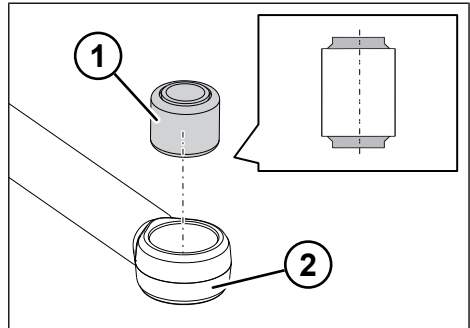


Fig. 5-87: Installing the silent block

- 1 Silent block
- 2 Tie rod

- ✓ The silent block is installed.

5.3.4 Steering pin unit

Removing the steering knuckle

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Remove the axle from the vehicle.
- ▶ Remove the stabilisation unit (see "5.3.1 Stabilisation unit", pg. 56).
- ▶ Remove the tie rod (see "5.3.3 Tie rod unit", pg. 59).
- ▶ Remove the brake calliper (see "5.2.6 Brake calliper", pg. 44).
- ▶ Remove the wheel bearing unit (see "5.2.7 Wheel bearing unit", pg. 46).
- ▶ Remove the screws and washers from the upper and lower cover.

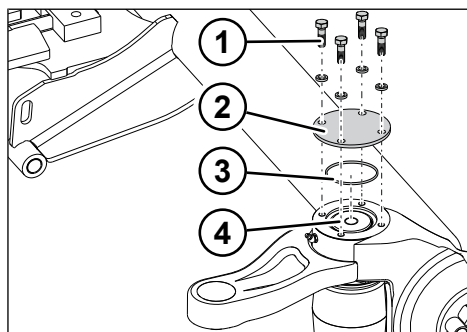


Fig. 5-88: Removing the upper cover

- 1 Screws
- 2 Top cover
- 3 O-ring
- 4 Steering pin

- Remove both covers from the steering pin.
- Remove and dispose of the O-rings.
- Remove and dispose of the V-seal of the axle stub.
- Lay the axle on the press and support it. Ensure at least 2 t of compressive force and 300 mm of free space.

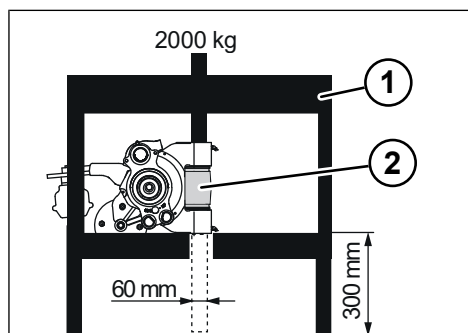


Fig. 5-89: Inserting the axle stub into the press

- 1 Press
- 2 Axle stub

- Heat the axle stub to 300 °C for about 5 minutes.

- Press out the steering pin with a dummy pin \varnothing 57.7 mm +/- 1 mm x 300 mm.
- Take the axle out of the press.
- Remove the axle stub from the steering knuckle.
- Remove and dispose of both screw plugs from the axle stub.

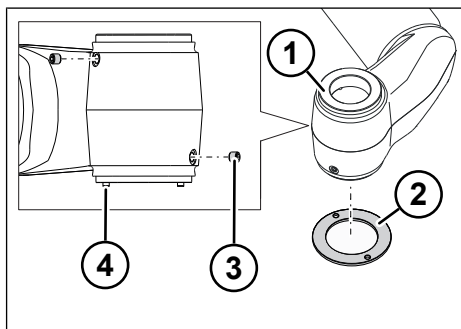


Fig. 5-90: Removing the screw plugs

- 1 Axle stubs
- 2 Washer with two holes
- 3 Screw plug
- 4 Hollow dowel pin

- Remove and dispose of the washer with two holes.
- Clean the axle stub and removing any adhesive residues.
- Check the hole in the screw plugs (\varnothing 3.5 mm) for clearance.
- Clean the bushes of the steering knuckle, check and replace if necessary. **NOTE! Replace the bushes immediately if the lubrication groove is no longer visible due to wear** (see "" pg. 64).
- ✓ The steering knuckle is removed.

Installing the steering knuckle

- Slide a new V-seal onto the larger diameter of the axle stub.

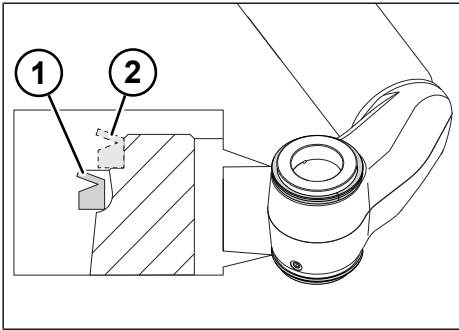


Fig. 5-91: Seal for the axle stub

- 1 Larger diameter
- 2 Smaller diameter

- Grease the thrust washer.
- Place the thrust washer with the flat side on the lower steering knuckle. The lug of the washer is in the groove.

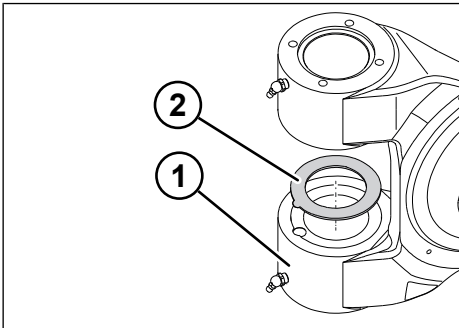


Fig. 5-92: Inserting the thrust washer

- 1 Steering knuckle
- 2 Thrust washer

- Place the washer with the two holes on the hollow dowel pin of the axle stub.
- NOTE! Replace the hollow dowel pin if it does not fix the washer.**

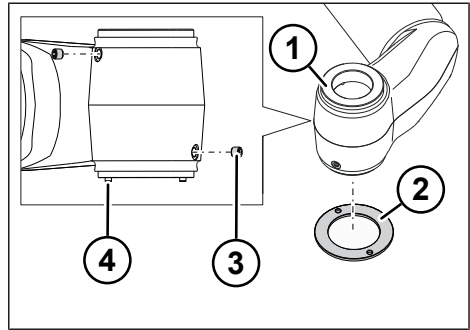


Fig. 5-93: Removing the screw plugs

- 1 Axle stub
- 2 Washer with two holes
- 3 Screw plug
- 4 Hollow dowel pin

- Insert the axle stub into the steering knuckle.
- Insert the dummy pin **without grease**.
- Lay the axle on the press and support it.
- Press in the steering pin without grease 2 mm \pm 0.5 mm up to the lower edge.

INFO

If a press is not available, the steering pin can be driven in with a hammer. To do so, screw a screw (M20) into the top of the steering pin up to the stop.

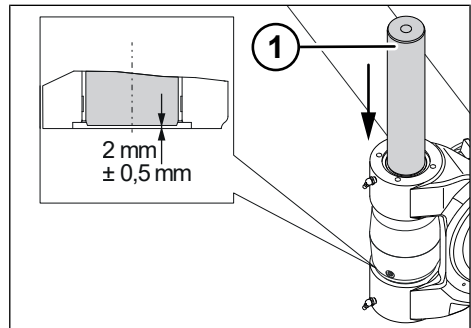


Fig. 5-94: Pressing in the steering pin

- 1 Steering pin

- Grease new O-rings and insert them at the top and bottom.

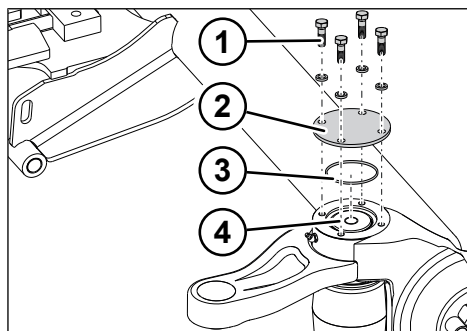


Fig. 5-95: Removing the upper cover

- 1 Screws
- 2 Top cover
- 3 O-ring
- 4 Steering pin

- Install the covers of the steering pin with 45 Nm \pm 3 Nm.
- Slide the installed V-seals down onto the smaller diameter of the axle stub.

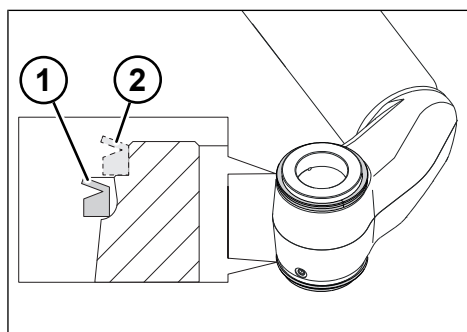


Fig. 5-96: Seal for the axle stub

- 1 Larger diameter
- 2 Smaller diameter

- Install the tie rod (see "5.3.3 Tie rod unit", pg. 59).
- Install the stabilisation unit (see "5.3.1 Stabilisation unit", pg. 56).
- Install the wheel bearing unit (see "5.2.7 Wheel bearing unit", pg. 46).

- Install the brake calliper (see "5.2.6 Brake calliper", pg. 44).

INFO

The components must have a temperature of at least 15 °C for bonding. Heat up the components if necessary (maximum 40 °C).

- Insert the adhesive gun into the hole of the lower screw plug.

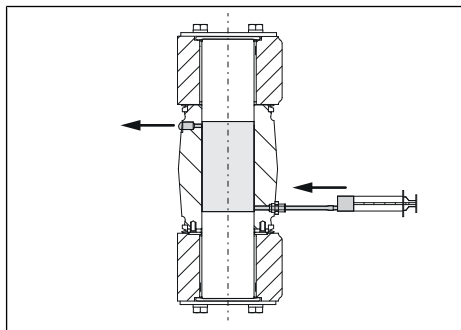


Fig. 5-97: Filling the adhesive, sectional view

- Inject the full contents of the adhesive gun, until it emerges from the upper opening.
- Screw in the upper screw plug until it is flush.
- Take off the adhesive gun.
- Screw in the lower screw plug until it is flush.
- **NOTE! Do not move the axle for at least 30 minutes! Allow the adhesive to harden for at least 24 hours before the axle is installed.**
- Lubricate the steering pin while moving it.

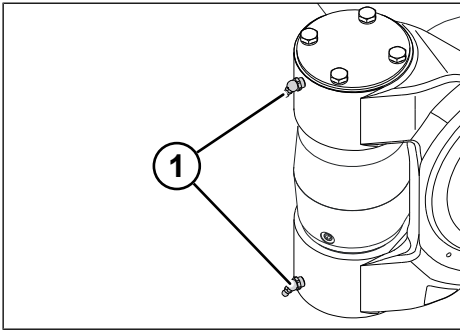


Fig. 5-98: Lubricating the steering pin

- 1 Grease nipple

✓ The steering knuckle is installed.

Remove the bushes

- ☑ The steering knuckles are removed on both sides.
- ▶ Press the bushes out with a mandrel.

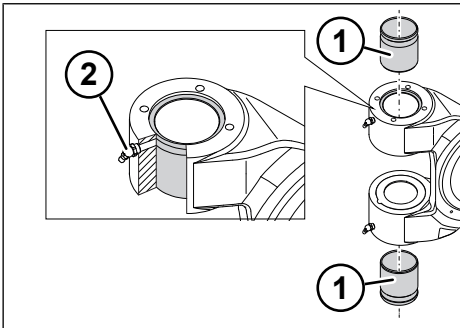


Fig. 5-99: Replacing the bushes

- 1 Bushes
2 Grease nipple

- ▶ Clean the bearing seats.
- ▶ Repeat the process on the other side.
- ✓ The bushes are removed.

Installing the bushes

- ▶ Clean the bearing seats.
- ▶ Drive in the new bushes flush up to the first indent. Make sure that the groove is positioned at the grease nipple.

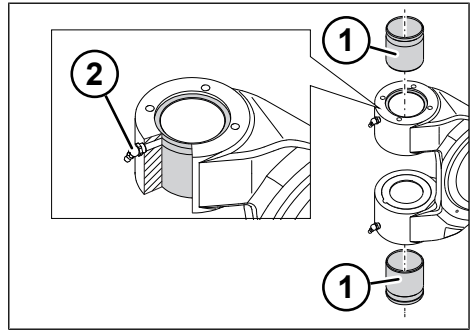


Fig. 5-100: Replacing the bushes

- 1 Bushes
2 Grease nipple

- ▶ Check the 60H9 fit of the bush (inner diameter 60H9).
- ▶ Install the steering knuckles.
- ✓ The bushes are installed.

5.4 Air suspension

INFO

The work steps for the “bottom air spring link” type are identical to those of the “top air spring link” type.

5.4.1 Shock absorber

Removing the shock absorber

- ▶ Carry out preparatory work (see “5.1 Preparatory work”, pg. 33).
- ▶ Remove the retainer nuts.

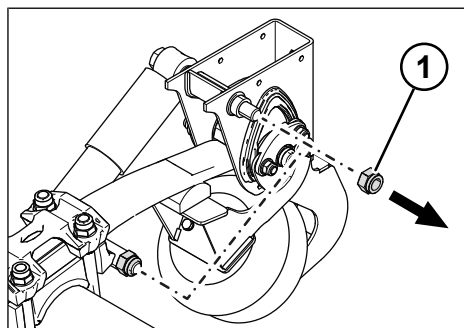


Fig. 5-101: Removing the retainer nut

- 1 Retainer nuts

- Remove the bolts.
- Remove the shock absorber.

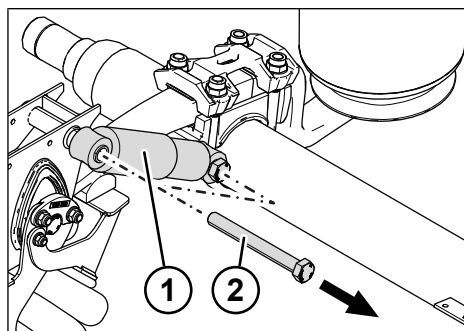


Fig. 5-102: Removing the bolts

- 1 Shock absorber
2 Bolt

- ✓ The shock absorber is removed.

Fitting the shock absorber

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Insert the shock absorber aligned properly.
- Insert the bolts.

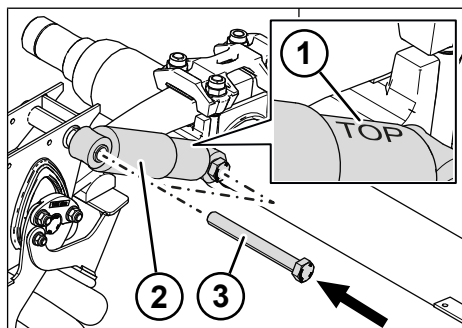


Fig. 5-103: Inserting the shock absorber

- 1 "TOP" marking, if applicable
2 Shock absorber
3 Bolt

- Tighten the retainer nut of the shock absorber fastening with a tightening torque of 530 Nm +/- 30 Nm.

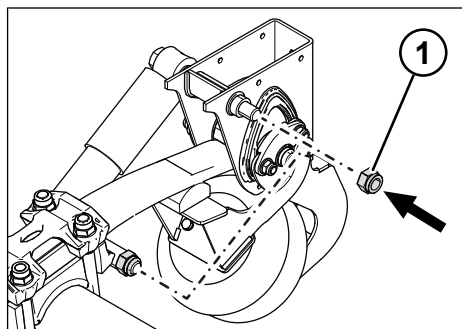


Fig. 5-104: Fastening the retainer nut

- 1 Retainer nuts

- ✓ The shock absorber is fitted.

5.4.2 Twinlift

Removing the Twinlift

Generation 1

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Remove the compressed air line.

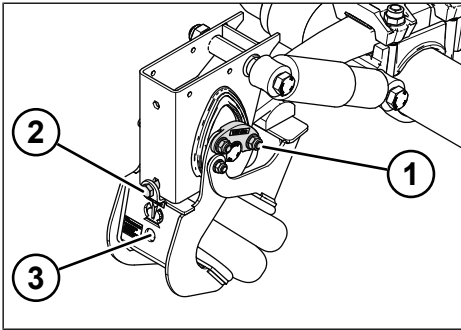


Fig. 5-105: Removing the twinlift

- 1 Anchor plate fitting
- 2 Screw
- 3 Compressed air line

- ▶ Secure the Twinlift to prevent it falling down.
- ▶ Loosen and remove the screws.
- ▶ Loosen and remove the anchor plate fitting.
- ▶ Remove the anchor plate.
- ▶ Remove the Twinlift.
- ✓ The Twinlift is removed.

Generation 2

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Remove the compressed air line.

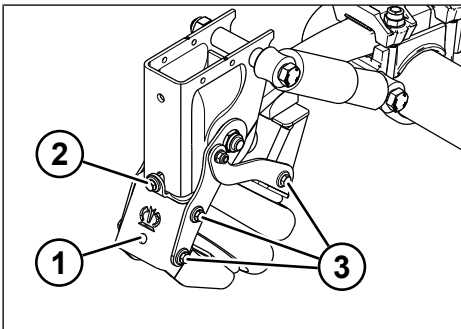


Fig. 5-106: Removing the Twinlift

- 1 Compressed air line
- 2 Screw
- 3 Screws for side parts

- ▶ Secure the Twinlift to prevent it falling down.
- ▶ Loosen and remove the screws.
- ▶ Loosen the screws for the side parts.
- ▶ Spread the side parts apart until the Twinlift can be removed.
- ▶ Remove the Twinlift.
- ✓ The Twinlift is removed.

Installing the Twinlift

Generation1

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Position the Twinlift.

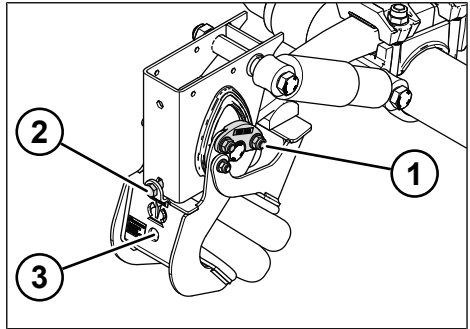


Fig. 5-107: Fastening the Twinlift

- 1 Anchor plate fitting
- 2 Screw
- 3 Compressed air line

- ▶ Replace the anchor plate and secure with new retainer nuts.
- ▶ Fasten the anchor plate with a tightening torque of 120 Nm +/- 10 Nm.
- ▶ Position the screw in the slotted hole of the air spring bracket and fasten with a tightening torque of 80 Nm +/- 5 Nm.
- ▶ Fasten the compressed air line.
- ✓ The Twinlift is installed.

Generation 2

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).

- Loosen the screws for the side parts.
- Spread the side parts apart.

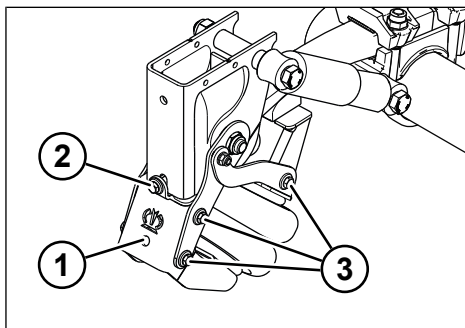


Fig. 5-108: Fastening the Twinlift

- 1 Compressed air line
- 2 Screw
- 3 Screws for side parts

- Place the Twinlift on the steering pin fitting.
- Fasten the screws for the side parts with a tightening torque of 120 Nm +/- 10 Nm.
- Position the screw in the slotted hole of the air spring bracket and fasten with a tightening torque of 80 Nm +/- 5 Nm.
- Fasten the compressed air line.
- ✓ The Twinlift is installed.

5.4.3 Twinlift two-fold bellow

Removing the two-fold bellow

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Loosen and remove the twinlift's compressed air line.

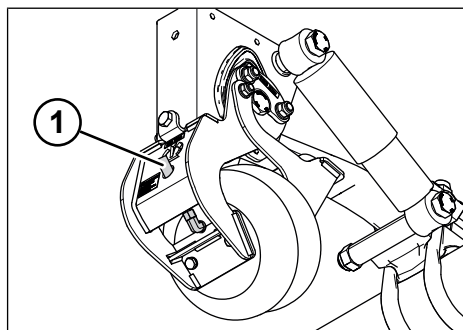


Fig. 5-109: Removing the compressed air line

- 1 Compressed air line

- Move the twinlift downwards.
- Loosen and remove the fitting and flat washers of the two-fold bellow.
- Remove the two-fold bellow.

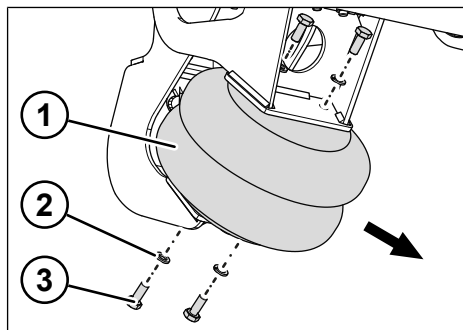


Fig. 5-110: Removing the two-fold bellow

- 1 Two-fold bellow
- 2 Flat washers
- 3 Two-fold bellow fitting

- ✓ The two-fold bellow is removed.

Fitting the two-fold bellow

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Position the two-fold bellow.
- Moisten the screws with Loctite 243.
- Fasten the screws and flat washers onto the two-fold bellow with a tightening torque of 40 Nm +/- 5 Nm.

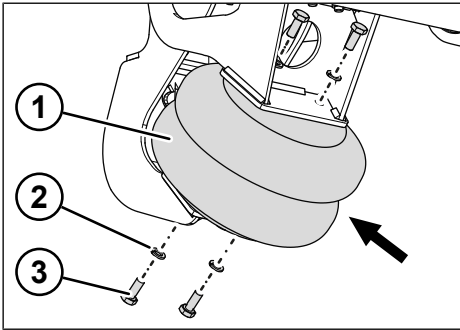


Fig. 5-111: Fitting the two-fold bellow

- 1 Two-fold bellow
- 2 Flat washers
- 3 Two-fold bellow fitting

- Fasten the compressed air line for the twinlift.

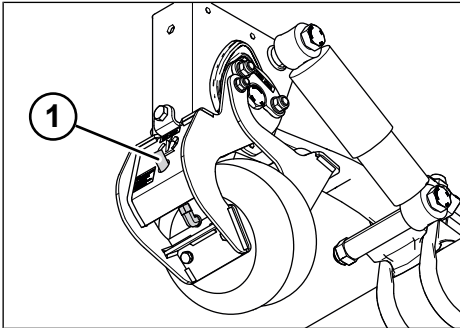


Fig. 5-112: Fastening the compressed air line

- 1 Compressed air line

- ✓ The two-fold bellow is fitted.

Removing the wear block

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Loosen and remove the wear block's fitting.
- Remove the wear block.

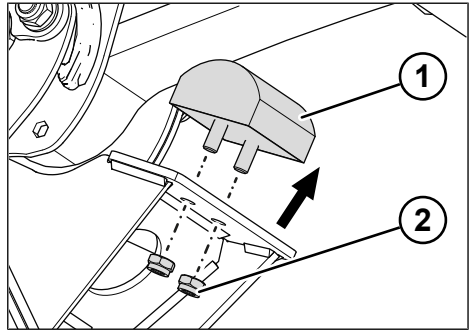


Fig. 5-113: Removing the wear block

- 1 Wear block
- 2 Fitting

- ✓ The wear block is removed.

Fitting the wear block

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Clean the surfaces of the twinlift.
- Position the wear block.
- Fasten the wear block with new retainers with a tightening torque of 40 Nm +/- 5 Nm.

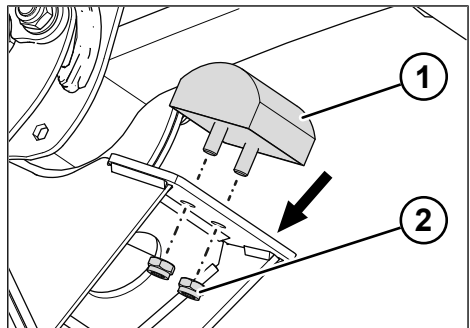


Fig. 5-114: Fitting the wear block

- 1 Wear block
- 2 Fitting

- ✓ The wear block is fitted.

5.4.4 Air spring bellow

Removing the air spring bellow

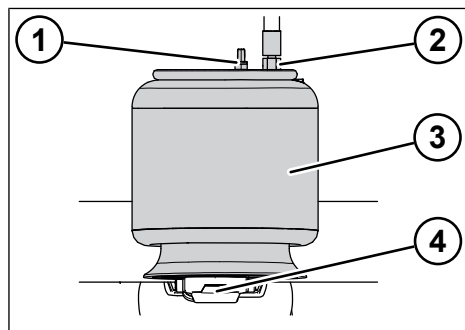


Fig. 5-115: Air spring bellow

- 1 Crimped plate retainer nut
- 2 Compressed air line
- 3 Air spring bellow
- 4 Fitting on the air spring bellow to the link

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Loosen and remove the compressed air line.
- Loosen and remove the retainer nuts on the crimped plate.
- Loosen and remove the lower fitting on a one-part air spring bellow.

INFO

With a two-part air spring bellow (rail loading), only remove the cone on the link / adapter plate if it is damaged or the link has been replaced.

- Remove the air spring bellow.
- ✓ The air spring bellow is removed.

Fitting the air spring bellow

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Position the air spring bellow.
- With a two-part air spring bellow (rail loading), position the cone on the link.

- Fasten the lower fitting on the air spring bellow / cone on the link with a micro-encapsulated M12 screw to a tightening torque of 82 Nm \pm 3 Nm. **NOTE! Place the adapter plate at the same position as before removal. M16 screw: 280 Nm \pm 10 Nm, M12 nut: 110 Nm \pm 10 Nm**
- Fasten the retainer nut of the crimped plate with a tightening torque of 55 Nm \pm 5 Nm.
- Fasten the compressed air line.
- ✓ The air spring bellow is fitted.

5.4.5 Integration (top air spring link)

Removing the integration

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Secure the axle body to prevent it falling down.
- Loosen and remove the retainer nuts and flat washers.
- Remove the clamp clip.
- Remove the spring clip.

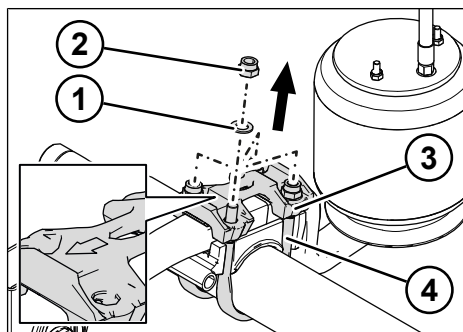


Fig. 5-116: Loosening the retainer nuts

- 1 Retainer nuts
- 2 Flat washers
- 3 Spring clip
- 4 Clamp plate

- Lower the axle body downwards.

- Remove the shim and heart stud.

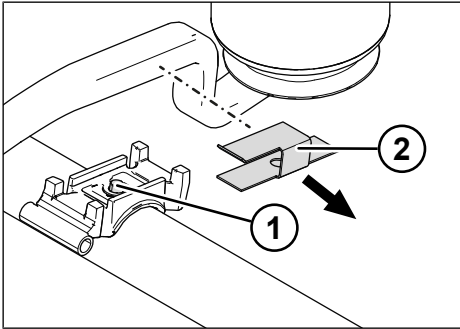


Fig. 5-117: Removing the shim

- 1 Heart stud
- 2 Shim

- Check the axle plate for damage and deformation. If there is convex deformation of the axle plate, contact KRONE GmbH & Co. KG.
- ✓ The integration is removed.

Fitting the integration

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Replace the shim and heart stud. While doing this, ensure that the hole of the shim and the hole on the link are aligned with each other.

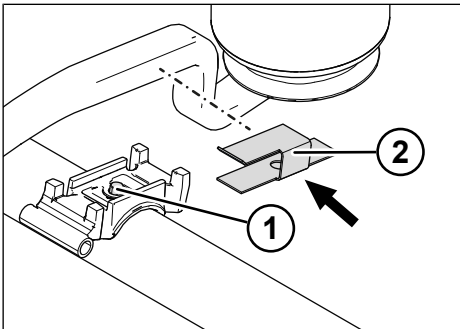


Fig. 5-118: Fastening the shim

- 1 Heart stud
- 2 Shim

- Lift up the axle body so that the air spring link sits on the axle plate. While doing this, ensure that the heart stud engages in the air spring link.
- Replace the clamp plate. While doing this, ensure that the arrow points in the direction of travel.

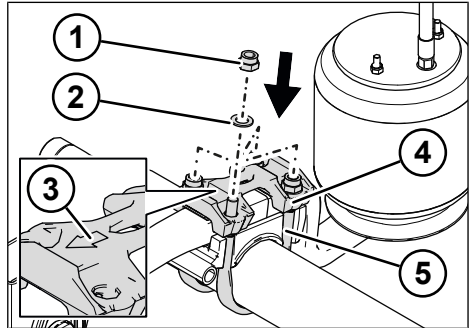


Fig. 5-119: Fastening the retainer nuts

- 1 Retainer nuts
- 2 Flat washers
- 3 Arrow
- 4 Spring clip
- 5 Clamp plate

- Insert the spring clip evenly.
- Replace the flat washers and new retainer nuts.
- Align the air spring link at 90° to the axle.

INFO

The spring clips must not tilt and the threaded ends must protrude evenly over the retainer nuts.

- Tighten up all the retainer nuts evenly with half the torque in a criss-cross pattern.
- Tighten up all the retainer nuts evenly with a tightening torque of 700 Nm +/- 25 Nm in a criss-cross pattern.
- ✓ The integration is fitted.

5.4.6 Integration (bottom air spring link)

Removing the integration

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Secure the axle body and air spring link to prevent them from falling down.
- ▶ Loosen and remove the retainer nuts and flat washers.
- ▶ Remove the clamp clip.
- ▶ Remove the spring clip.

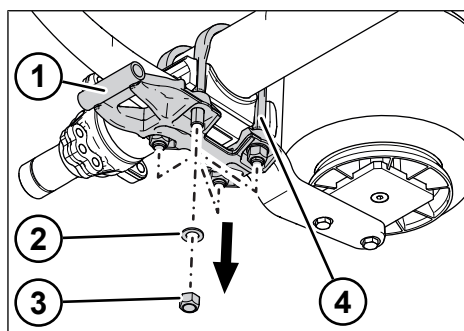


Fig. 5-120: Loosen the retainer nuts [integration, bottom air spring link]

- 1 Clamp plate
- 2 Flat washers
- 3 Retainer nuts
- 4 Spring clip

- ▶ Lower the air spring link downwards.
- ▶ Remove the shim and heart stud.

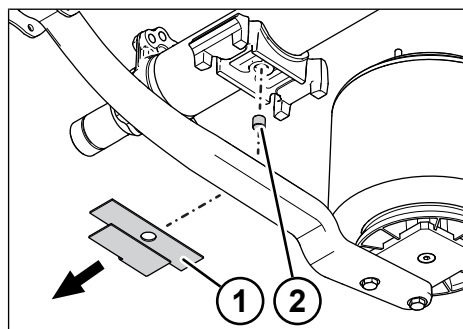


Fig. 5-121: Removing the shim

- 1 Shim
- 3 Heart stud

- ▶ Check the axle plate for damage and deformation. If there is convex deformation of the axle plate, contact KRONE GmbH & Co. KG.
- ✓ The integration is removed.

Fitting the integration

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Replace the shim and heart stud. While doing this, ensure that the hole of the shim and the hole on the air spring link are aligned with each other.

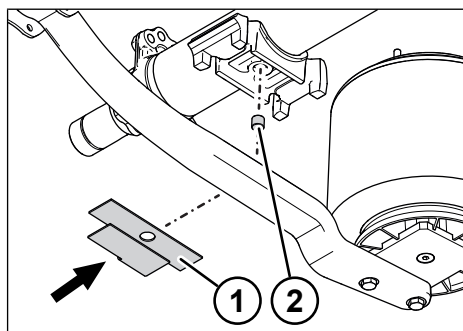


Fig. 5-122: Fastening the shim

- 1 Shim
- 2 Heart stud

- ▶ Lift up the air spring link so that the air spring link sits on the axle plate. While doing this, ensure that the heart stud engages in the air spring link.
- ▶ Put on the spring clip.
- ▶ Place the clamp plate.
- ▶ Replace the flat washers and new retainer nuts. While doing this, ensure that the shock absorber mount points forward in the direction of travel.

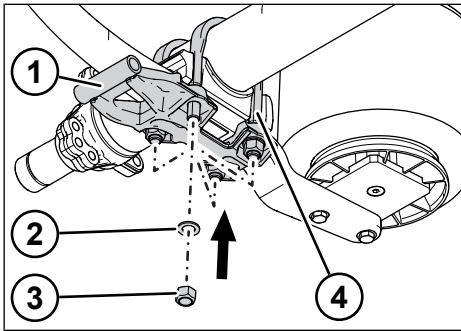


Fig. 5-123: Fastening the retainer nuts

- 1 Clamp plate
- 2 Flat washers
- 3 Retainer nuts
- 4 Spring clip

- ▶ Align the air spring link at 90° to the axle.

INFO

The spring clips must not tilt and the threaded ends must protrude evenly over the retainer nuts.

- ▶ Tighten up all the retainer nuts evenly with half the torque in a criss-cross pattern.
- ▶ Tighten up all the retainer nuts evenly with a tightening torque of 700 Nm +/- 25 Nm in a criss-cross pattern.
- ✓ The integration is fitted.

5.4.7 Air spring link

Removing the air spring link

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Remove the Twinlift (see "5.4.2 Twinlift", pg. 65).
- ▶ Remove the integration (see "5.4.5 Integration (top air spring link)", pg. 69), (see "5.4.6 Integration (bottom air spring link)", pg. 71).
- ▶ Allow the axle to lower down under control until the link is freely accessible.
- ▶ Secure the air spring link to prevent it falling down.
- ▶ Loosen and remove the fitting of the air spring bellow.

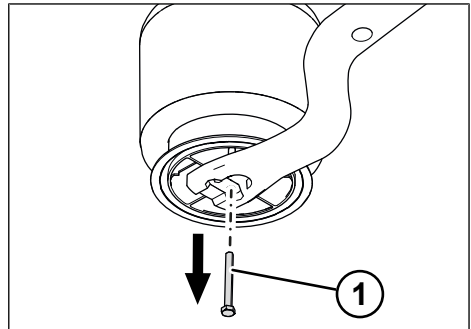


Fig. 5-124: Removing the fitting of the air spring bellow

1 Air spring bellow fitting

- ▶ Loosen the retainer nut and remove with the eccentric nuts/washers.

INFO

The link fitting of the D(N)OKTX2 air spring bracket has no eccentric nuts. Washers are used instead.

- ▶ Remove the steering pin and eccentric nut/washer.

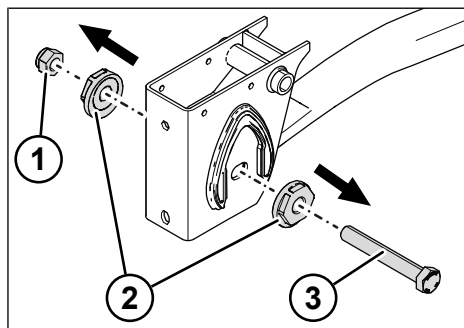


Fig. 5-125: Removing the link fitting

- 1 Retainer nut
- 2 Eccentric nuts/washers
- 3 Steering pins

- Remove the air spring link.
- Remove and check the thrust washers (see "4.5.1 Air suspension, brake and wheel bearing unit", pg. 29).

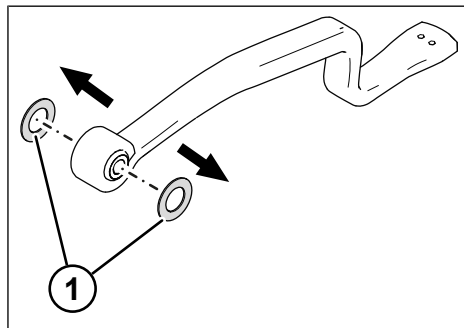


Fig. 5-126: Removing the thrust washers

- 1 Thrust washers

- ✓ The air spring link is removed.

Fitting the air spring link

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Place the thrust washers on the inner ring of the silent block.

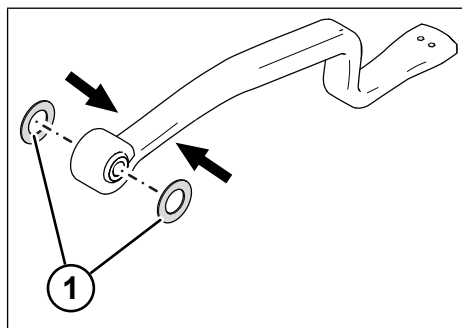


Fig. 5-127: Fastening the thrust washers

- 1 Thrust washers

- Insert the air spring link in the air spring bracket.
- Secure the air spring link to prevent it falling down.
- Insert the steering pin with eccentric nut/washer.

INFO

The link fitting of the D(N)OKTX2 air spring bracket has no eccentric nuts. Washers are used instead.

- Insert the retainer nut with eccentric nut/washer.

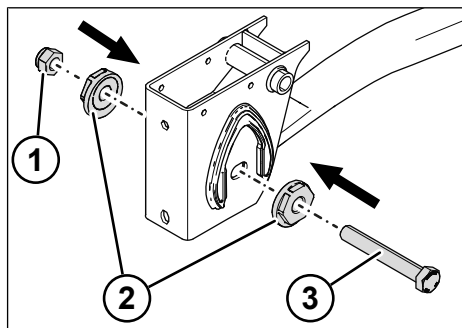


Fig. 5-128: Fastening the link fitting

- 1 Retainer nuts
- 2 Eccentric nuts/washers
- 3 Steering pins

- Fasten the air spring bellow with a tightening torque of 82 Nm +/- 3 Nm.

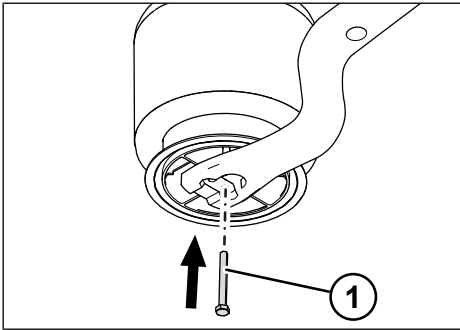


Fig. 5-129: Fastening the air spring bellow fitting

1 Air spring bellow fitting

- ▶ Install the integration (see "5.4.5 Integration (top air spring link)", pg. 69), (see "5.4.6 Integration (bottom air spring link)", pg. 71).
- ▶ Align the air spring unit at the ride height.
- ▶ Fasten the retainer nut with a pre-tensioning tightening torque of 200 Nm. For Generation 1 air spring brackets, ensure that the marking on the eccentric nuts points downwards (neutral position).

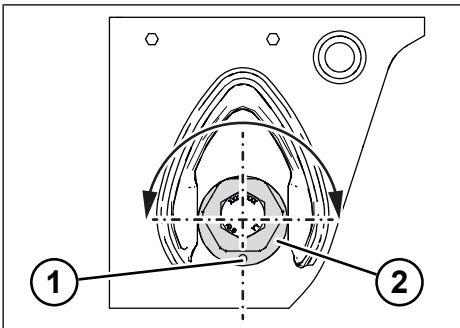


Fig. 5-130: Adjusting the play of the air spring link

- 1 Marking
- 2 Eccentric nuts

- ▶ Set the track (see "5.4.8 Setting the track", pg. 76).
- ✓ The air spring link is fitted.

Removing the silent bearing

- ▶ Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- ▶ Remove the Twinlift (see "5.4.2 Twinlift", pg. 65).
- ▶ Loosen the retainer nut and remove with the eccentric nut/washer.

INFO

The link fitting of the D(N)OKTX2 air spring bracket has no eccentric nuts. Washers are used instead.

- ▶ Remove the steering pin and eccentric nut/washer.

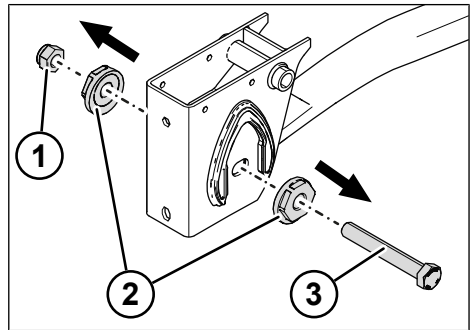


Fig. 5-131: Removing the link fitting

- 1 Retainer nut
- 2 Eccentric nuts/washers
- 3 Steering pins

- ▶ Lower the axle body downwards.
- ▶ Remove and check the thrust washers (see "4.5.1 Air suspension, brake and wheel bearing unit", pg. 29).

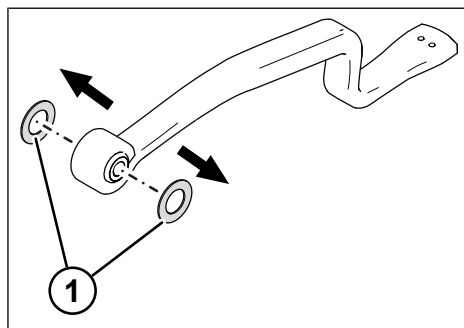


Fig. 5-132: Removing the thrust washers

- 1 Thrust washers

► Removing the silent bearing

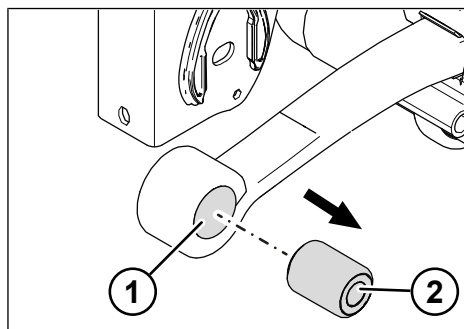


Fig. 5-133: Removing the silent bearing

- 1 Link bearing
2 Silent bearing

✓ The silent bearing is removed.

Fitting the silent bearing

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Clean the link eye.
- Insert the silent bearing in the link eye.

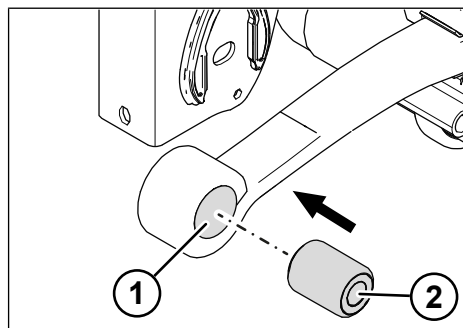


Fig. 5-134: Inserting the silent bearing

- 1 Silent bearing
2 Link eye

- Insert the thrust washer (thickness > 2.0 mm).

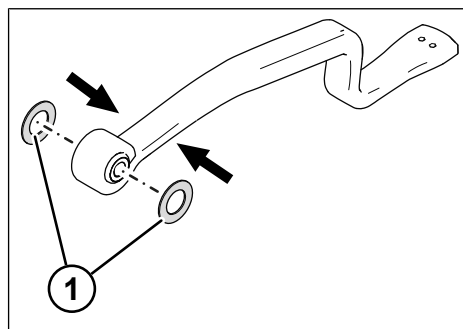


Fig. 5-135: Fastening the thrust washers

- 1 Thrust washers

- Lift up the axle body so that the air spring link sits on the air spring bracket.
- Insert the steering pin and eccentric nut/washer.

INFO

The link fitting of the D(N)OKTX2 air spring bracket has no eccentric nuts. Washers are used instead.

- Insert the retainer nut with eccentric nut/washer.

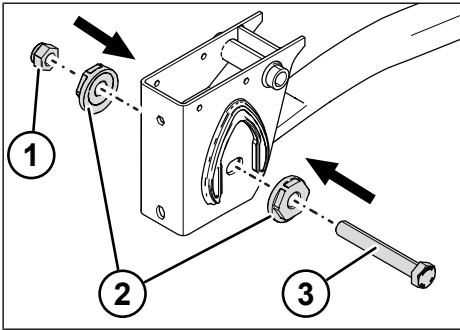


Fig. 5-136: Fastening the link fitting

- 1 Retainer nut
- 2 Eccentric nuts/washers
- 3 Steering pins

- Align the air spring unit at the ride height.
- Fasten the retainer nut with a pre-tensioning tightening torque of 200 Nm. For Generation 1 air spring brackets, ensure that the marking on the eccentric nuts points downwards (neutral position).

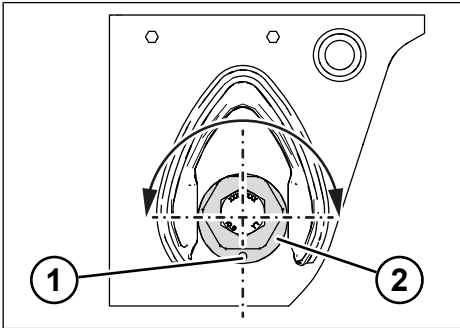


Fig. 5-137: Adjusting the play of the air spring link

- 1 Eccentric nuts/washers
- 2 Marking

- Fit the track measuring device in accordance with the manufacturer's instructions and align it.
- Set the track (see "5.4.8 Setting the track", pg. 76).

- Install the Twinlift (see "5.4.2 Twinlift", pg. 65).
- ✓ The silent bearing is installed.

5.4.8 Setting the track

Generation 1 air spring bracket

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Align the air spring unit at the ride height.
- Fasten the retainer nut with a pre-tightening torque of 200 Nm. While doing this, ensure that the marking on the eccentric nuts points downwards (neutral position).

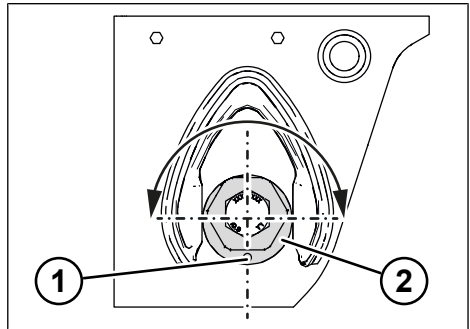


Fig. 5-138: Adjusting the play of the air spring link

- 1 Markings
- 2 Eccentric nut

- Fit the track measuring device in accordance with the manufacturer's instructions and align it.
- Set the track.

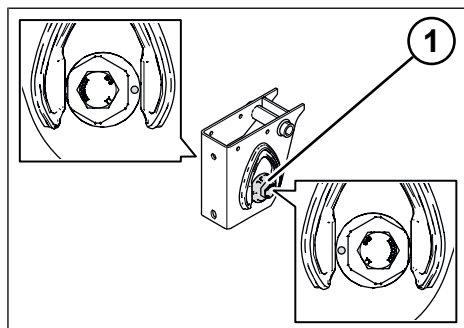


Fig. 5-139: Adjusting the eccentric nuts identically

1 Eccentric nut

- By evenly turning the eccentric nuts on each air spring bracket, the axle can be moved forwards or backwards ± 5 mm. While doing this, ensure that both eccentric nuts are adjusted identically.
- Fasten the retainer nut with a tightening torque of $340 \text{ Nm} \pm 20 \text{ Nm} + 90^\circ \pm 3^\circ$. While doing this, ensure that both eccentric nuts remain adjusted identically.
- Remove the track measuring device according to the manufacturer specifications.
- ✓ The track is adjusted.

Generation 2 air spring bracket

- Carry out preparatory work (see "5.1 Preparatory work", pg. 33).
- Loosen the retainer nut until the steering pin fitting can be moved by hand.
- Fit the track measuring device in accordance with the manufacturer's instructions and align it.
- Put on the lever tool.

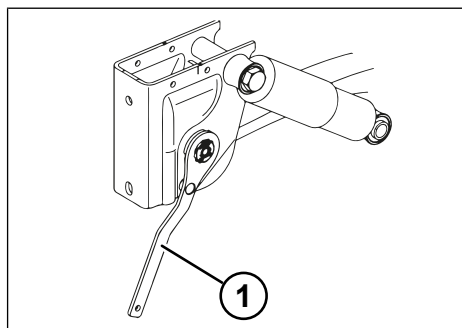


Fig. 5-140: Lever tool

1 Lever tool

- Set the track. The axle can be moved by ± 5 mm forwards or back by pulling or pressing on the lever tool.
- Fasten the retainer nut with a tightening torque of $340 \text{ Nm} \pm 20 \text{ Nm} + 90^\circ \pm 3^\circ$. Make sure that the steering pin fitting is not shifted.
- Remove the track measuring device according to the manufacturer specifications.
- ✓ The track is adjusted.

6 Repair time schedule

General aspects

No.	Component	Work step	Repair time [min]	Upstream tasks	Working time, complete [min.]
1	Vehicle	Set-up time, complete	30		
2	Wheel	Fitting and removing	10		
3	Brake air gap	Testing and setting	6	2	16
4	EBS/ABS brake system	Reading the error memory	30		

Disc brake

No.	Component	Work step	Repair time [min]	Upstream tasks	Working time, complete [min.]
5	Brake caliper, 1 pc	Complete check	7	2, 8	29
6	ABS wheel sensor	Removing and installing	4		
7	Membrane-type brake cylinder	Removing and installing	15	2	25
8	Brake pad	Removing and installing	12	2, 3	28
9	Brake calliper	Removing and installing	25	2, 3, 7, 8	68
10	Wheel flange, complete	Removing and installing	12	2, 3, 7, 8, 9	80
11	Brake disc	Removing and installing	25	2, 3, 7, 9, 10	93
12	Wheel bearing unit	Removing and installing	20	2, 3, 6, 7, 8, 9, 10	104
13	Bolts per wheel	Removing and installing	20	2	30
14	Pressure piece with bellows and inner seal	Removing and installing and replacing	25	2, 3, 8	53
15	Guide bearing (loose bearing, DU bearing)	Removing and installing	15	2, 3, 7, 8, 9	83
16	Guide bearing, fixed bearing	Removing and installing	20	2, 3, 7, 8, 9	88
17	Bellows, inner	Removing and installing	9	2, 3, 7, 8, 9	77

No.	Component	Work step	Repair time [min]	Upstream tasks	Working time, complete [min.]
18	Track measurement, 2 axles, complete		65		
19	Track measurement, 3 axles, complete		80		
20	Axle, complete incl. track	Removing and installing	195		
21	Air spring bellows (1 piece)	Removing and installing	20		
22	Shock absorber (1 piece)	Removing and installing	15		
23	Trailing arm (1 piece), including associated tasks, without track	Removing and installing	95	21, 22, 24	180
24	Clamp plate and spring clip, 1 side, without connection	Removing and installing	50		
25	Air spring bracket with support incl. all associated tasks	Removing and installing	195	22	210
26	Axle lift	Removing and installing	20		

Additional for self-steering axle

No.	Component	Work step	Repair time [min]	Upstream tasks	Working time, complete [min.]
26	Stabilisation unit	Removing and installing	10		
27	Locking cylinder	Removing and installing	10		
28	Tie rod	Removing and installing	5	26, 27	25

REPAIR TIME SCHEDULE

No.	Component	Work step	Repair time [min]	Upstream tasks	Working time, complete [min.]
29	Axle stub, 1 page	Removing and installing	100	20, 12	400
30	Bushes in the axle stub	Removing and installing	20	29	420

7 Spare parts and customer service

Bernard-Krone-Straße 1
D-49757 Werlte

7.1 Spare parts

NOTE

Property damage caused by incorrect spare parts!

The use of non-approved or incorrect spare parts affects safety and can result in voiding of the operating permit.

- Only use original spare parts.

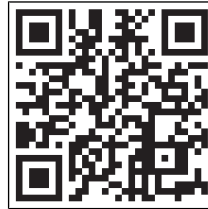
The original spare parts are regularly checked for safety and functionality. The use of original spare parts guarantees road and operating safety and the operating permit is retained.

- When ordering spare parts, provide the item number and the axle name.

You can order spare parts by phone under +49 (0) 59 51 / 209-302 or from the KRONE website. An electronic spare parts catalogue is available on the website:
www.krone-trailer.com



www.krone-trailer.com



www.krone-trailerparts.com

7.2 Customer service and support

The customer service department at Fahrzeugwerk Bernard KRONE GmbH & Co. KG can be reached using the following contact data:

Customer Service

Telephone: +49 (0) 59 51 / 209-320

email: kd.nfz@krone.de

Internet: www.krone-trailer.com/service/kundendienst

Spare Parts

Telephone: +49 (0) 59 51 / 209-302

Email: Ersatzteile.nfz@krone.de

Internet: www.krone-trailer.com

Fahrzeugwerk Bernard KRONE
GmbH & Co. KG

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