Repair Manual

Graders BG 110 / 130 / 160 / 190 / 240

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Internet: www.gp-papenburg.de
Country of origin: Made in Germany

Document no.:

Technical changes

We reserve the right to make technically required changes in production, processing and appearance for all versions.

Contents

1 Overview of Illustrations

2 General Instructions

2.1 Notes on the Repair Manual

This repair manual applies only in combination with the original operating and maintenance instructions that were a component of the scope of delivery.

This repair manual describes the disassembly and assembly of the draw bar with cylinders, the swivelling bridge as well as the rear mounted ripper for the purpose of eliminating malfunctions and overhauling.

The tasks described herein may only be performed by technicians who have been trained for the task described. Basic knowledge in the setup and function of the **Grader BG 110, Grader BG 130, Grader BG 160**, Grader **BG 190** and **Grader BG 240** is prerequisite.

Read through the repair manual carefully before starting any work. Perform the individual steps as described and do not arbitrarily deviate from these steps. Follow the safety instructions!

Only original spare parts and specialty tools may be used, which have been approved by **GP Günter Papenburg AG**.

If steps cannot be completed, ask Technical Customer Service at GP Günter Papenburg AG.

2.2 Liability Limitation

GP Günter Papenburg AG assumes no liability for damages and malfunctions that result from:

- Non-observance of operating instructions and of the repair manual.
- Use that is not pursuant to the specifications, faulty disassembly or assembly.
- Arbitrary add-ons or changes to the vehicle or use of impermissible spare parts and specialty tools.
- Improper tasks with the vehicle or parts thereof.
- Insufficient maintenance.
- Improper and inexpert implementation of tasks and the resulting damages.
- Catastrophic incidents due to external man-induced event and force majeure.
- Operating error.

2.3 Qualified Personnel

The repair and commissioning of the grader may only be performed by qualified personnel.

The vehicle user must take care to ensure that all steps are performed according to the technical safety information in this repair manual.

2.4 Intended Use

The repairs apply exclusively to the maintenance of the **BG 110, Grader BG 130, Grader BG 160, Grader BG 190 and Grader 240.** The correct and safe usage of the overhaul requires proper handling during shipping, storage, disassembly, assembly, electrical and mechanical connection in the vehicle, operation and driving as well as maintenance.

3 Safety Instructions

3.1 Specific safety information and symbols used

In the following repair instructions, specific safety information is provided in order to reference the additional risks that cannot be avoided when operating the grader. These residual risks imply dangers to

persons

Product and grader

Environment

This safety information and the measures for avoiding hazards must be observed!

⚠ DANGER
Danger to life and limb or risk of serious injuries.

⚠ WARNING
Danger of injuries and/or risk of property damage.

⚠ CAUTION
Risk of damage to property.

NOTE
Useful additional information and tips

3.2 Basic Safety Instructions

This product was developed based on the "state of the art," the fundamental safety requirements and the recognized technical safety laws, standards and regulations.

3.2.1 Residual risks

In order to avoid the remaining risks, the safety information and the description of the steps must be read carefully prior to beginning any work!

⚠ DANGER
 **Despite all precautions taken, some risks remain. Residual dangers are potential, not obvious dangers, for example:** **There is a risk from suspended loads.** **Risks from mechanical impacts (gear mechanisms, drive)** **Risks from thermal influences** **(hot gear oil and other liquids, hot housing parts)** **Risks from chemical agents (cleaning agents, adhesives)** **Risks from electrical current (drive motor, electrical lines)**

In addition to the safety information described, the applicable occupational safety rules, accident prevention specifications and environmental protection in the work area must be adhered to!

All safety specifications and instructions must be followed!

3.3 Fundamental safety measures for normal operation

The grader may only be operated by people who have been trained and are authorized to do so, who are familiar with the operating instructions and can work in accordance with them!

Before switching on the grader, check and ensure that

only authorized persons are present in the work area of the grader,

nobody can get injured through the starting up of the grader.

Prior to beginning work each time with the grader, perform a visual inspection and ensure that it is operated in flawless condition!

Immediately report any shortcomings that you find to your superior.

Prior to beginning work each time, remove materials and objects that are not needed for the job from the work area of the grader!

Before every start of work each time, check and ensure that all the safety devices are working smoothly.

3.4 Basic safety measures for service and maintenance

Comply with the intervals for maintenance and inspection activities as specified in the operating manual.

Follow the maintenance and repair instructions for the individual components in the operating manual.

⚠ DANGER

There is a risk from suspended loads!
Heavy machines and spare parts can fall down when moved and result in serious injuries
Only use suitable and flawless load pickup and slewing tools.
Watch out for load.

⚠ DANGER

There is risk of injuries or loss of life from electrical shock.
Only trained technicians may work on the electrical systems.
Pull out the battery plug prior to beginning any work.

⚠ DANGER

Danger to life and limb or risk of serious injuries.
Allow only specially trained personnel to carry out maintenance and repair work on hydraulic equipment!
Render the grader free of pressure before maintenance and repair work on hydraulic equipment.

⚠ DANGER

Risk from hazardous materials (oil, cleaning agents and other chemical agents)!
Hazardous materials can cause serious injuries if it comes in contact with skin, eyes, airways or if swallowed.
In the event of contact, rinse immediately with clear water, wash off and seek medical attention immediately. Wear protective gloves and goggles. Adhere to the manufacturer's information about the product. Do not eat, drink or smoke.

⚠ DANGER

Hazard from moving parts!
Vehicles moving unexpectedly can cause serious injuries. Disconnect battery and block wheels if applicable. Park the vehicle on flat, non-inclined, surface and secure from rolling away.

DANGER

Risk from sudden lowering assemblies! Assemblies that are lowered suddenly can cause serious injuries!
The grader may only be lifted out by pushers, blade or rear rippers for placing support bearing frames at suitable points or for mounting slewing tools. No repairs can be made after lifting up!
Lifting up does not provide a stop function!

WARNING

There is a risk of injury from hot oil or other liquids and hot surfaces!
Hot oil, other liquids or hot surfaces can scald or burn skin shortly after the grader is operating.
Let the grader cool prior to disassembly / assembly.
Wear protective gear (safety glasses and gloves).

CAUTION

Cleaning agent risk!
Cleaning agents can damage the grader components.
Only use cleaning agents sparingly on dirty parts (e.g., in the oil screw area).

3.5 Environmental protection regulations

CAUTION

Risk of environmental damages.
During all work on and with the grader, compliance with the legal responsibilities for avoiding waste and for proper usage and disposal is required.

In particular during installation, repair and maintenance work, substances
greases and oils,
hydraulic oils,
like cleaning fluids containing solvents
must not pollute the ground or enter the drainage system!
These substances must be stored, transported, collected and disposed of in suitable containers.

CAUTION

Risk of environmental damages.
Dispose of lubricating oil, coolant or cleaners properly.

3.6 Preparing for repairs

3.6.1 Basic notes

Ensure that all areas are clean. Clean the grader prior to disassembly.
Caution and cleanliness are essential to a proper repair.

Replace parts or assemblies when worn or damaged.

Parts installed incorrectly cause damages. Adhere to the step sequence and perform work in technically correct manner.

Clean each part prior to assembly; check for wear and other defects. Replace damaged or worn parts.

If specified, coat threads and surfaces with Loctite protective agent when assembling.

All screws and threads have metric dimensions. Only use tools with metric dimensions.

When assembling, adhere to all specified setting values, test data and tightening torques.

3.6.2 Tools, measuring instruments, equipment

Tools:

hammer
open-end wrench sizes 10, 11, 12, 14, 17, 24, 27, 30, 36
box spanner sizes 10, 11, 12, 14, 17, 24, 27, 30, 36
socket wrench sizes 13, 19, 24, 55
torque wrench, sizes 19, 24
hexagon socket head wrench sizes 5, 6, 8, 10, 12, 14, 17, 19, 24
hexagon wrench size 8
screwdriver
hammer
Aluminum awl
fencing pliers
snapring pliers
Aluminum awl
scraper
cutter
putty

Measuring devices:

gage (tooth flank play)

Equipment:

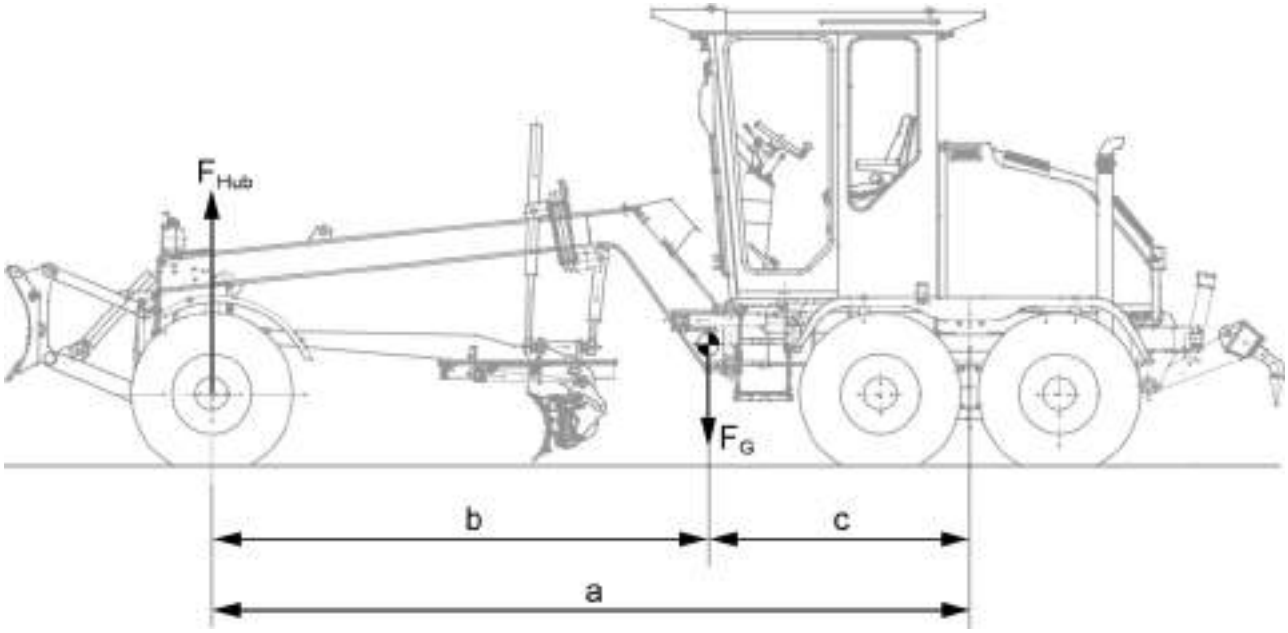
lift apparatus, crane
forklift with palette
closure material ROV 15-LA, M 15-LA, VK 15-LA
hose extenders 2SN12 x 2000 CEL/DKOL
hook chains
cable
M10 ring screws
metal supports
marking pencil
locking device - squared timber
screw clamp

Consumables:
cleaner (brake cleaner)
abrasive, sandpaper
Loctite 243, 586
lubricating grease
molybdenum disulfide lubricant varnish (Gleitmo-900 Spray)

3.6.3 Tightening torques for screws and nuts

Tightening torques taken from information on the individual steps. If no information is provided, reference the applicable tightening torques from the tables in the appendix.

3.6.4 Weights and distance measurements



Type	F_G (kg)*	a (mm)	b (mm)	c (mm)	F_{stroke} (kg)
BG 110	10150	5236	3561	1675	3250
BG 130	13150	5443	3738	1705	4120
BG 160	15250	5676	3846	1830	4920
BG 190	18050	6136	4336	1800	5300
BG 240	21880	6427	4417	2010	6850

*F_G without dozer blade

4 Overview of assemblies

4.1 Vehicle types

4.1.1 Grader BG 110 / BG130

Fig. 1 Grader BG 110 / BG 130

4.1.2 Grader BG160 / BG 190

Fig. 2 Grader BG 160 / BG 190

4.1.3 Grader BG 240

Fig. 3 Grader BG 240

4.2 Main machine parts

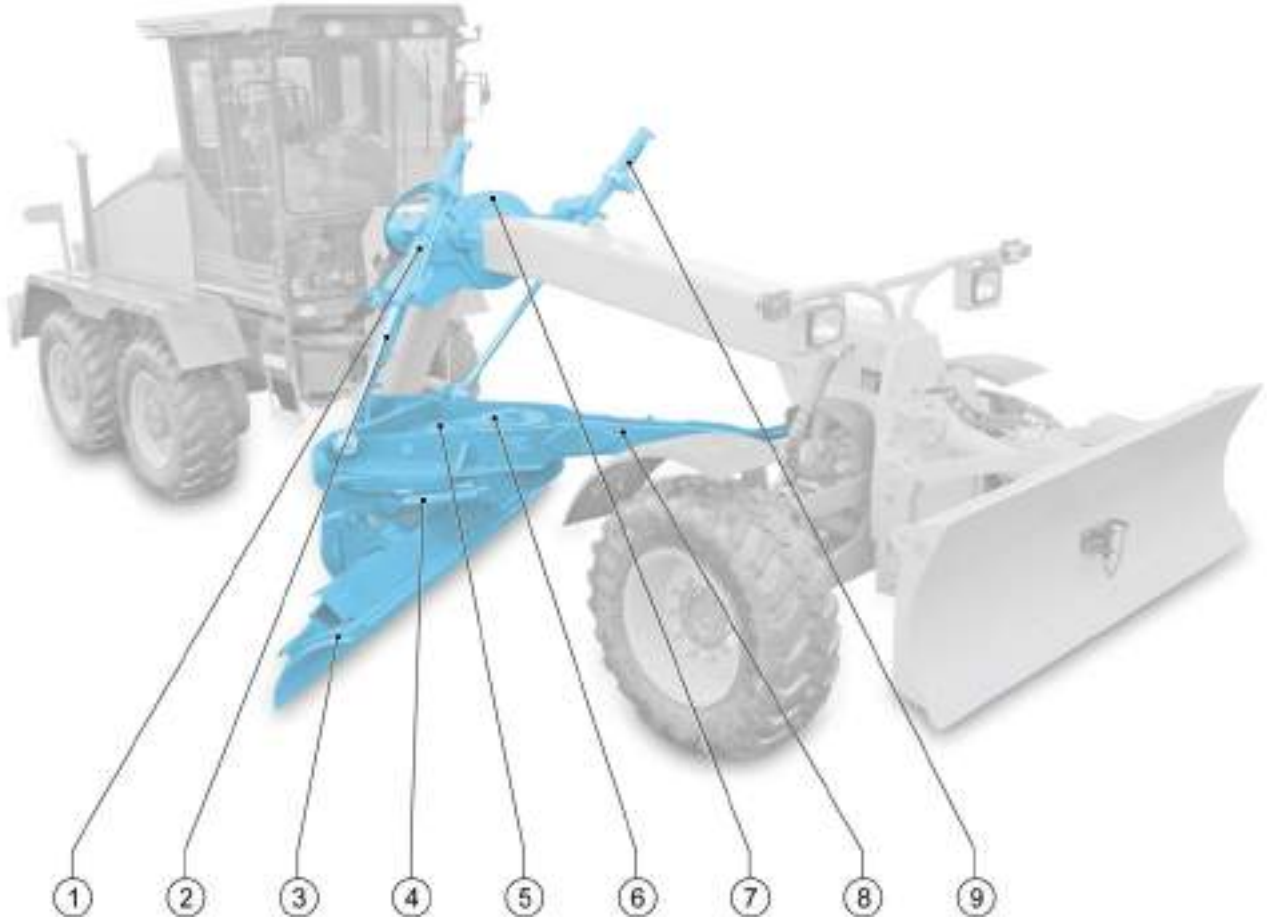


Fig. 4 Rear rippers, draw bar, swivelling bridge and cylinder assemblies

1 Lifting cylinder, right
2 Slewing cylinder
3 Blade
4 Cutting angle cylinder
5 Slewing joint
6 Slewing gear drive
7 Swivelling bridge
8 Draw bar
9 Lifting cylinder, left

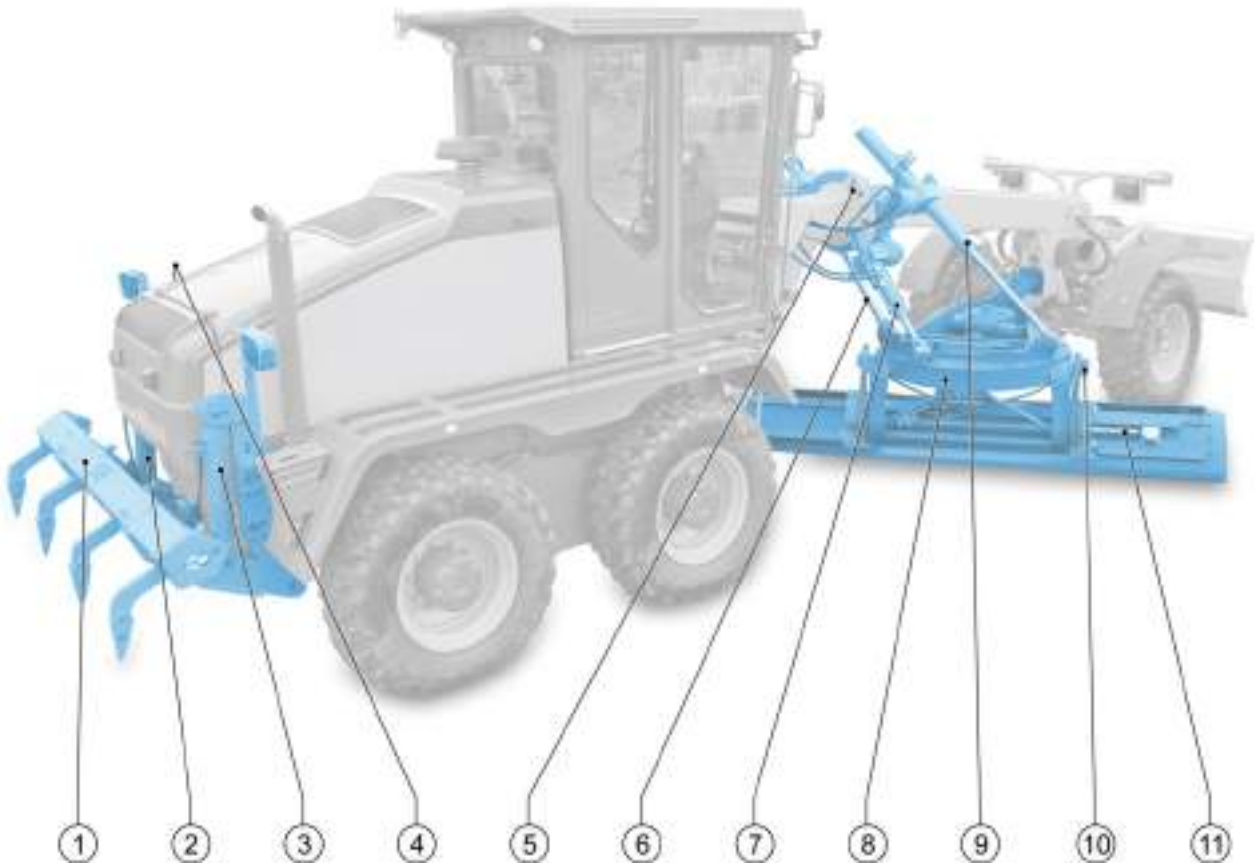


Fig. 5 Rear mounted rippers, draw bar, swivelling bridge and cylinder assemblies

1 Rear mounted ripper
2 Left rear ripper cylinder
3 Right rear ripper cylinder
4 Depth indicator
5 Swivelling bridge
6 Lifting cylinder, left
7 Slewing cylinder
8 Draw bar
9 Lifting cylinder, right
10 Cutting angle cylinder
11 Blade sliding cylinder

5 Assembly change

5.1 Draw bar assembly

5.1.1 Replacing draw bar

5.1.1.1 Disassembling draw bar

Step 1

Retract blade (Fig. 1, Item 3) to side and move the cutting angle cylinder
(Fig. 1, Item 4).

Step 2

Remove all lubricant and hose lines (1) to the draw bar assembly (2) with the appropriate flat wrench.

Lock using closure material.

Remove hose lines (1) from draw bar (2).

Closure material:

ROV 15-LA, M15-LA and VK15-LA.

Tools:

open-end wrench

BG 110 size: 22
BG 130 size: 22
BG 160 size: 27
BG 190 size: 27
BG 240 size: 27

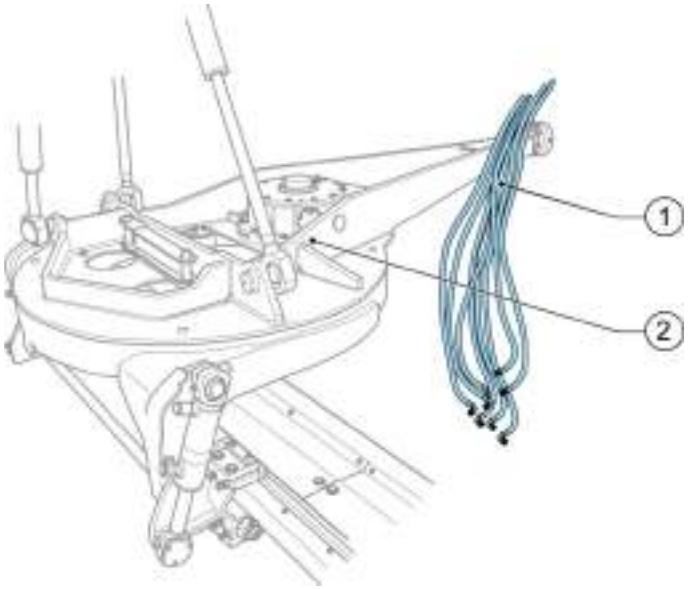


Fig. 6 Remove lubrication and hose lines

Step 3 **→ Section 4.1.2.1**

Slewing joint disassembly

Step 4a	**BG 110 / BG 130**

Loosen the bolted assemblies on the ball socket (1) using a flat wrench and remove 3 screws (2).

Leave a screw (3) as a safety when dismantling the draw bar.

Tools:

open-end wrench,
box spanner

BG 110 sizes: 24 / 26
BG 130 sizes: 24 / 26

Standardized parts:

BG 110 screws M 16-10.9 (2)
BG 130 screws M 16-10.9 (2)

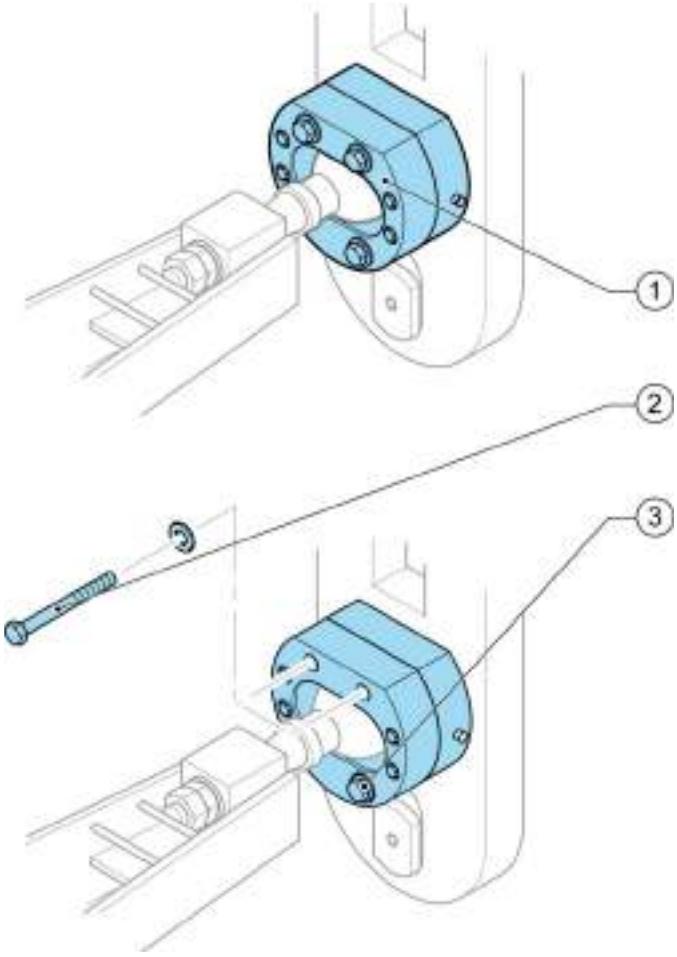


Fig. 7 Loosen screw connections on the ball socket

Step 4b	**BG 160 / BG 190 / 240**

Loosen the bolted assemblies on the ball socket (1) using a flat wrench and remove 3 nuts (2).

Leave a screw (3) as a safety when dismantling the draw bar.

Tools:

open-end wrench

BG 160: size 36
BG 190: size 36
BG 240: size 36

Standardized parts: (2)

BG 160: M24 hexagon nut
BG 190: M24 hexagon nut
BG 240: M24 hexagon nut

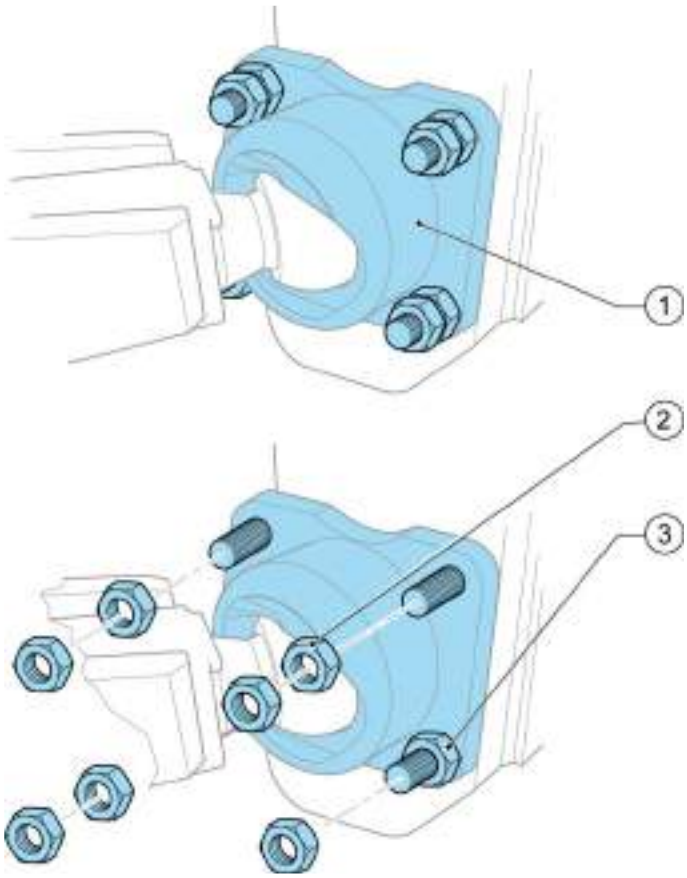


Fig. 8 Loosen screw connections on the ball socket

Step 5	**→ Section 4.2.1.1**

Loosen slewing cylinder

Step 6	**→ Section 4.2.2.1**

Disconnect lifting cylinders

Step 7

Sling draw bar (3) with 3 hook chains (1).

Front chain lines (2) approx. 35 mm longer than the other hook chains.

Equipment:

3 hook chains,
lift apparatus

Weight

BG 110: approx. 1800 kg
BG 130 approx. 1800 kg
BG 160: approx. 1800 kg
BG 190: approx. 1800 kg
BG 240: approx. 1800 kg

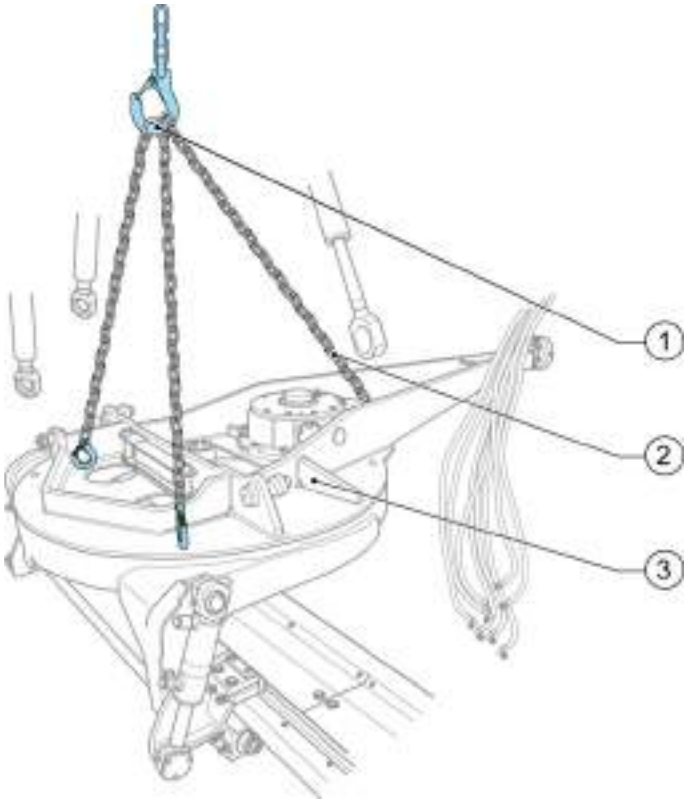


Fig. 9 Draw bar on hook chain

Step 8a BG 110 / BG 130

Unscrew the last screw (3) on the ball socket (1).

Move out draw bar (2) backward and then sideways.

Tools:

open-end wrench

BG 110: size 24 / 26
BG 130: size 24 / 26

Standardized parts: (3)

BG 110: screws M 16-10.9
BG 130: screws M 16-10.9

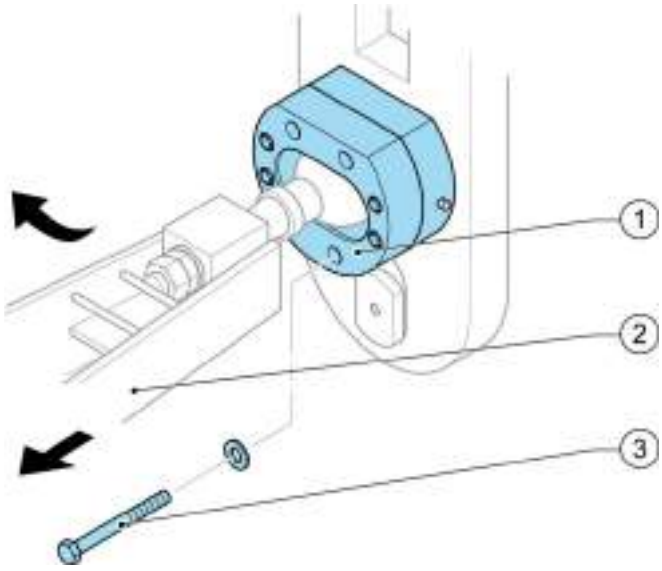


Fig. 10 Loosen the last bolted assembly on the ball socket.

Step 8b	**BG 160 / BG 190 / BG 240**

Unscrew the last nut (3) on the ball socket (1).

Move out draw bar (1) backward and then sideways.

Tools:

open-end wrench

BG 160: sizes 36
BG 190: sizes 36
BG 240: sizes 36

Standardized parts: (3)

BG 160: M24 hexagon nut
BG 190: M24 hexagon nut
BG 240: M24 hexagon nut

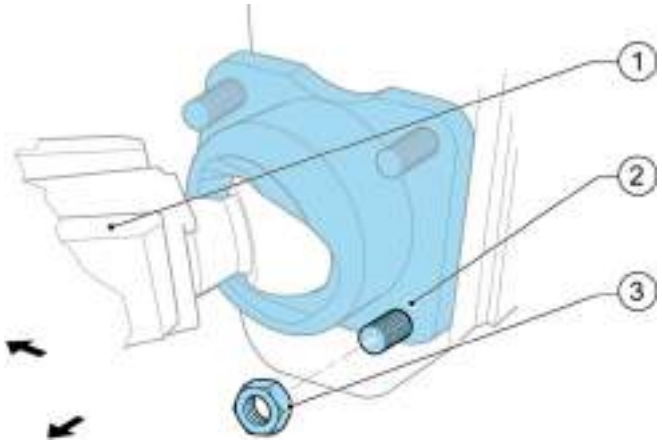


Fig. 11 Loosen the last bolted assembly on the ball socket.

Step 9

Offset draw bar (1) onto metal support (2).

Equipment:
1 metal support,
3 hook chains,
lift apparatus

Weight

BG 160: approx. 1800 kg
BG 190: approx. 2000 kg
BG 240: approx. 2500 kg

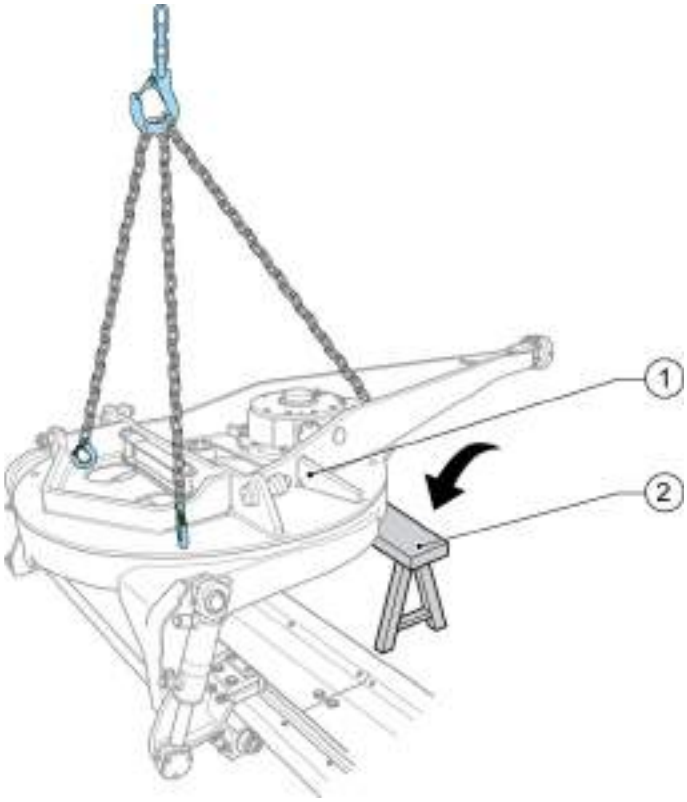


Fig. 12 Offset draw bar onto metal support

Step 10	**→ Section 4.1.3.1**

Dismounting slewing gear drive

Step 11	**→ Section 4.1.5.1**

Dismantle ball bolt from draw bar

Step 12	**→ Section 4.1.6.1**

Disassembling the draw bar from the slewing gear

Step 13	**→ Section 4.1.7.1**

Dismantle four-point bearing from draw bar

5.1.1.2 Draw bar assembly

Step 1	**→ Section 4.1.3.2**
Assembly of slewing gear drive on draw bar	

Step 2	**→ Section 4.1.2.2**
Assembly of slewing joint on draw bar	

Step 3	**→ Section 4.1.7.2**
Assembly of four-point bearing on draw bar	

Step 4	**→ Section 4.1.5.2**
Assembly of ball bolt on draw bar	

Step 5	**→ Section 4.1.6.2**
Assembly of draw bar to slewing gear	

Step 6a **BG 110 / BG 130**

Clean off old Loctite from screws (6) and recoat with Loctite (7).

Suspend draw bar (1) with 3 hook chains (2) and install sideways next to the front frame (3)

Screw the ball socket (5) to the frame front part (4) with 4 screws (6).

Tools:

socket wrench

BG 110: sizes 24
BG 130: sizes 24

Standardized parts: (6)

BG 110: screws
M 16x90 -10.9 DIN 933

BG 130: screws
M 16x90 -10.9 DIN 933

Starting torques: (6)

BG 110: M_T=265 Nm
BG 130: M_T=265 Nm

Equipment:
cleaning agent
Loctite 243,
3 hook chains,
lift apparatus,

Weight

BG 110: approx. 1800 kg
BG 130: approx. 2000 kg

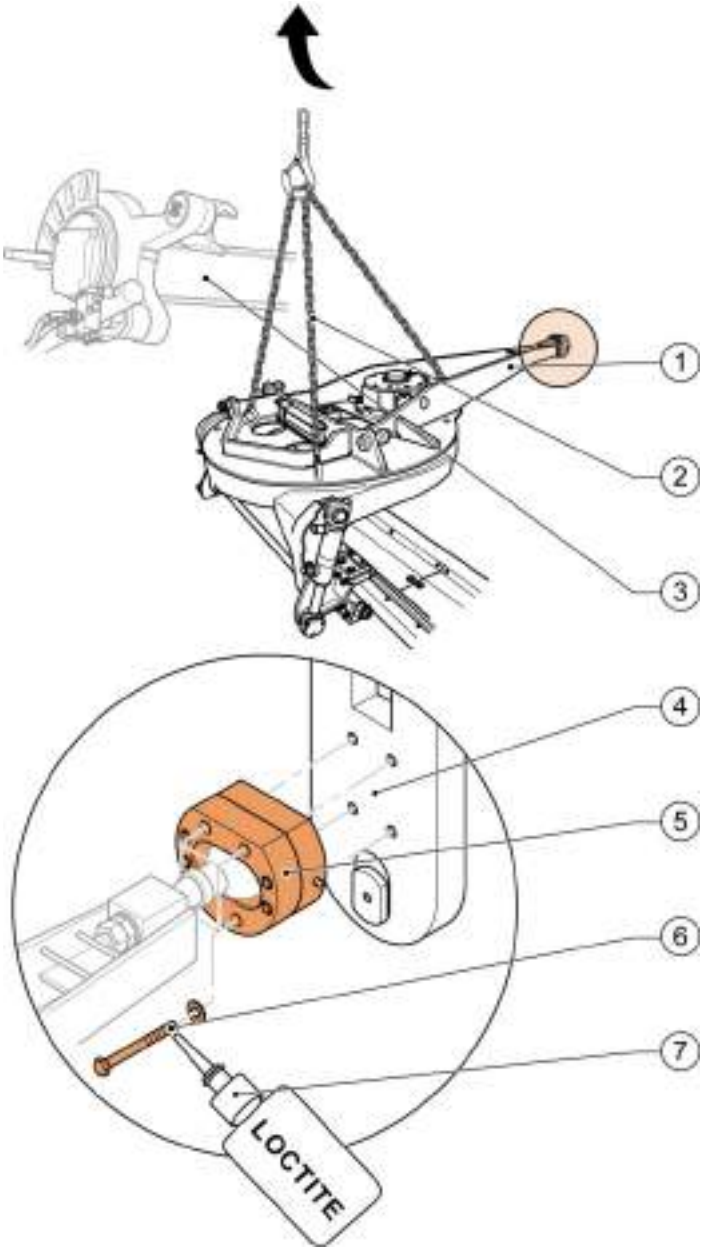


Fig. 13 Screw the draw bar to the front frame

Step 6b **BG 160 / BG 190 / BG 240**

Clean the old Loctite from the screws (7) on the front frame (4) and coat with new Loctite.

Suspend draw bar (2) with 3 hook chains (3) and install sideways next to the front frame (1)

Screw and lock the ball socket (5) with nuts (5) to the frame front part (4).

Tools:

socket wrench

BG 160: sizes 36
BG 190: sizes 36
BG 240: sizes 36

Standardized parts: (2)

BG 160: M24 hexagon nut
BG 190: M24 hexagon nut
BG 240: M24 hexagon nut

Starting torques: (6)

BG 160: M_T= 265 Nm
BG 190: M_T= 265 Nm
BG 240: M_T= 265 Nm

Equipment:

cleaning agent
Loctite 243
3 hook chains,
lift apparatus,

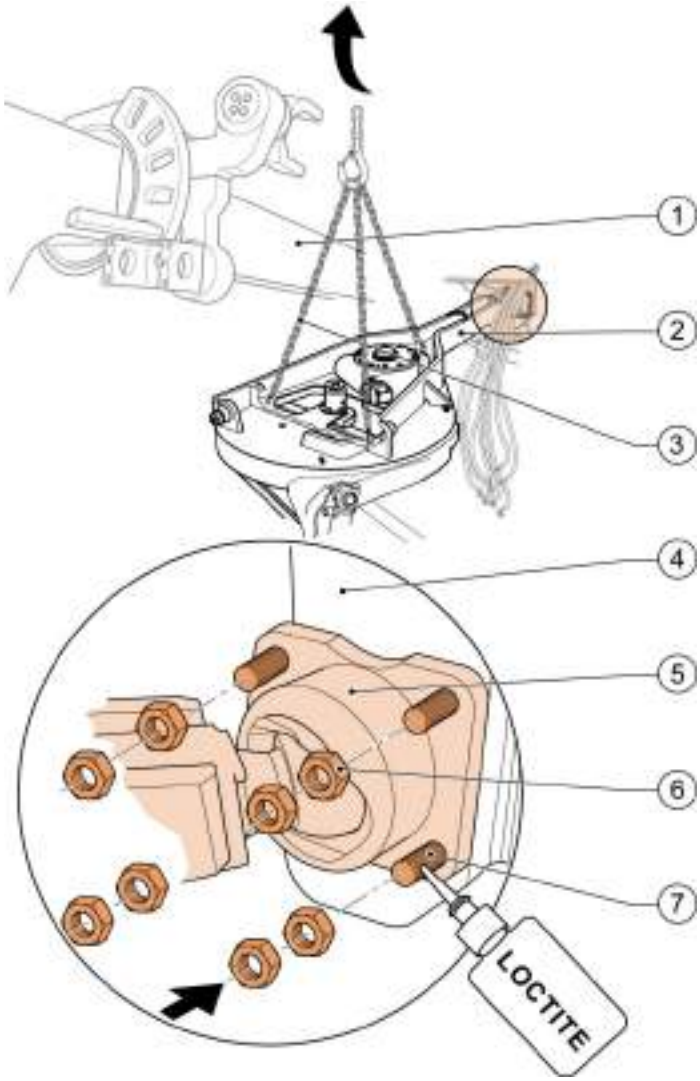


Fig. 14 Screw the draw bar to the front frame

Step 7

Offset draw bar (2) onto floor. Loosen a chain line (3) and reconnect it over the front frame (1).

Lift draw bar (2) and set down in middle.

Equipment:

3 hook chains,
lift apparatus,

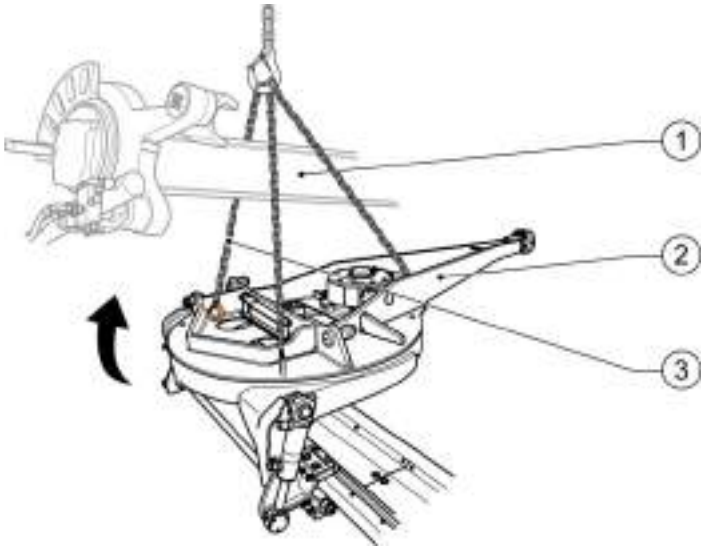


Fig. 15 Set down draw bar and align

5.1.2 Changing slewing joint

5.1.2.1 Dismounting slewing joint

Step 1

Use a flat wrench to remove the hose lines (2) on the slewing joint (1) and close with closure material.

Closure material*:

ROV 15-LA, M15-LA and VK15-LA.
ROV 12-LA, M12-LA and VK12-LA

* Depending on the construction condition

Tools:

open-end wrench

BG 110: size 22 hose
BG 130: size 22 hose
BG 160: size 22 hose
BG 190: size 22 hose
BG 240: size 22 hose

BG 110: size 27 socket
BG 130: size 27 socket
BG 160: size 27 socket
BG 190: size 27 socket
BG 240: size 27 socket

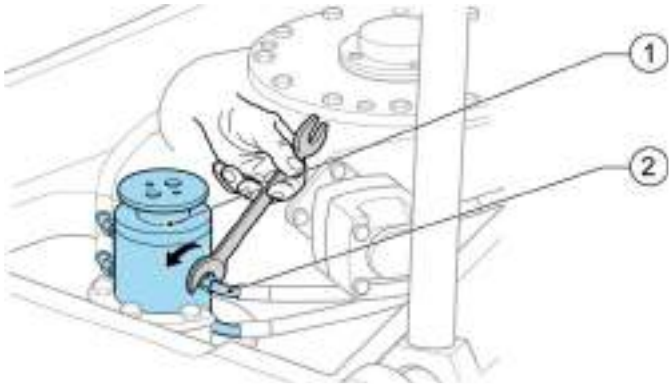


Fig. 16 Remove hose lines on the slewing joint

Step 2

Dismantle the cover (3) from the slewing joint (1):
Use torque wrench to loosen 2 hex screws (4).
Use a torque wrench to remove the hose lines (2) on the slewing joint (1) and close with closure material.

Closure material*:

ROV 15-LA, M15-LA and VK15-LA.
ROV 12-LA, M12-LA and VK12-LA

* Depending on the construction condition

Tools:

open-end wrench

BG 110: sizes 17, 22, 27
BG 130: sizes 17, 22, 27
BG 160: sizes 17, 22, 27
BG 190: sizes 17, 22, 27
BG 240: sizes 17, 22, 27

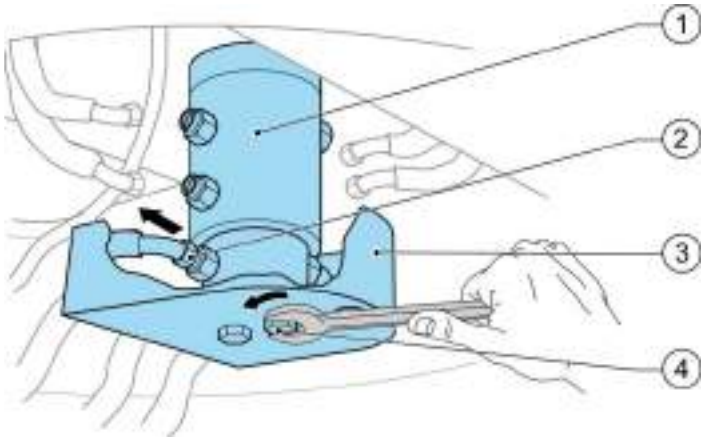


Fig. 17 Dismantle the slewing joint cover

Step 3

Use socket wrench to remove 3 screws (1) from slewing joint (2).

Tools:

socket wrench

BG 110: sizes 19
BG 130: sizes 19
BG 160: sizes 19
BG 190: sizes 19
BG 240: sizes 19

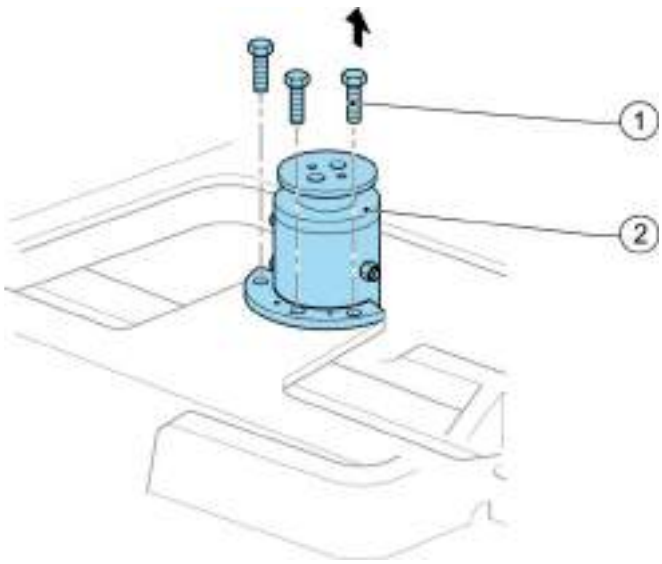


Fig. 18 Loosen slewing joint

Step 4

Secure the slewing joint (2) with 2 cotter pins (1) on the draw bar.

Use a screwdriver to loosen and remove the slewing joint (2).

Tools:

screwdriver

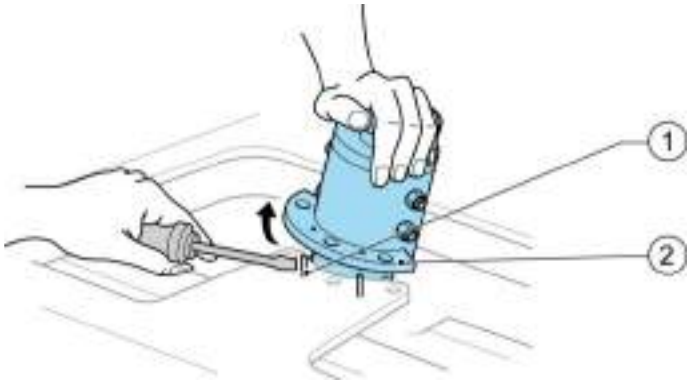


Fig. 19 Loosen slewing joint

5.1.2.2 Assembling slewing joint

Step 1

Knock 2 cotter pins (2) into the swivel joint (1) until they stick out approx. 1 mm on the bottom (3) as centring.

Tools:

hammer

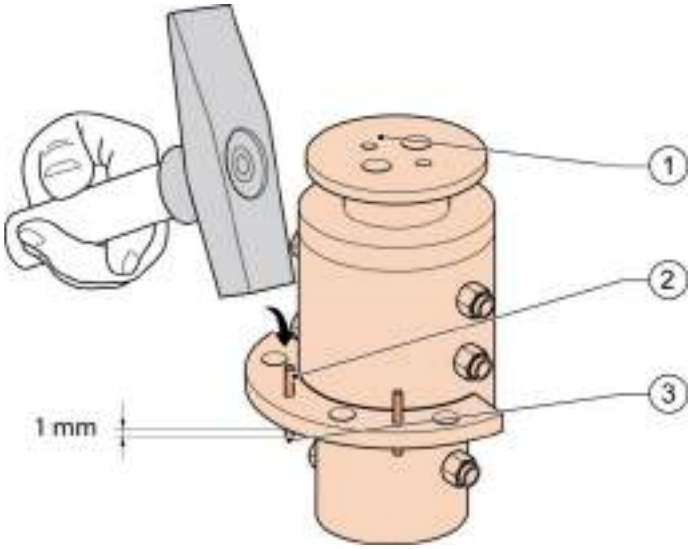


Fig. 20 Knock cotter pins into the swivel joint

Step 2

Place swivel joint (1) on and knock the 2 cotter pins (2) into the draw bar (3).

Tools:

hammer

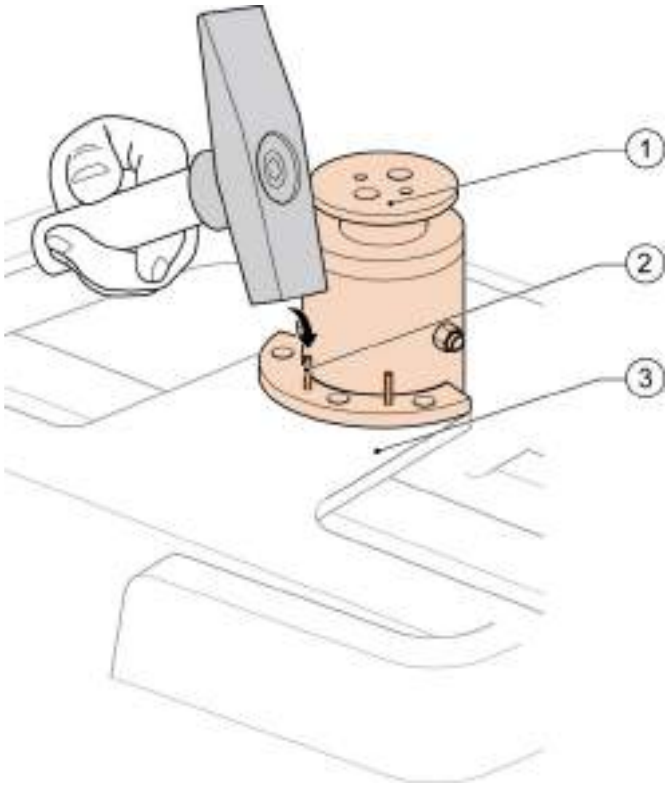


Fig. 21 Use cotter pins to secure to the draw bar

Step 3

Secure 3 screws (1) using Loctite 243 (4) and thus tightly screw the swivel joint (2) to the draw bar (3) using a torque wrench.

Tools:

hexagon socket,
torque wrench

BG 110: sizes 19
BG 130: sizes 19
BG 160: sizes 19
BG 190: sizes 19
BG 240: sizes 19

Standardized parts: (1)

BG 110: screws M 12x25-8.8
BG 130: screws M 12x25-8.8
BG 160: screws M 12x25-8.8
BG 190: screws M 12x25-8.8
BG 240: screws M 12x25-8.8

Starting torques: (1)

BG 110: M_T=74 Nm
BG 130: M_T=74 Nm
BG 160: M_T=74 Nm
BG 190: M_T=74 Nm
BG 240: M_T=74 Nm

Equipment:
Loctite 243

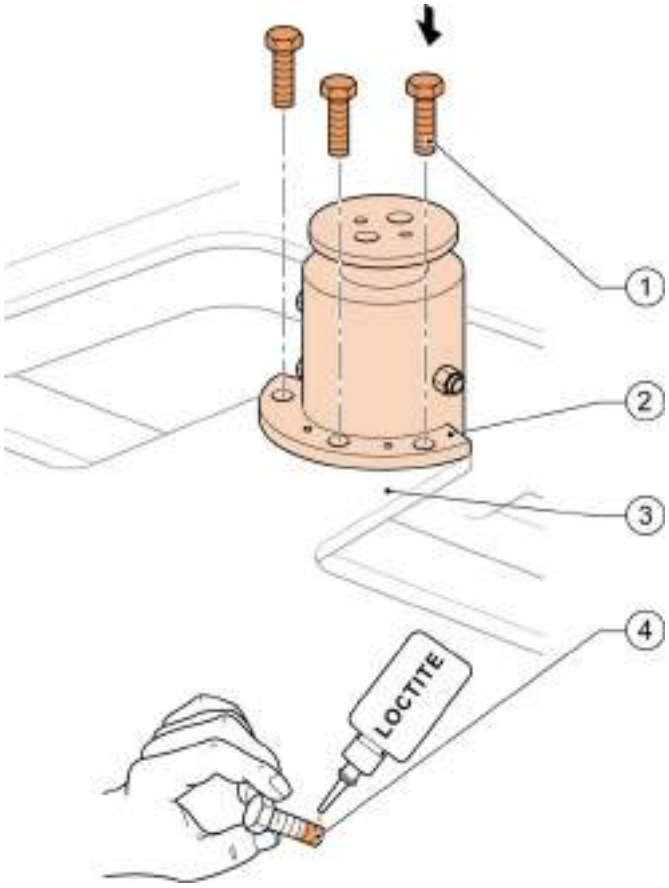


Fig. 22 Screwed connection of slewing joint on draw bar

5.1.3 Replace slewing gear drive

5.1.3.1 Dismounting slewing gear drive

Step 1

Remove plastic stopper (1) from the threaded holes of the slewing gear drive (2).

Tools:

screwdriver

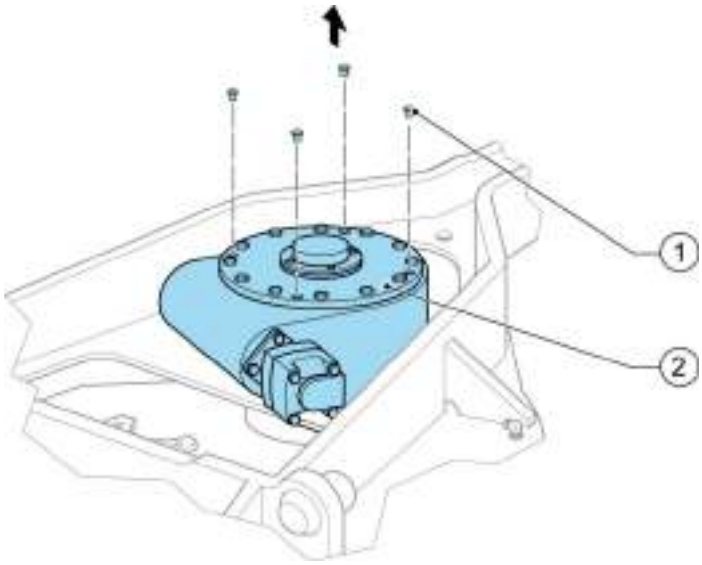


Fig. 23 Loosen plastic stoppers from slewing gear drive

Step 2

Screw ring bolts (1) into the threaded holes of the slewing gear drive (2).

Material: (1)

BG 110: 4 M10 ring screws
BG 130: 4 M10 ring screws
BG 160: 4 M10 ring screws
BG 190: 4 M10 ring screws
BG 240: 4 M10 ring screws

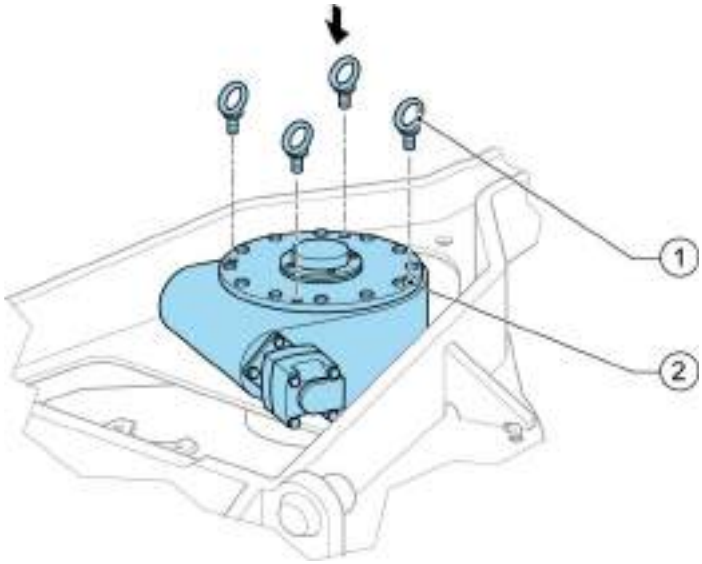


Fig. 24 Screw ring bolts to the slewing gear drive

Step 3a **BG 110 / BG 130 / BG 160**

Use a socket wrench to remove 7 screws (1) for securing the slewing gear drive (2) to the draw bar (3) above.

Tools:

socket wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: sizes 24

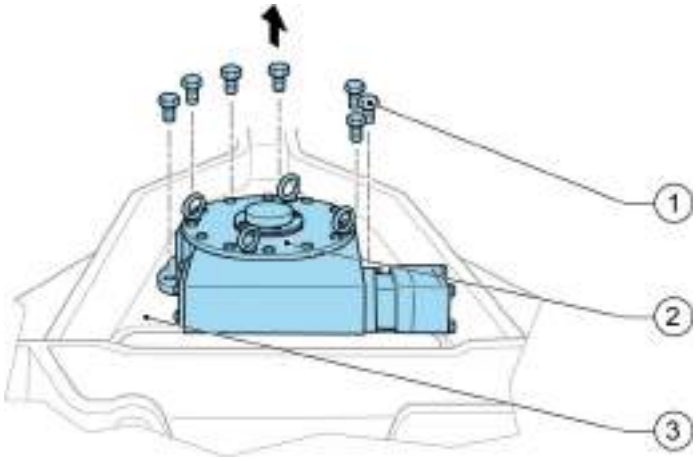


Fig. 25 Loosen screws from slewing gear drive from above.

Step 3b **BG 190 / BG 240**

Use a socket wrench to remove 5 screws (1) and 2 countersunk screws (4) for securing the slewing gear drive (2) to the draw bar (3) below.

Tools:

socket wrench (1)

BG 190: size 30
BG 240: size 30

Allen wrench (4)

BG 190: sizes 12
BG 240: sizes 12

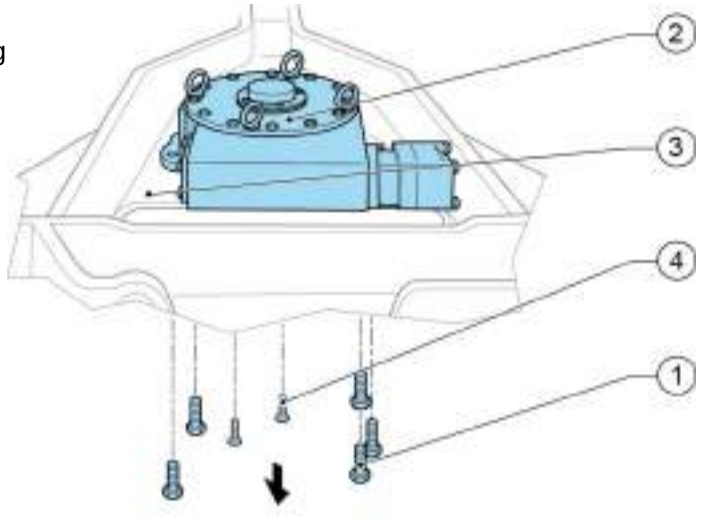


Fig. 26 Loosen screws from slewing gear drive from below

NOTE

At BG 190 / BG 240, disassemble screws (1+4) from below.
The 2 countersunk screws (4) can only be dismantled if the slewing gear was dismantled.

Step 4

Suspend hook chains (1) from the ring bolts (3).

Using a crane, lift the slewing gear drive (2) from the draw bar (4).

Equipment:

4 hook chains,
lift apparatus

Weight

BG 110: approx. 140 kg
BG 130: approx. 140 kg
BG 160: approx. 140 kg
BG 190: approx. 220 kg
BG 240: approx. 220 kg

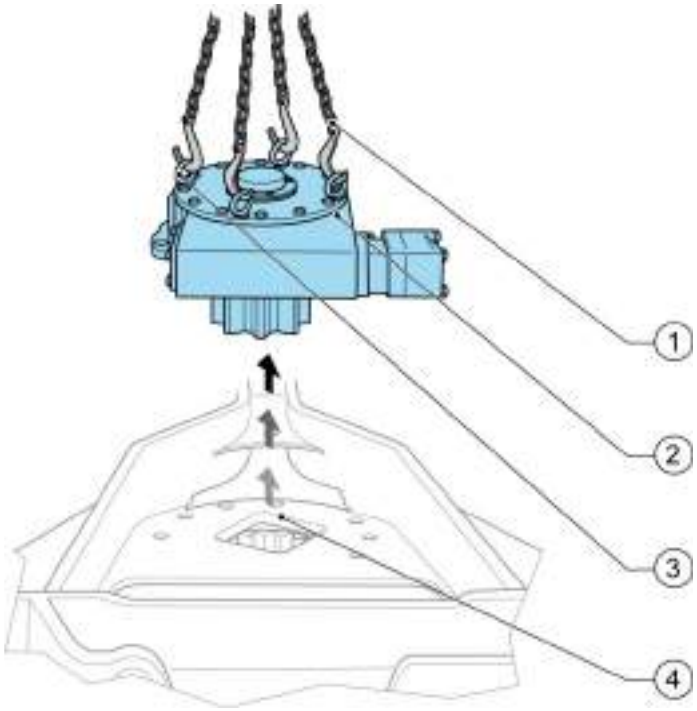


Fig. 27 Use crane to lift slewing gear drive

5.1.3.2 Assemblying slewing gear drive

NOTE
Prior to assembly of the screwed connections, apply Loctite to the thread of the screws. The connection must be clean and free of grease.

Step 1

When assembling the draw bar (1) to 2 metal supports (3), seat securely.

Clean surfaces for centring the slewing gear drive (2) with a suitable tool (metallic blank).

Clean colouring from the centring.

Equipment:

2 metal supports,
cutter,
scraper,
abrasive,
cleanser

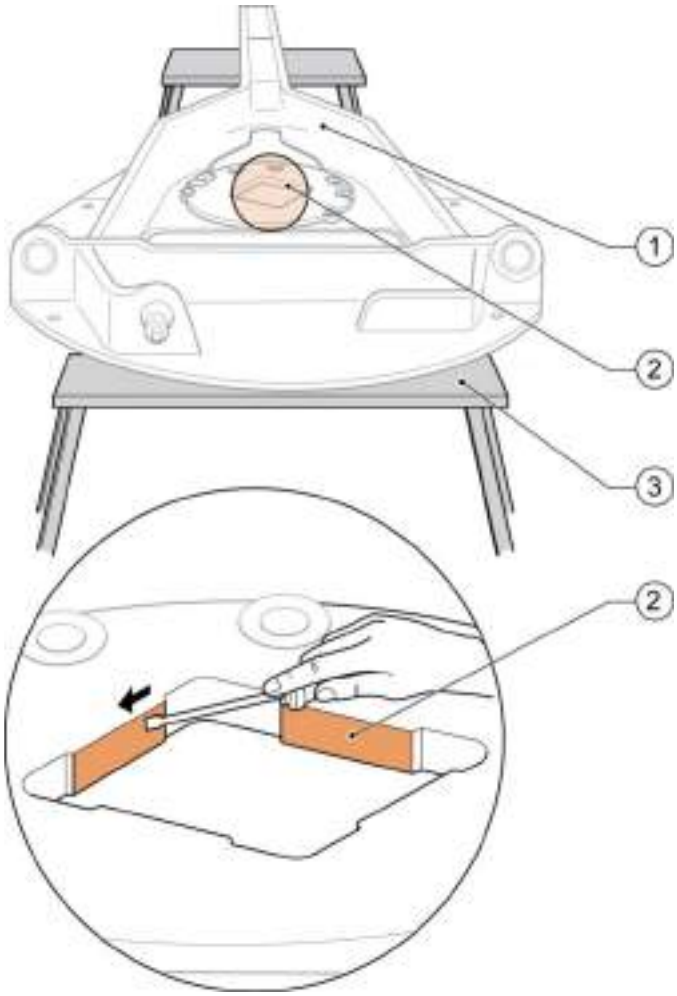


Fig. 28 Clean surfaces on draw bar

Step 2

Suspend hook chains (1) in the ring bolts (2) on the slewing gear drive (slewing gear) (3).

Using the crane, place the slewing gear drive (slewing gear transmission) (3) on the draw bar (4).

Remove the 4 ring bolts (2).

Equipment:

4 hook chains,
lift apparatus

Weight

BG 110: approx. 140 kg
BG 130: approx. 140 kg
BG 160: approx. 140 kg
BG 190: approx. 220 kg
BG 240: approx. 220 kg

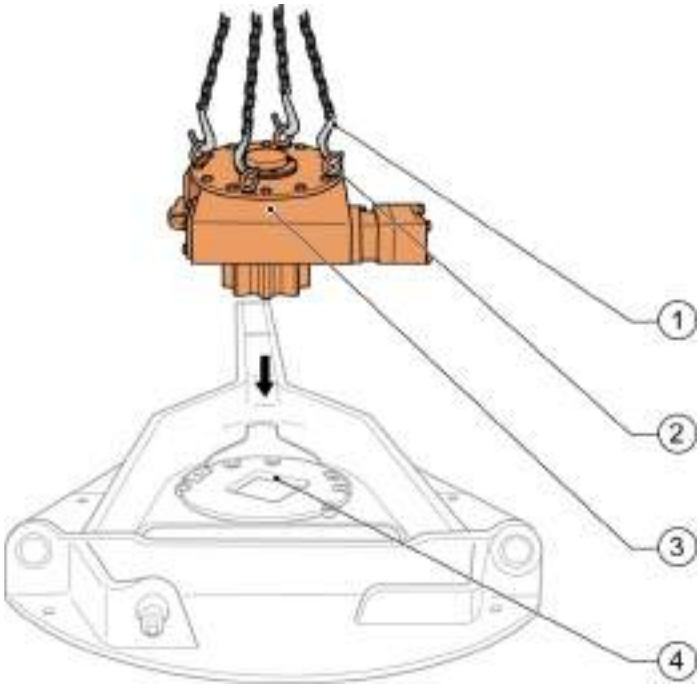


Fig. 29 Use crane to set slewing gear drive on draw bar

Step 3a **BG 110 / BG 130 / BG 160**

Secure 7 screws (1) using Loctite 243 (3) and thus tightly screw the slewing gear drive (slewing gear transmission) (2) onto the draw bar (3) using a torque wrench from above.

Tools:

torque wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: sizes 24

Standardized parts: (1)

BG 110: screws M 16-10.9
BG 130: screws M 16-10.9
BG 160: screws M 16-10.9

Starting torques: (1)

BG 110: M_T=265 Nm
BG 130: M_T=265 Nm
BG 160: M_T=265 Nm

Equipment:

Loctite 243

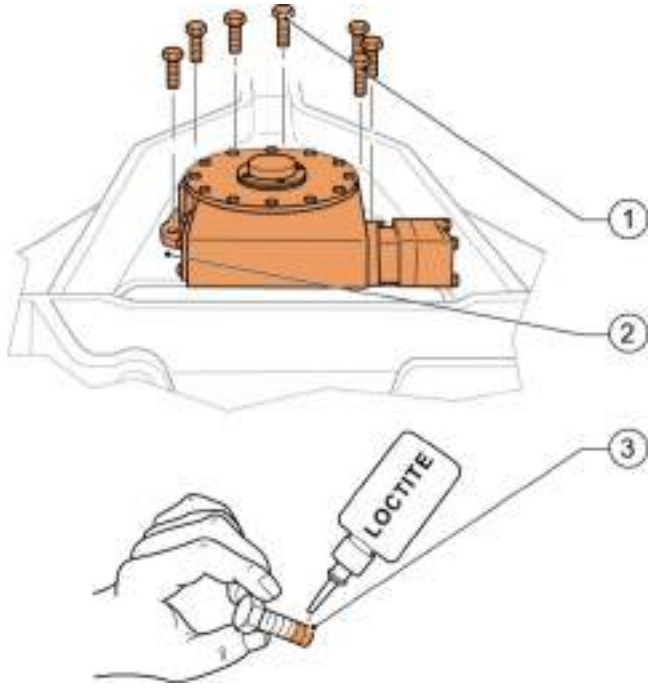


Fig. 30 Screw the slewing gear drive on the draw bar from above

Step 3b **BG 190 / BG 240**

Secure 5 screws (1) and 2 countersunk screws (1) using Loctite 243 (5) and tightly screw the slewing gear drive (slewing gear) (2) onto the draw bar (3) using a torque wrench from below.

Tools:

torque wrench (1)

BG 190: size 30
BG 240: size 30

Allen wrench (4)

BG 190: sizes 12
BG 240: sizes 12

Standardized parts:

BG 190: screws M 20-10.9 (1)
BG 240: screws M 20-10.9 (1)

BG 190: countersunk head screws M 8 (4)
BG 240: countersunk head screws M 8 (4)

Starting torques: (1)

BG 190: M_T=510 Nm
BG 240: M_T=510 Nm

Equipment:

Loctite 243

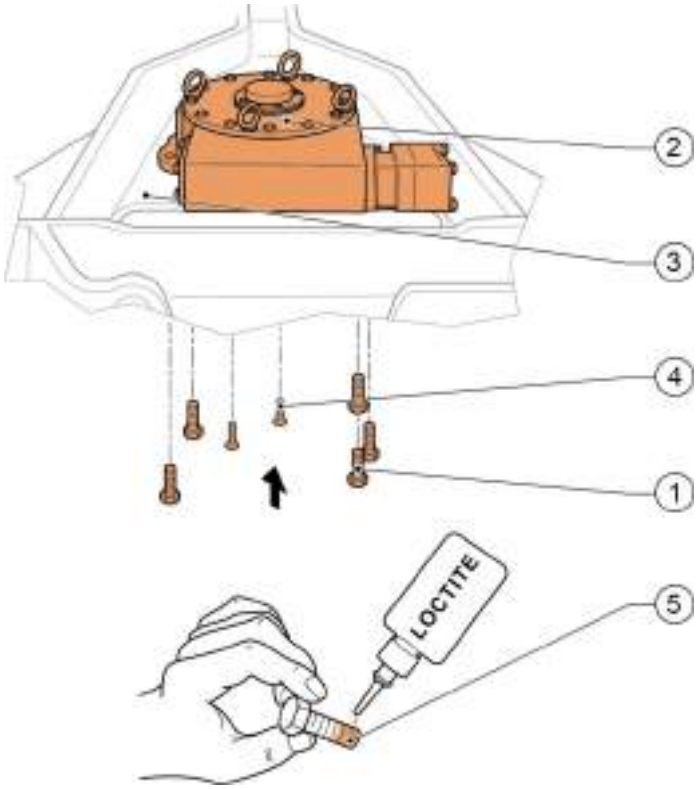


Fig. 31 Screw the slewing gear drive to the draw bar from below

5.1.4 Replacing slewing gear motor

5.1.4.1 Dismounting slewing gear motor

Step 1

Use a flat wrench to remove the hose lines (2) on the motor (1) (slewing gear motor) and close with closure material.

Closure material:
ROV 15-LA, M15-LA and VK15-LA

Tools:

open-end wrench

BG 110: size 27 hose and socket
BG 130: size 27 hose and socket
BG 160: size 27 hose and socket
BG 190: size 27 hose and socket
BG 240: size 27 hose and socket

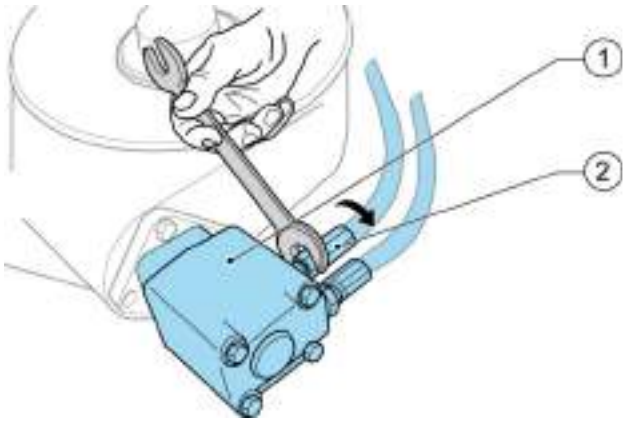


Fig. 32 Loosen hose lines from slewing gear motor

Step 2

Use tool to loosen 4 screws (3) of the slewing gear motor (2) on the slewing gear drive (1). Remove and replace slewing gear motor (2).

Tools:

Allen-type wrench

BG 110: sizes 10
BG 130: sizes 10
BG 160: sizes 10
BG 190: sizes 10
BG 240: sizes 10

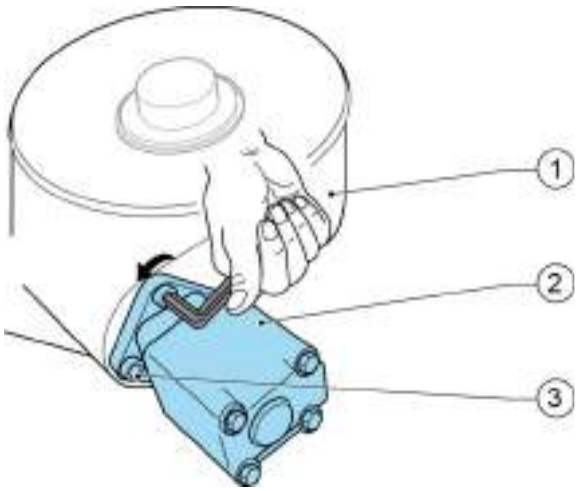


Fig. 33 Loosen screws and slewing gear drive

5.1.4.2 Assembling slewing gear motor

Working Steps

The slewing gear motor is installed in reverse order.

NOTE
No lock washers are used under the screws with internal hex DIN 912!

5.1.5 Changing ball bolt

5.1.5.1 Dismounting ball bolt BG 110 / BG 130

Step 1

Using a socket wrench, loosen nut (4), nut (5) and washer (4) from the ball bolt (1).

Remove ball bolt (1) and ball socket (2) from the draw bar (6).

Tools:

socket wrench

BG 110: sizes 55
BG 130: size 55

Aluminum front retainer,
hammer

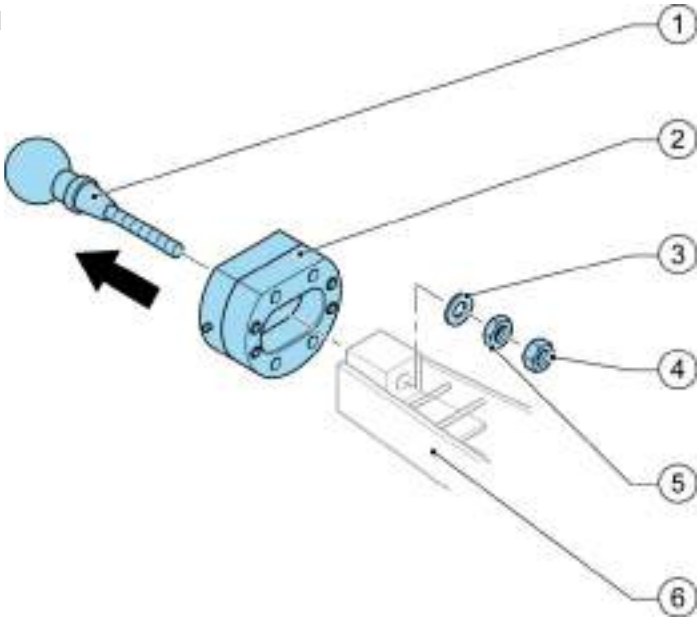


Fig. 34 Remove ball bolt from draw bar

5.1.5.2 Dismounting ball bolt BG 160 / BG 190 / BG 240

Step 1

Using a socket wrench, loosen nut (2), nut (3) and washer (4) from the ball bolt (1).

Knock out ball bolt (1) with aluminum front retainer (5) and hammer from the draw bar (6).

Tools:

socket wrench
BG 160: sizes 55
BG 190: sizes 55
BG 240: sizes 55

Aluminum front retainer,
hammer

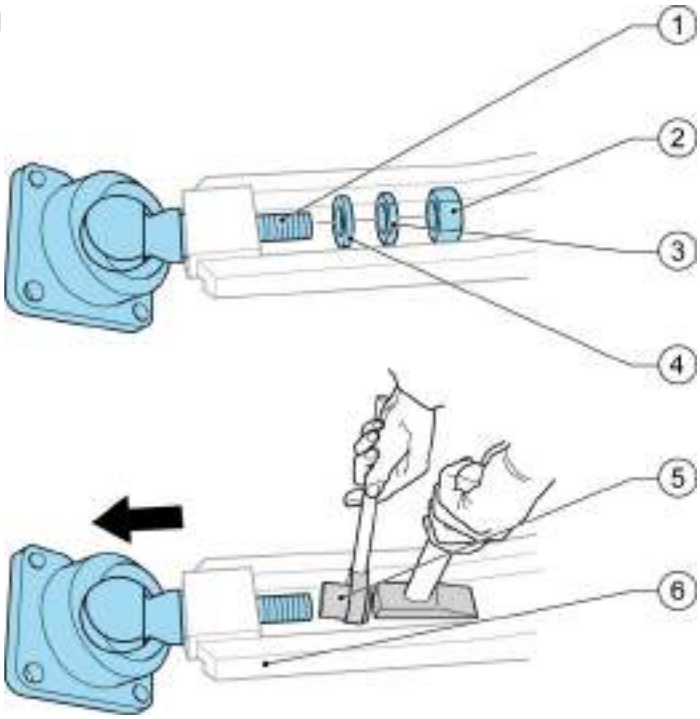


Fig. 35 Knock ball bolt out of draw bar

5.1.5.3 Assemblying ball bolt BG 110 / BG 130

Step 1

Spray the ball socket (2) and ball bolt (1) sliding surfaces with molybdenum disulfide lubricating varnish (Gleitmo-900 spray) and let dry.

Lubricate the ball bolt (1) with lubricant and mount with ball socket (2) in the draw bar (6).

Tighten nut (4) and nut (5) with washer (3), lock and secure with Loctite 243 (7).

Tools:

socket wrench

BG 110: sizes 55
BG 130: sizes 55

Standardized parts:

BG 110: nut M 30 DIN 933 (4)
BG 110: nut M 30 DIN 439)

BG 130: nut M 30 DIN 933 (4)
BG 130: nut M 30 DIN 439)

Starting torques:

BG 110: M_T=3200 Nm (4)
BG 110: M_T=3200 Nm (5)

BG 130: M_T=3200 Nm (4)
BG 130: M_T=3200 Nm (5)

Equipment:

molybdenum disulfide lubricating varnish (Gleitmo-900 spray),
lubricating grease,
Loctite 243

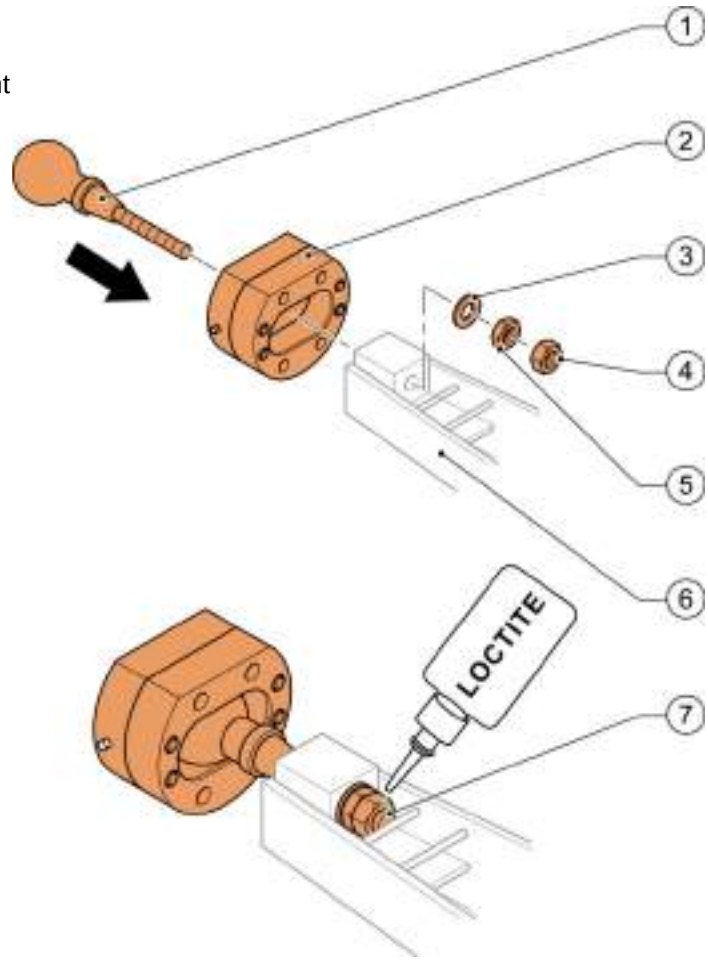


Fig. 36 Mount ball bolt in draw bar

5.1.5.4 Assembling ball bolt BG 160 / BG 190 / BG 240

Step 1

Spray the ball socket (1) and ball bolt (2) sliding surfaces with molybdenum disulfide lubricating varnish (Gleitmo-900 spray) and let dry.

Lubricate the ball bolt with lubricant and mount in the draw bar (6).

Tighten nut (3) and nut (4) with washer (5), lock and secure with Loctite 243 (7).

Tools:

socket wrench

BG 160: sizes 55
BG 190: sizes 55
BG 240: sizes 55

Standardized parts:

BG 160: nut M 36-10 DIN 934 (3)
BG 160: nut M 36-10 DIN 439 (4)

BG 190: nut M 36-10 DIN 934 (3)
BG 190: nut M 36-10 DIN 439 (4)

BG 240: nut M 36-10 DIN 934 (3)
BG 240: nut M 36-10 DIN 439 (4)

Starting torques:

BG 160: M_T=3200 Nm (3)
BG 160: M_T=3200 Nm (4)

BG 190: M_T=3200 Nm (3)
BG 190: M_T=3200 Nm (4)

BG 240: M_T=3200 Nm (3)
BG 240: M_T=3200 Nm (4)

Equipment:

molybdenum disulfide lubricating varnish (Gleitmo-900 spray),
lubricating grease,
Loctite 243

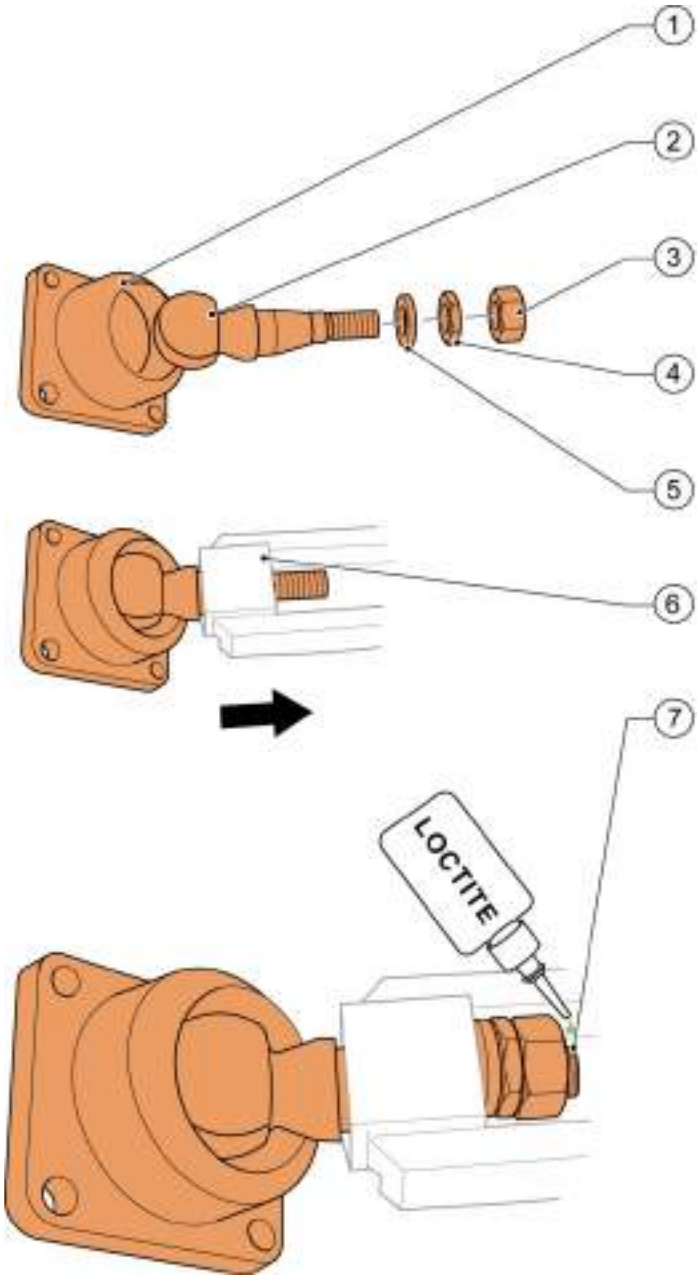


Fig. 37 Mount ball bolt in draw bar

5.1.6 Change the slewing gear draw bar

5.1.6.1 Disassembling the draw bar from the slewing gear

Step 1

Unscrew 4 hex screws (1) on top of draw bar (2) with socket wrench.

Unscrew 1 hex screw (4) below the draw bar (2) and remove the cover (3) of the slewing gear.

Tools:

socket wrench

BG 110: size 13
BG 130: size 13
BG 160: size 13
BG 190: size 13
BG 240: size 13

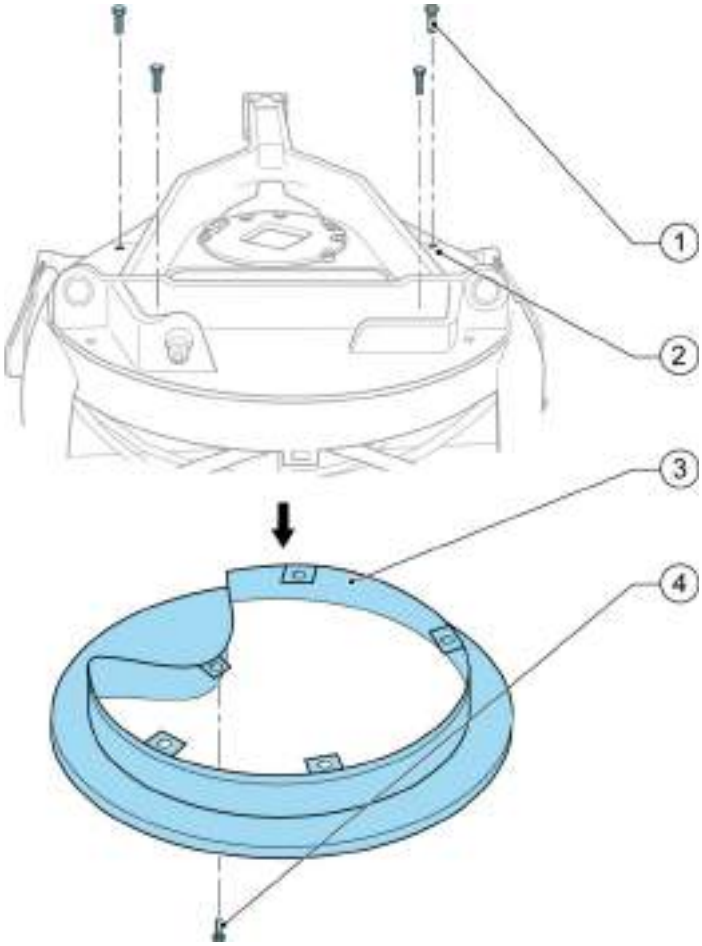


Fig. 38 Remove slewing gear cover

Step 2

Unscrew all hex screws (3) and washers (2) on four-point bearing (ball bearing slewing gear) (1) with socket wrench.

Tools:

socket wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: sizes 24
BG 190: sizes 24
BG 240: sizes 24

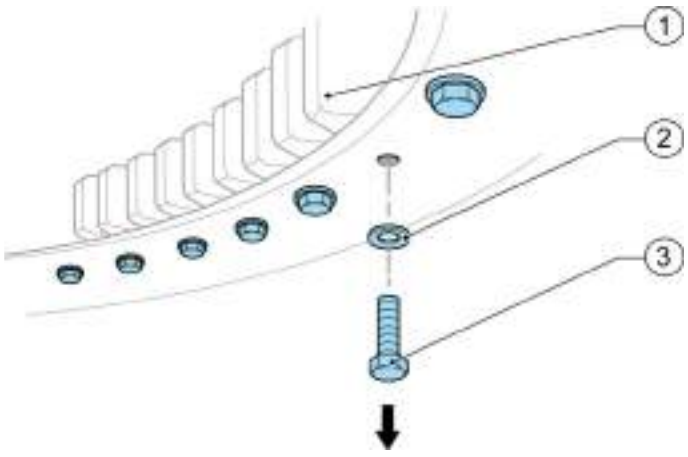


Fig. 39 Loosen ball bearing slewing gear screw in socket

Step 3

Suspend draw bar (2) from crane with 3 hook chains (1) and lift out of the slewing gear (3).

Equipment:

3 hook chains,
lift apparatus

Weight

BG 110: approx. 400 kg
BG 130: approx. 400 kg
BG 160: approx. 440 kg
BG 190: approx. 520 kg
BG 240: approx. 520 kg

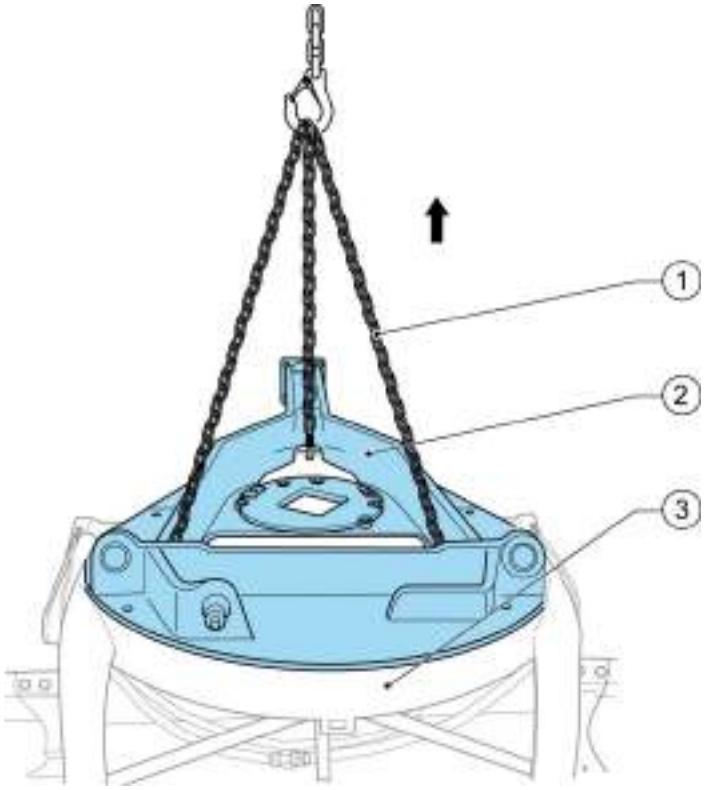


Fig. 40 Use crane to lift out draw bar

5.1.6.2 Assembly of draw bar to slewing gear

Step 1

Clean the contact surface (1) for the four-point bearing (ball bearing slewing gear) of the slewing gear (2) with sandpaper (3) of rust and old surface adhesive (Loctite). The surface must be metallic bright.

Spread Loctite 586 (4) thinly onto the contact surface (1) for the four-point bearing (ball bearing slewing gear) of the slewing gear (2) using a putty knife.

Equipment:

sandpaper,
Loctite 586,
putty

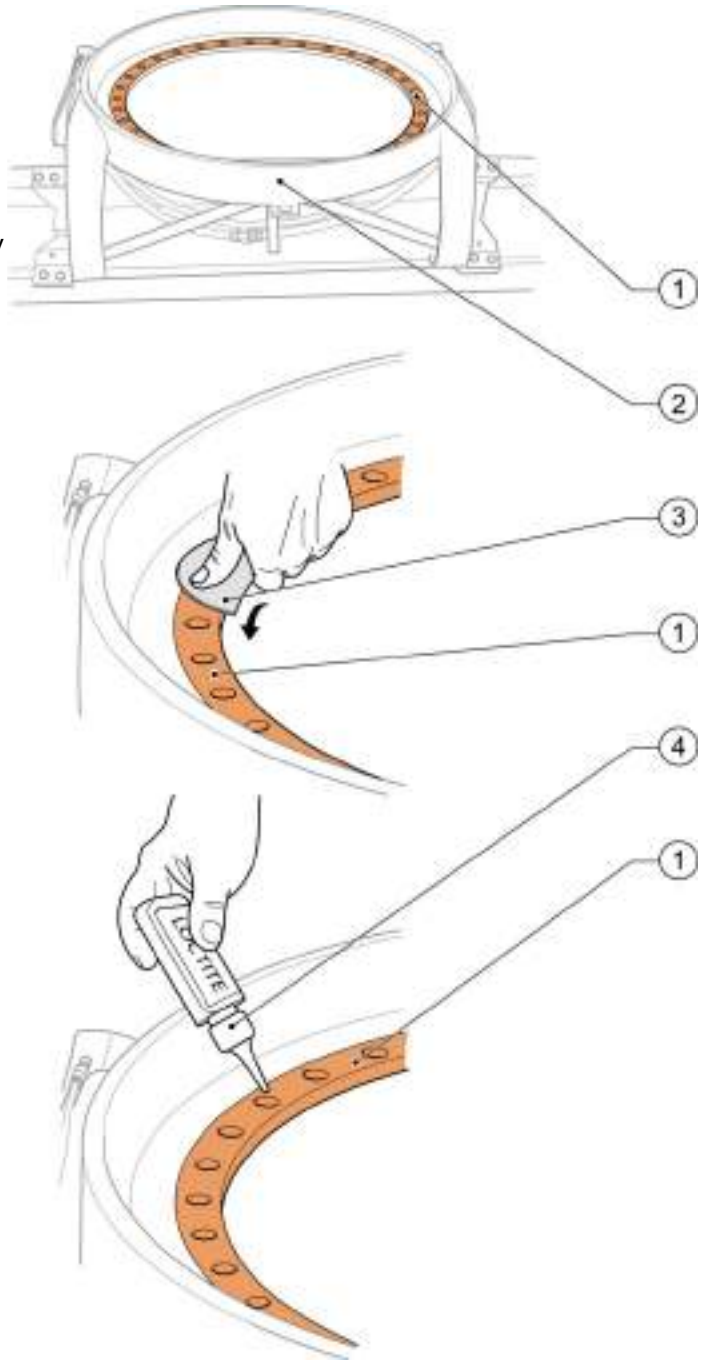


Fig. 41 Prepare bearing surface on slewing gear

Step 2

Suspend draw bar (1) from crane with 3 hook chains (2) and place on the bearing surface of the slewing gear (3).

Equipment:

3 hook chains,
lift apparatus

Weight

BG 110: approx. 530 kg
BG 130: approx. 530 kg
BG 160: approx. 580 kg
BG 190: approx. 800 kg
BG 240: approx. 800 kg

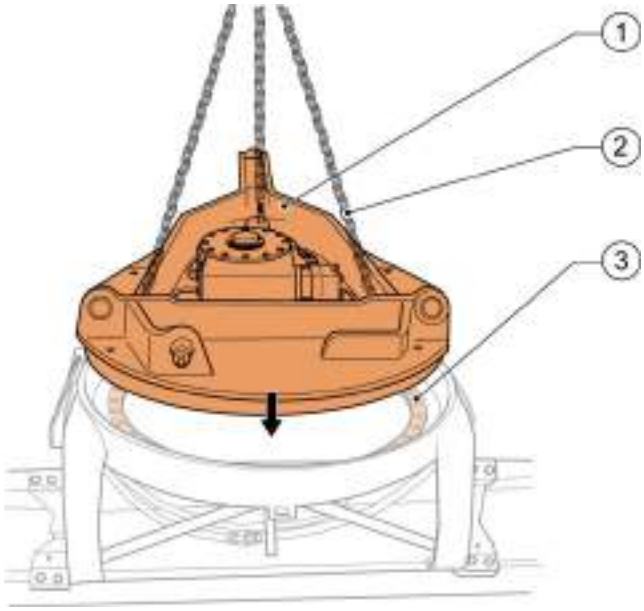


Fig. 42 Use crane to place draw bar on slewing gear

Step 3

Secure all hex screws (4) with Loctite 243 (1) and affix on the four-point bearing (ball bearing slewing gear) (2) with HT washers (3).

Then tighten all hex screws (4) with torque wrench.

Tools:

torque wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: sizes 24
BG 190: sizes 24
BG 240: sizes 24

Standardized parts:

BG 110: screw M 16 (4)
BG 130: screw M 16 (4)
BG 160: screw M 16 (4)
BG 190: screw M 16 (4)
BG 240: screw M 16 (4)

BG 110: DIN 6916 HT washer 17 mm (3)
BG 130: DIN 6916 HT washer 17 mm (3)
BG 160: DIN 6916 HT washer 17 mm (3)
BG 190: DIN 6916 HT washer 17 mm (3)
BG 240: DIN 6916 HT washer 17 mm (3)

Starting torques:

BG 110: M_T=270 Nm (4)
BG 130: M_T=270 Nm (4)
BG 160: M_T=270 Nm (4)
BG 190: M_T=270 Nm (4)
BG 240: M_T=270 Nm (4)

Equipment:

Loctite 243

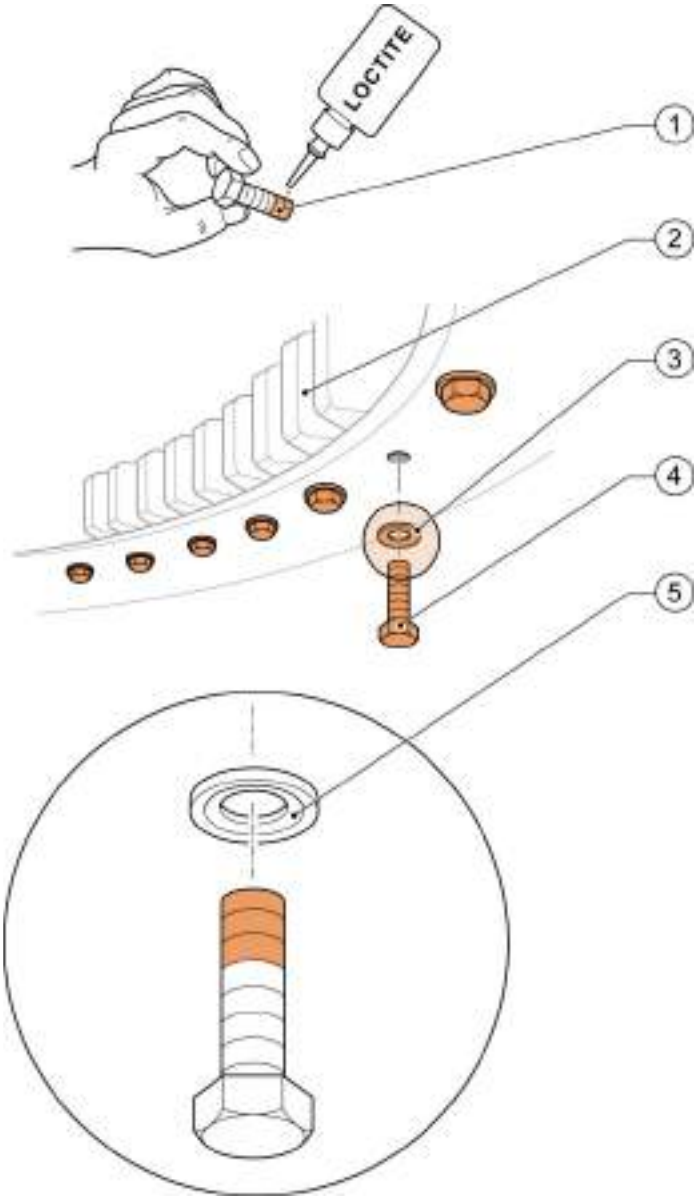


Fig. 43 Screw down ball bearing slewing rim

NOTE
Be sure that the recess (5) of the HT washers (3) faces the screw head!

5.1.7 Changing ball bearing slewing gear

5.1.7.1 Disassembling the ball bearing slewing gear from the draw bar

Step 1

Using the crane and cable (1), turn the draw bar (2) onto its back and place on the floor or metal supports.

Remove all screws (3) and washers (4) with socket wrench.

Tools:

socket wrench

BG 110: sizes 19
BG 130: sizes 19
BG 160: sizes 19
BG 190: sizes 19
BG 240: sizes 19

Weight

BG 110: approx. 610 kg
BG 130: approx. 610 kg
BG 160: approx. 660 kg
BG 190: approx. 820 kg
BG 240: approx. 820 kg

Equipment:

cable,
lift apparatus

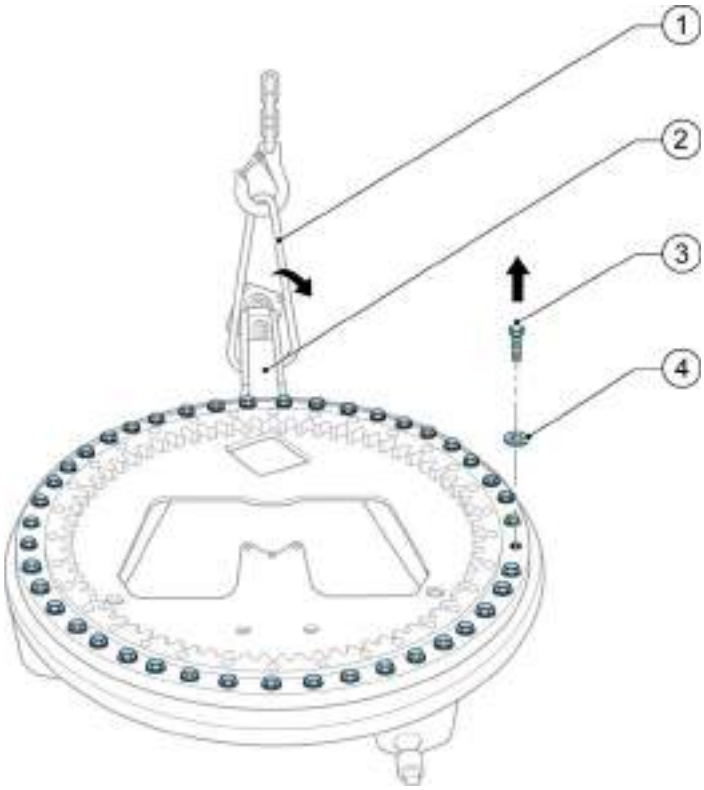


Fig. 44 Remove screws on back of draw bar

Step 2

Screw in 3 ring bolts (1) in the threaded holes of the ball bearing slewing gear (four-point bearing) (3) in the draw bar (2).

Equipment:

3 M16 ring screws

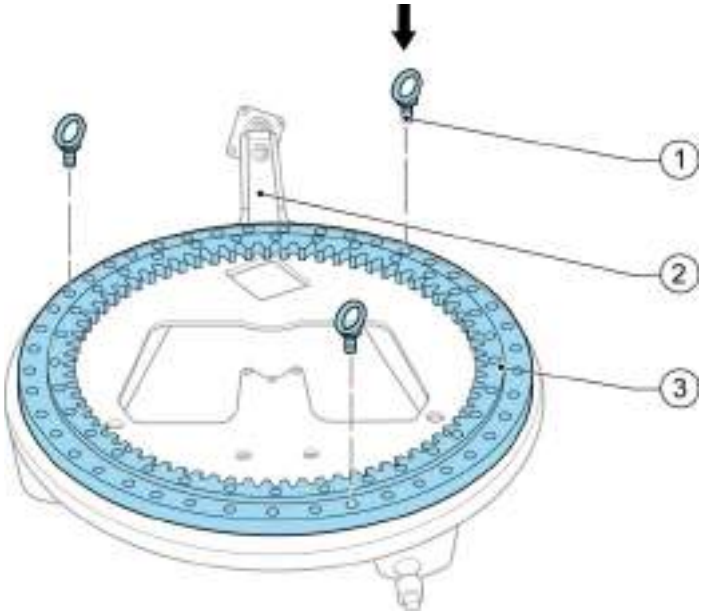


Fig. 45 Screw ring bolts into ball bearing slewing gear

Step 3

Suspend hook chains (4) from the ring bolts (1).

Lift ball bearing slewing gear (four-point bearing) (2) off of the draw bar (3).

Equipment:

3 hook chains,
lift apparatus

Weight

BG 110: approx. 217 kg
BG 130: approx. 217 kg
BG 160: approx. 217 kg
BG 190: approx. 283 kg
BG 240: approx. 283 kg

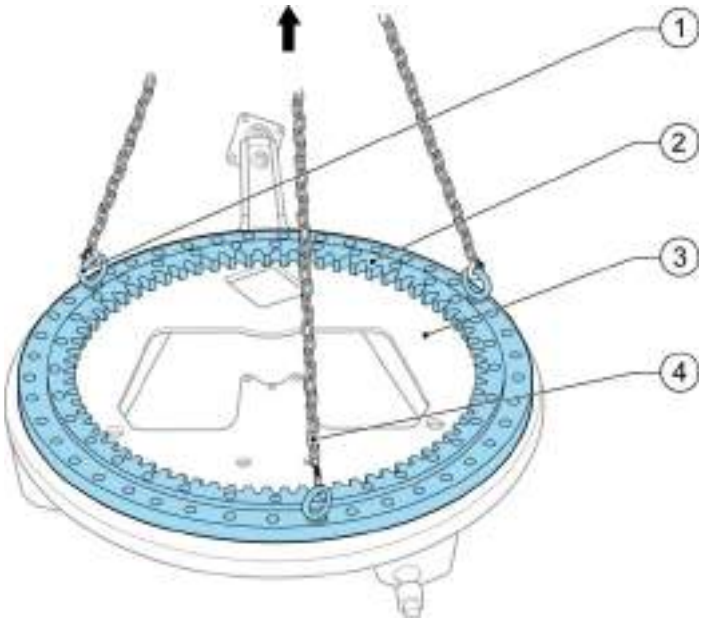


Fig. 46 Lift ball bearing slewing gear from draw bar

5.1.7.2 Assembling draw bar on ball bearing slewing gear

Step 1

Using the crane and cable (1), turn the draw bar (2) onto its back and place it securely on the metal supports (4) for further installation.

Equipment:

lift apparatus,
cable

Weight

BG 110: approx. 530 kg
BG 130: approx. 530 kg
BG 160: approx. 580 kg
BG 190: approx. 800 kg
BG 240: approx. 800 kg

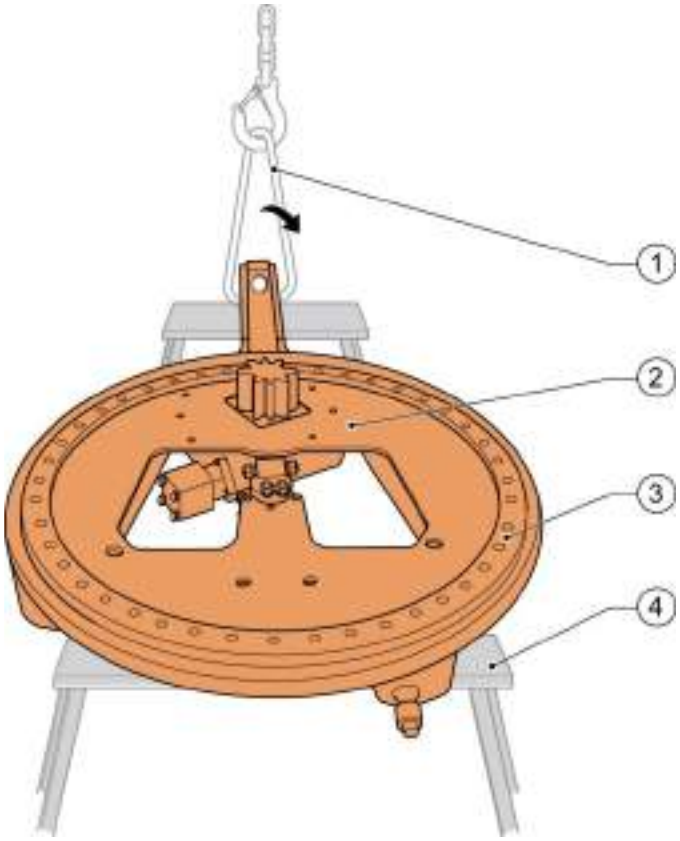


Fig. 47 Draw bar turned

Step 2

Clean contact surface (Tectyl) from contact surface (1) of the ball bearing slewing gear (four-point bearing) using cleansing agent. The surface must be metallic bright.

Apply Loctite 586 to contact surface (1) with a putty knife.

Secure all screws (3) with Loctite 243 (2) and prepare for installation with HT washer.

Tools:

socket wrench

BG 110: sizes 19
BG 130: sizes 19
BG 160: sizes 19
BG 190: sizes 19
BG 240: sizes 19

Standardized parts:

BG 110: screws M 12 (3)
BG 130: screws M 12 (3)
BG 160: screws M 12 (3)
BG 190: screws M 12 (3)
BG 240: screws M 12 (3)

BG 110: DIN 6916 HT washer 13 mm (4)
BG 130: DIN 6916 HT washer 13 mm (4)
BG 160: DIN 6916 HT washer 13 mm (4)
BG 190: DIN 6916 HT washer 13 mm (4)
BG 240: DIN 6916 HT washer 13 mm (4)

Equipment:

cleaning agent
(brake cleaner or similar)
Loctite 586,
Loctite 243,
putty

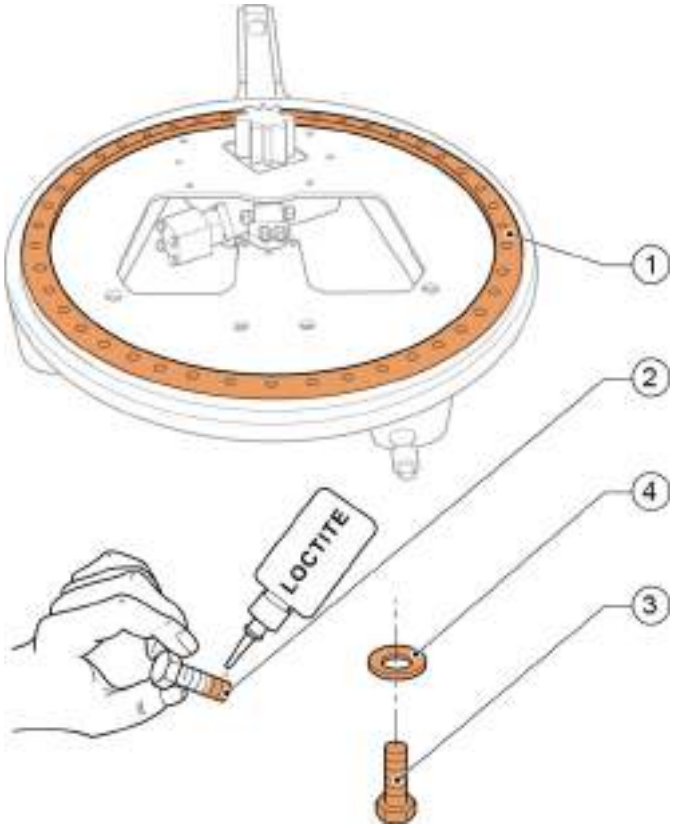


Fig. 48 Prepare contact surface and screws

Step 3

The slewing gear drive is connected to the grader so that the adjustments can be made to the tooth face clearance of the ball bearing slewing gear.

Loosen closure material from the hose lines and valves (2) for the motor (slewing gear motor) (3).

Lengthen the hose lines (2) of the vehicle (1) and connect to the motor (slewing gear motor) (3) with flat wrench.

Tools:

open-end wrench
for hose and socket

BG 110: sizes 22, 27
BG 130: sizes 22, 27
BG 160: sizes 22, 27
BG 190: sizes 22, 27
BG 240: sizes 22, 27

Equipment:

2x hose lengthening*
2SN12 x 2000 CEL/DKOL
2SN10 x 2000 CEL/DKOL

*Depending on model

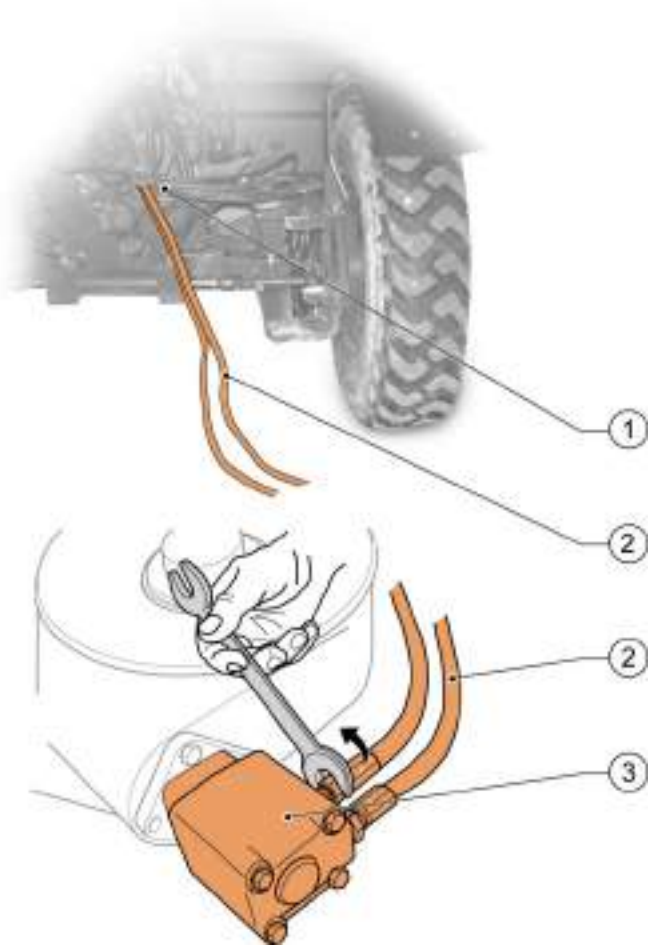


Fig. 49 Connect slewing gear motor with grader

Step 4

Suspend 3 hook chains (1) in the ring bolts (2) on the ball bearing slewing gear (four-point bearing) (3).

Using the crane, place the ball bearing slewing gear (four-point bearing) (3) on the contact surface (4) on the draw bar.

Equipment:

3 hook chains,
lift apparatus

Weight

BG 110: approx. 217 kg
BG 130: approx. 217 kg
BG 160: approx. 217 kg
BG 190: approx. 283 kg
BG 240: approx. 283 kg

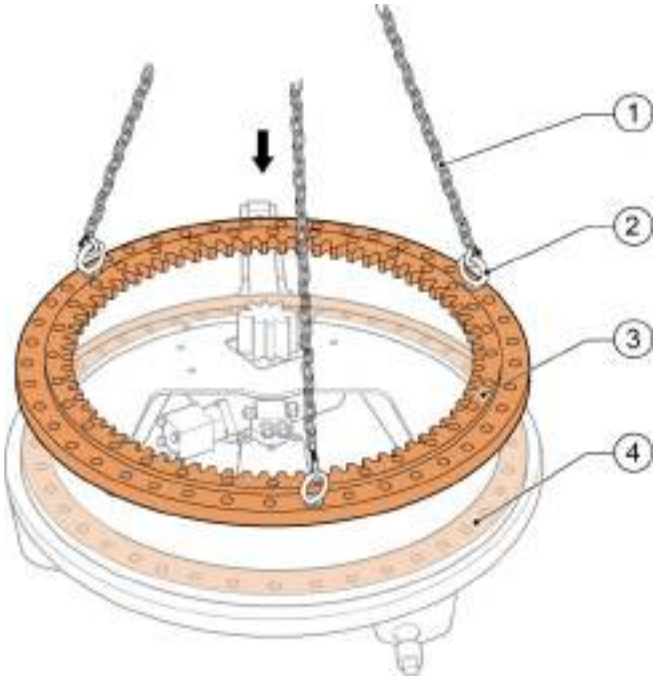


Fig. 50 Set ball bearing slewing gear on draw bar

Step 5

When placing the ball bearing slewing gear (four-point bearing) (2), ensure that the lubrication hole (8) of the external ring of the ball bearing slewing gear (four-point bearing) (2) matches the lubrication hole (7) of the draw bar (3).

The marking of the hardness step “S” (5) of the external ring of the ball bearing slewing gear (four-point bearing) (2) must be positioned opposite the engagement point of the pinion (1) (as shown).

The marking of the hardness step “S” (5) is at the height of the ball filling point (6) and of the nameplate (4).

Mark both locations in advance (8).

Equipment:

lift apparatus,
screwdriver,
(marking pen or similar)

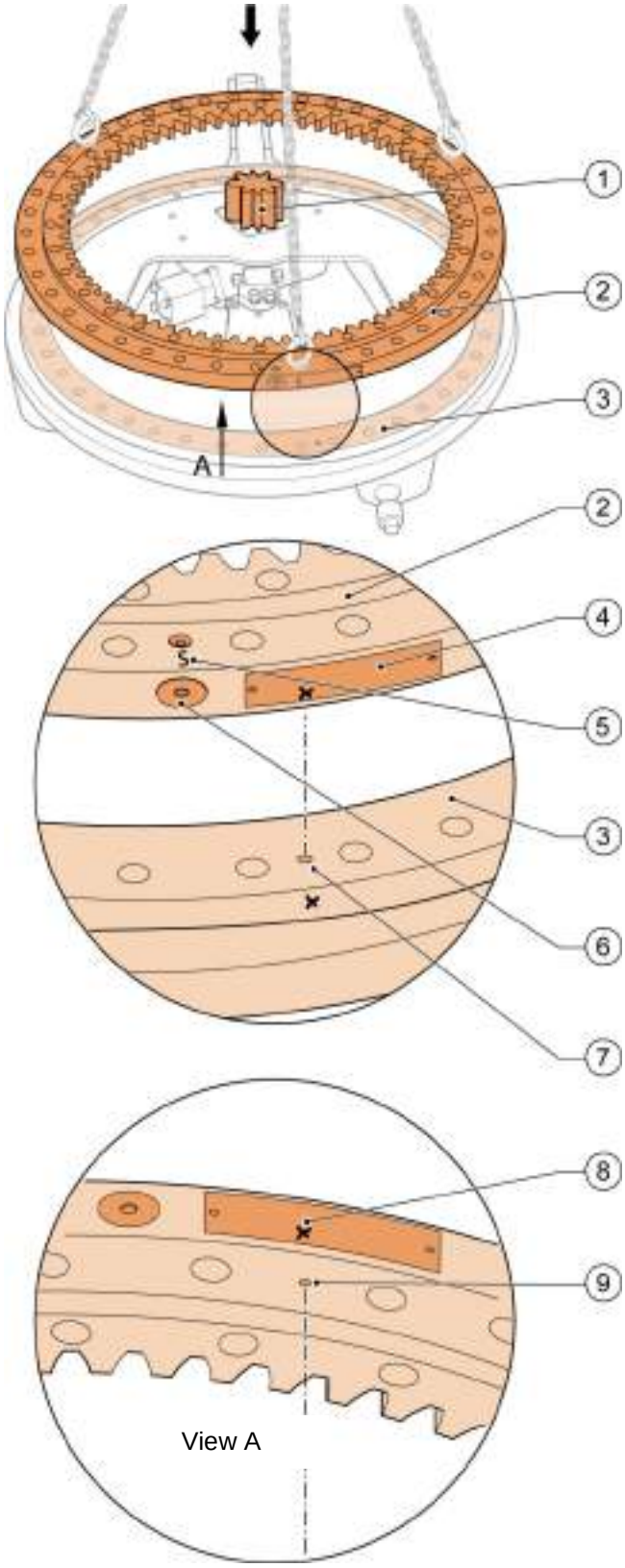


Fig. 51 Align the ball bearing slewing gear using the hardness step

Step 6

Use the marked locations for orientation.

Using a screwdriver, align the hole pattern of the external ring of the ball bearing slewing gear (four-point bearing) (1) and the draw bar (2).

Equipment:

lift apparatus,
screwdriver

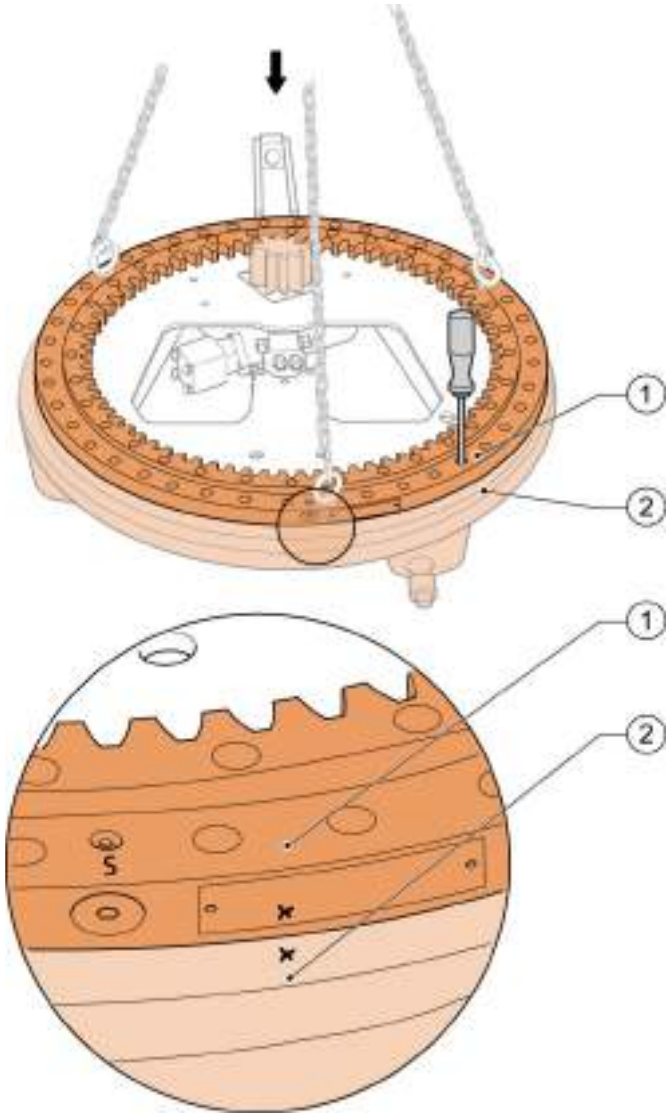


Fig. 52 Align the ball bearing slewing gear using the hole pattern

Step 7

Provisionally fasten the ball bearing slewing gear (four-point bearing) (2) with the prepared screws (1) and HT washers (4) to the draw bar (3).

Tools:

torque wrench

BG 110: sizes 19
BG 130: sizes 19
BG 160: sizes 19
BG 190: sizes 19
BG 240: sizes 19

Standardized parts:

BG 110: screws M 12 (1)
BG 130: screws M 12 (1)
BG 160: screws M 12 (1)
BG 190: screws M 12 (1)
BG 240: screws M 12 (1)

BG 110: DIN 6916 HT washer 13 mm (4)
BG 130: DIN 6916 HT washer 13 mm (4)
BG 160: DIN 6916 HT washer 13 mm (4)
BG 190: DIN 6916 HT washer 13 mm (4)
BG 240: DIN 6916 HT washer 13 mm (4)

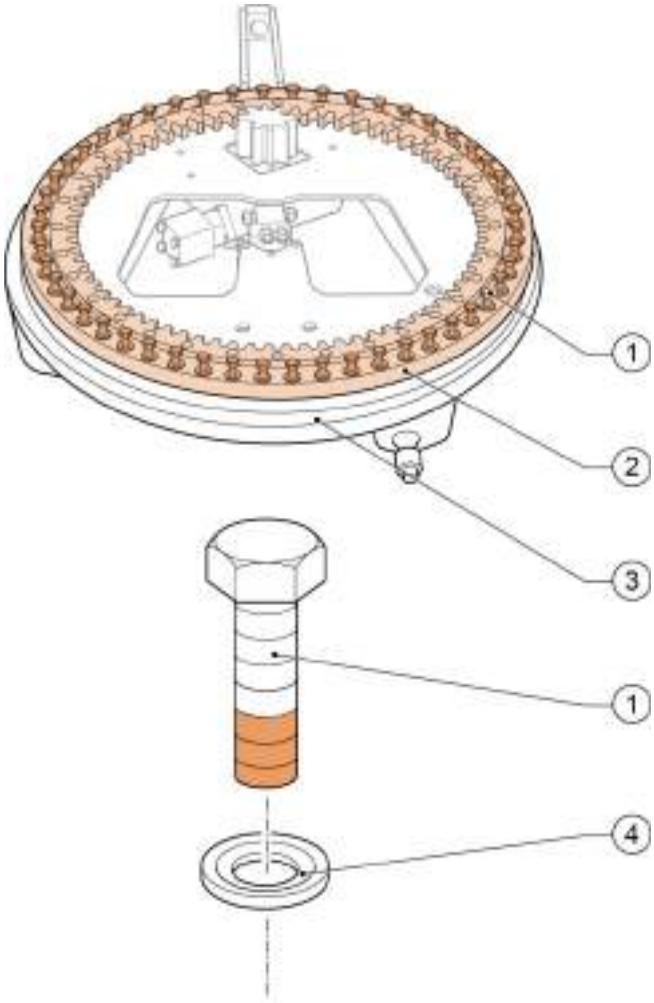


Fig. 53 Fasten screws on ball bearing slewing gear

NOTE
Be sure that the recess of the HT washers (4) faces the screw head!

Step 8

Gently tighten 4 screws (2) crosswise.

Check the tooth face clearance between ball bearing slewing gear (four-point bearing) (4) and pinion (5) using measuring gage.

Turn the ball bearing slewing gear (four-point bearing) (4).

Check the tooth face clearance at various points (staggered 90°) all the way around.

Modify it as needed by means of gentle taps against the bearing (4) with a hammer and aluminium mandrel (6).

When new (delivery condition), the tooth flank clearance of the four-point bearing (ball bearing slewing gear) (4) is adjusted on the three teeth highlighted in colour (1).

Tools:

measuring gage,
Aluminium mandrel,
hammer

Tooth face clearance:

BG 110: 0.45 mm
BG 130: 0.45 mm
BG 160: 0.45 mm
BG 190: 0.45 mm
BG 240: 0.45 mm

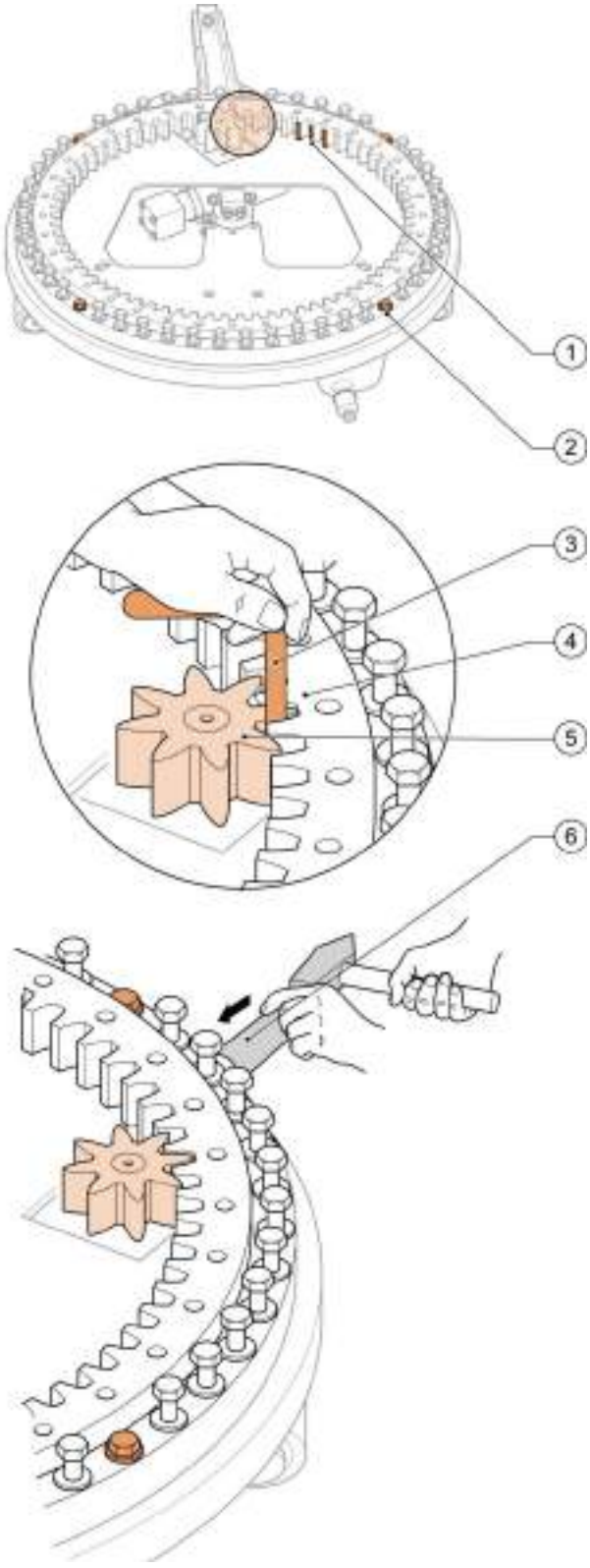


Fig. 54 Adjust tooth face clearance

Step 9

Start the grader.

Using the operating lever (1), turn the ball bearing slewing gear (four-point bearing) (2) all the way around and check the tooth face clearance.

When the tooth flank clearance is correct, tighten all screws (4) crosswise with torque wrench.

Mark each tightened screw with a marking pen (3).

Tools:

torque wrench

BG 110: sizes 19
BG 130: sizes 19
BG 160: sizes 19
BG 190: sizes 19
BG 240: sizes 19

Tightening torque

BG 110: M_T=110 Nm (4)
BG 130: M_T=110 Nm (4)
BG 160: M_T=110 Nm (4)
BG 190: M_T=110 Nm (4)
BG 240: M_T=110 Nm (4)

Tooth face clearance:

BG 110: 0.45 mm
BG 130: 0.45 mm
BG 160: 0.45 mm
BG 190: 0.45 mm
BG 190: 0.45 mm

Equipment:

marking pencil

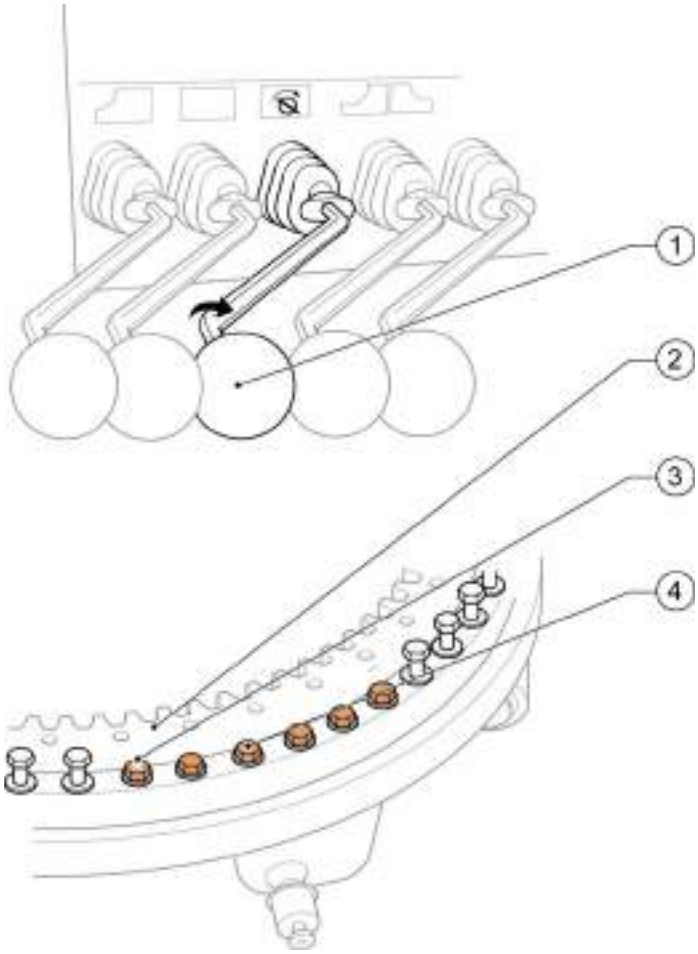


Fig. 55 Depending on tooth face clearance – tighten screws

DANGER

Hazard from moving parts!
Stand back when turning the ball bearing slewing gear (four-point bearing).

Step 10

Start the grader.

Using the operating lever (1), turn the ball bearing slewing gear (four-point bearing) (3) so that the hardness step “S” of the internal ring (4) of the ball bearing slewing gear (four-point bearing) is positioned across from the engagement point of the pinion (2).

Ball bearing slewing gear (four-point bearing) on the draw bar:

In the final assembly state, the “S” of the external ring (5) and “S” of the internal ring (4) of the ball bearing slewing gear (four-point bearing) (3) must be positioned across from the mesh point of the pinion (2)!

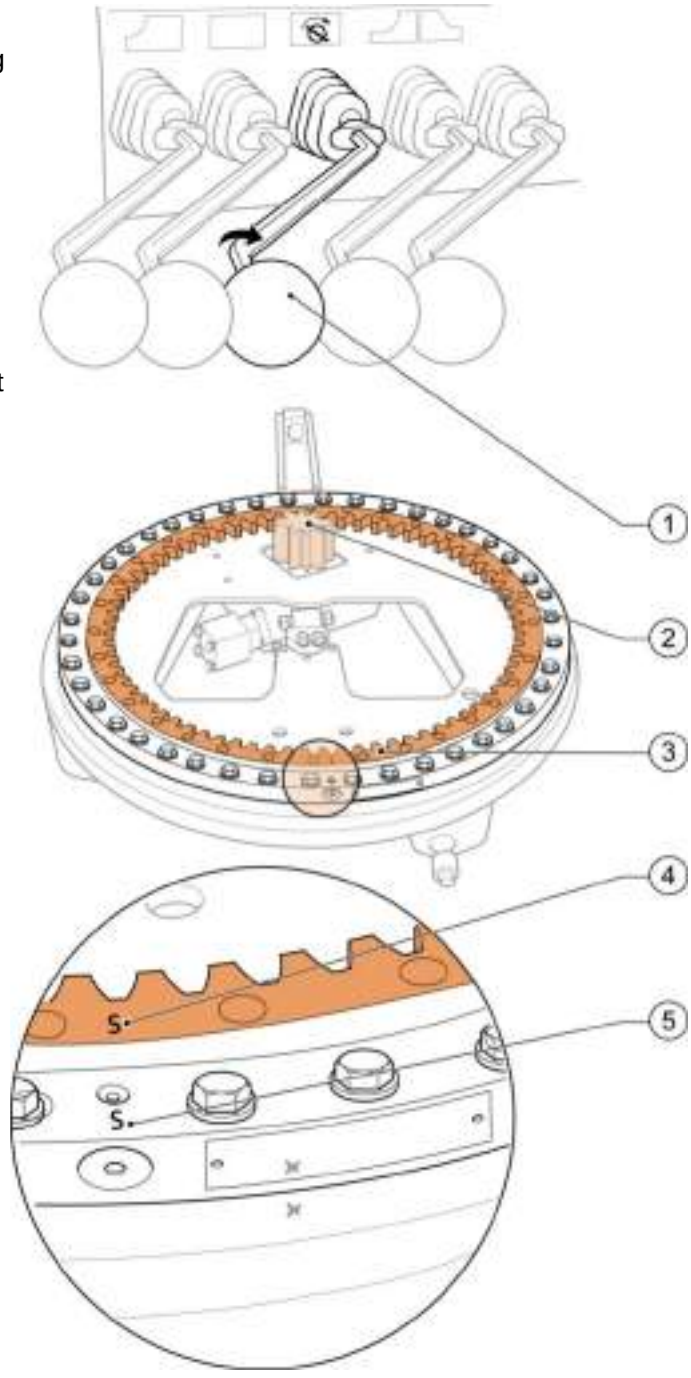


Fig. 56 Positioning the hardness step to the pinion

DANGER

Hazard from moving parts!
Stand back when turning the ball bearing slewing gear (four-point bearing).

Step 11

Disassemble the lengthened hose lines (2) from the motor (slewing gear motor) (3) with flat wrench and close off with closure material.

Closure material:
ROV 15-LA, M15-LA and VK15-LA

Tools:

open-end wrench

BG 110: size 27 hose and socket
BG 130: size 27 hose and socket
BG 160: size 27 hose and socket
BG 190: size 27 hose and socket
BG 240: size 27 hose and socket

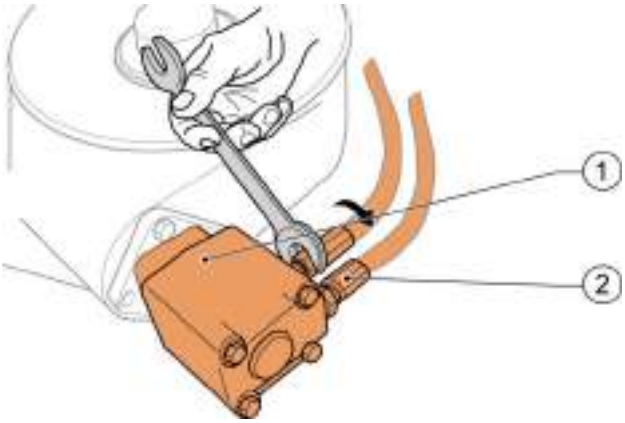


Fig. 57 Separate slewing gear motor from grader

5.2 Cylinder assemblies

5.2.1 Replacing slewing cylinder

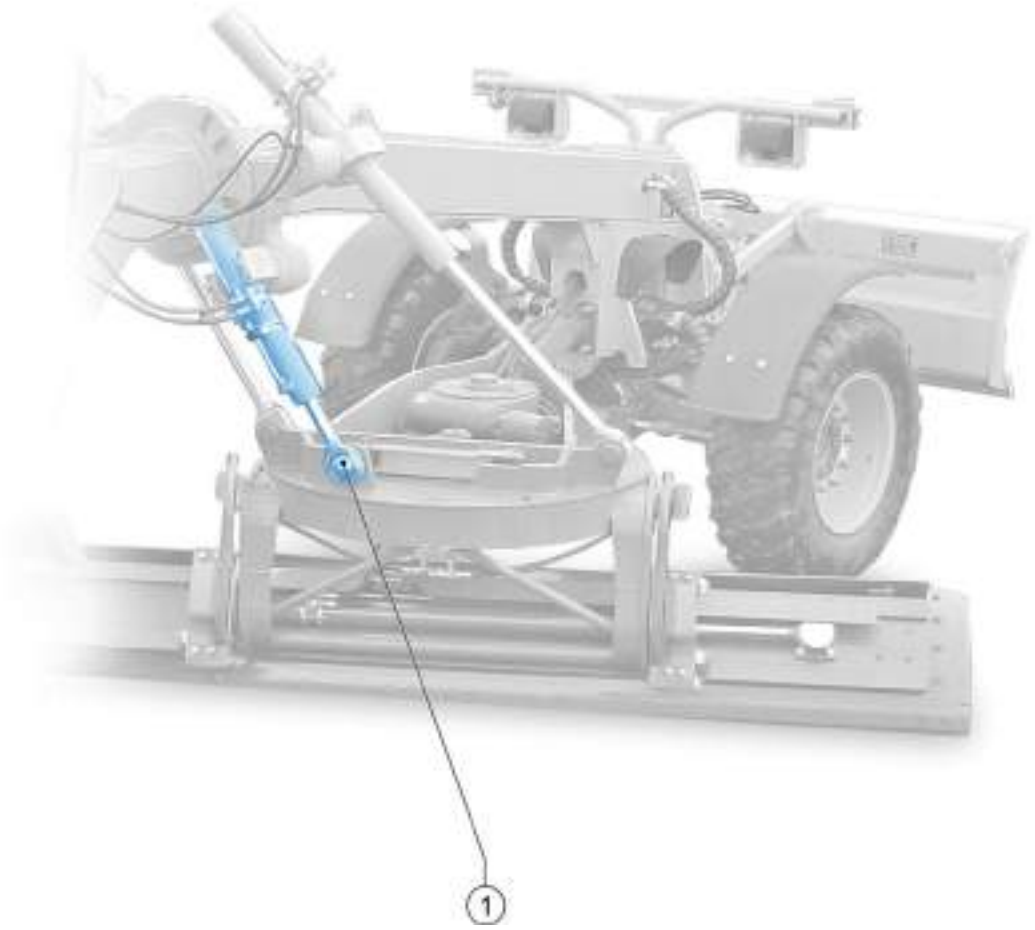


Fig. 58 Slewing cylinder

1 Slewing cylinder

5.2.1.1 Dismounting slewing cylinder

Step 1

Loosen the 3 cylinder screws (5) on the cover (4) using a screwdriver.
Remove the key (2) with fencing pliers.
Loosen and remove the nuts (crown nuts) (3) with flat wrench.

Item (1) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:

open-end wrench

BG 110: size 30
BG 130: size 30
BG 160: size 30
BG 190: sizes 36
BG 240: sizes 36

screwdriver,
fencing pliers

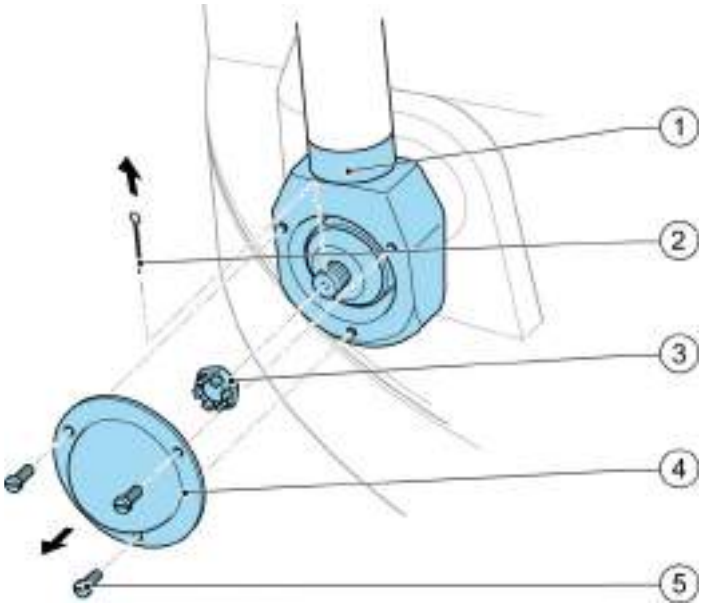


Fig. 59 Loosen screw connection on cylinder

Step 2

Loosen slewing cylinder (1):
Tap the lug of the cylinder (1) from the pin (3) using hammer and aluminium mandrel (2).

Tools:
hammer,
Aluminium mandrel

Retract slewing cylinder (1).

Item (1) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

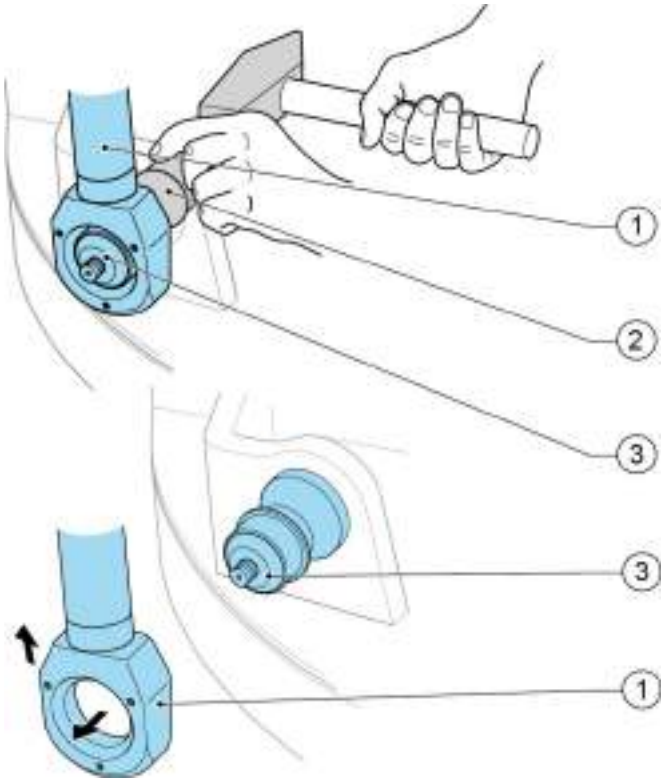


Fig. 60 Disconnect slewing cylinder from pin

Step 3

Remove hose lines (3) from the slewing cylinder (5) with flat wrench and close with closure material (4).

Disassemble lubrication lines (1) on fork head bearing (2) with flat wrench.

Item (5) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Closure material:

ROV 15-LA AN 9321352
M15-LA AN 560605131
VK15-LA AN 560335007

Tools:

open-end wrench

BG 110: size 27 hose
BG 130: size 27 hose
BG 160: size 27 hose
BG 190: size 27 hose
BG 240: size 27 hose

BG 110: size 24 socket
BG 130: size 24 socket
BG 160: size 24 socket
BG 190: size 24 socket
BG 240: size 24 socket

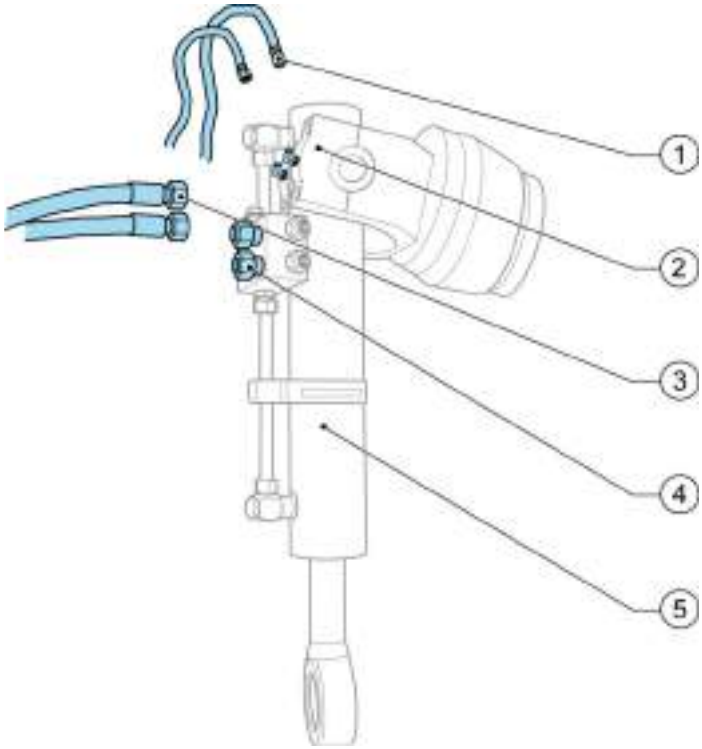


Fig. 61 Disconnect lines from the cylinder

Step 4

Mark (3) the installation position of the fork head (2) with a marking pen completely prior to disassembly.

Suspend slewing cylinder (4) on crane with a cable (1) and remove screws (5) from fork head bearing (2) with Allen wrench.

Item (4) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:

hexagon socket head wrench

BG 110: sizes 10
BG 130: sizes 10
BG 160: sizes 10
BG 190: sizes 10
BG 240: sizes 10

Equipment:
marking pen or similar.,
lift apparatus,
cable

Weight

BG 110: approx. 25 kg
BG 130: approx. 25 kg
BG 160: approx. 25 kg
BG 190: approx. 25 kg
BG 240: approx. 25 kg

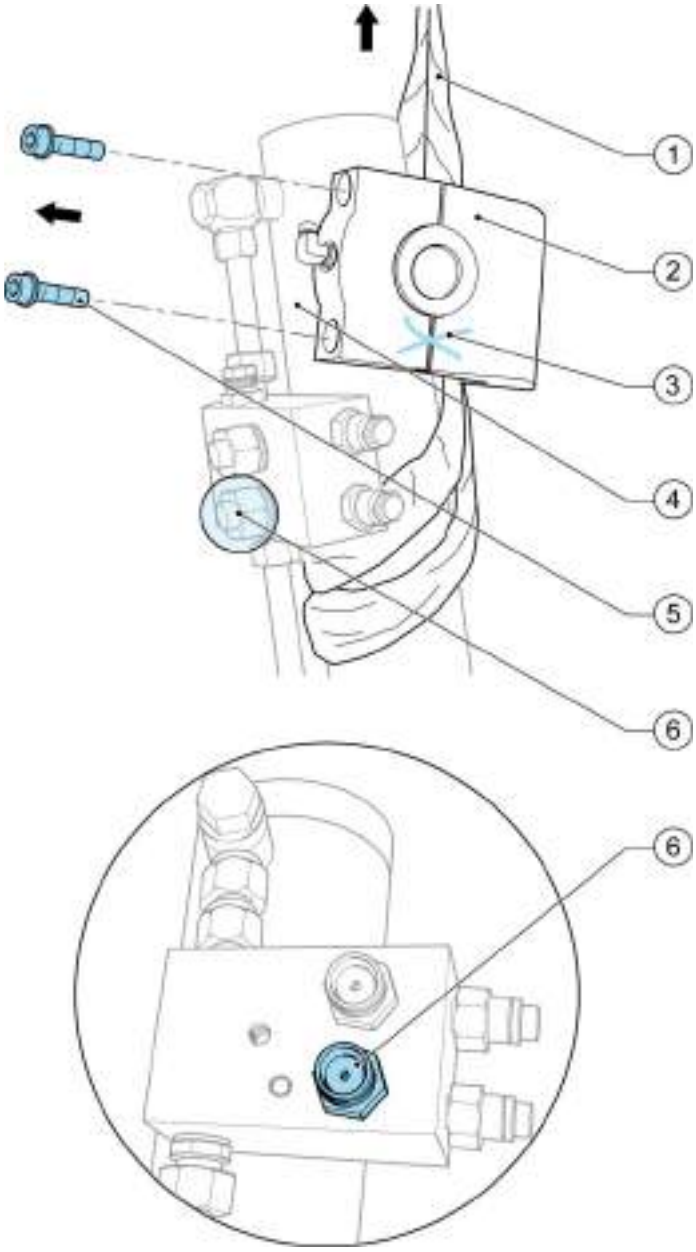


Fig. 62 Loosen forkhead bearing on slewing cylinder

⚠ CAUTION

Risk of damage to property. On the slewing cylinder, watch the restrictor (6)!

Step 5

Using a screwdriver, leverage the front part of the fork head bearing (2) off of the slewing cylinder (3).

For the further disassembly, place the slewing cylinder (3) securely on the floor using crane and cable (1).

Item (3) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools: screwdriver,

Equipment:

lift apparatus,
cable

Weight

BG 110: approx. 25 kg
BG 130: approx. 25 kg
BG 160: approx. 25 kg
BG 190: approx. 25 kg
BG 240: approx. 25 kg

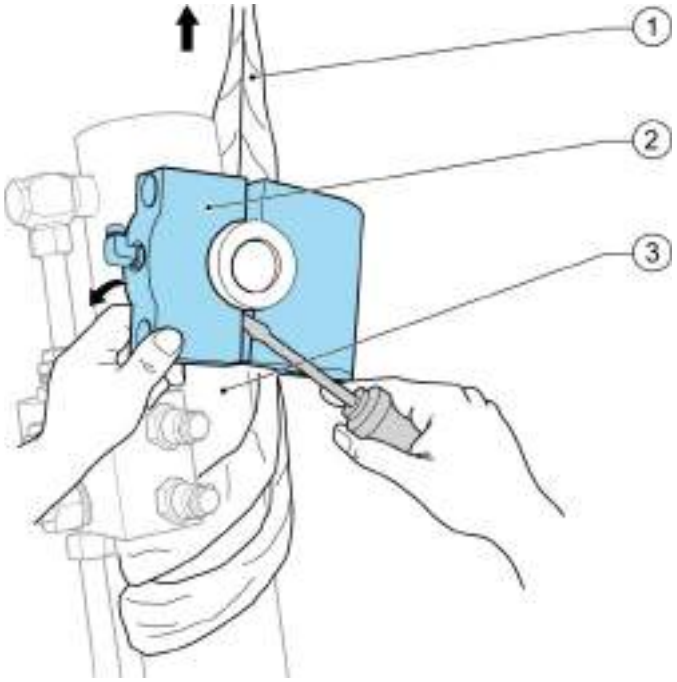


Fig. 63 Disconnect fork head bearing from slewing cylinder

Step 6

Using a screwdriver, leverage the bushings (1) out of the slewing cylinder (2).

Disassemble all pipelines (3) from the slewing cylinder (2).

Item (2) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:
screwdriver

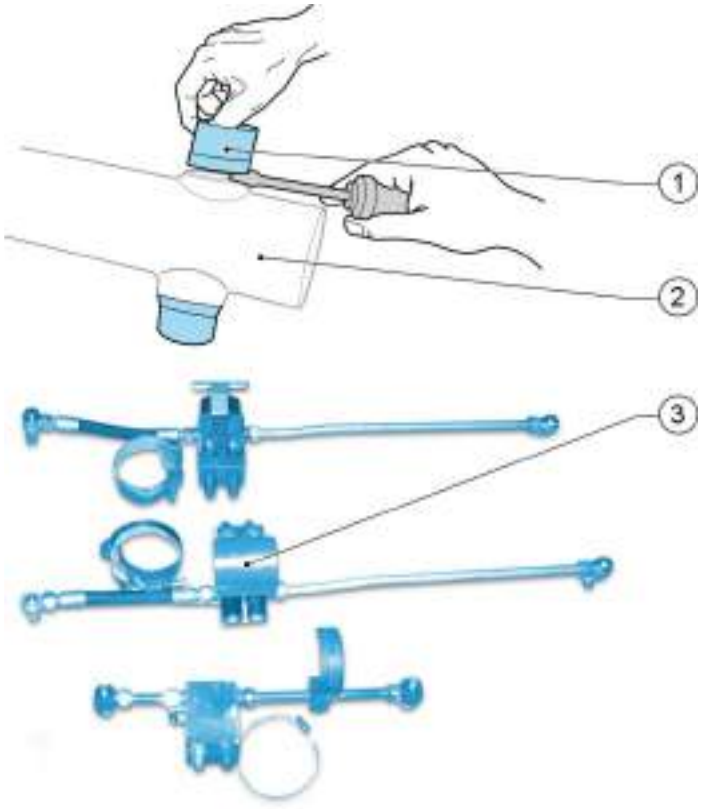


Fig. 64 Loosen bushings and pipelines from slewing cylinder

5.2.1.2 Mounting slewing cylinder

Step 1

Reuse lowering valve (2) to assemble the slewing cylinder (4).

Replace pipelines (1 and 3). Attach one side and adapt pipe length on other side.

Item (4) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:

open-end wrench

BG 110: sizes 27
BG 130: sizes 27
BG 160: sizes 27
BG 190: sizes 27
BG 240: sizes 27

Equipment:
pipelines (SP no. 4438305)

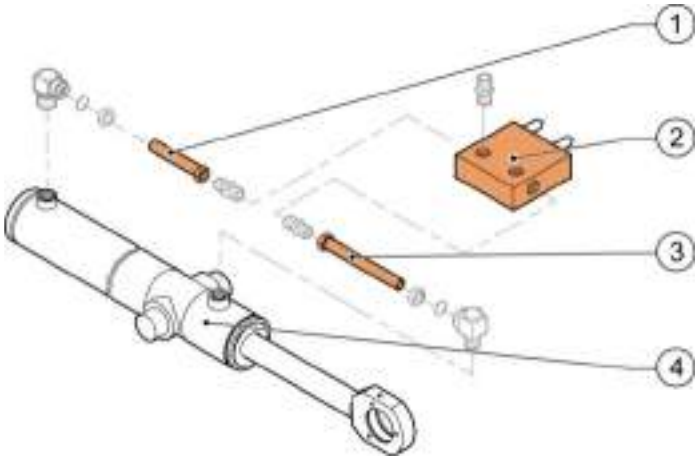


Fig. 65 Assemble hose lines on slewing cylinders

Step 2

Clean journal pin (3) on cylinder (1) and lubricate with grease.

Attach bushing (2).

Item (3) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Equipment:

lubricating grease

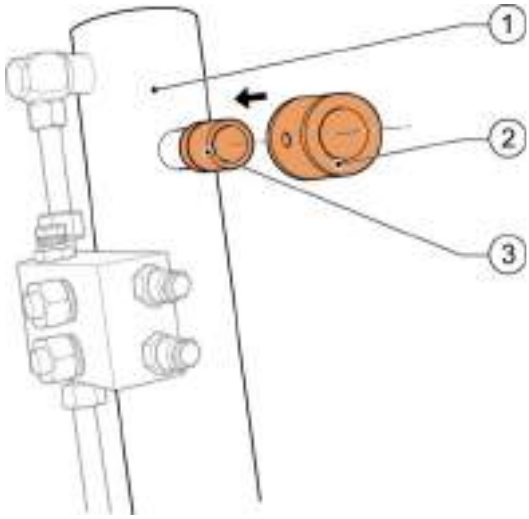


Fig. 66 Attach bushing on slewing cylinder

Step 3

First disassemble new fork head:
Loosen screws (6) with Allen wrench and remove upper part (5) from fork head (4).

Coat screws (6) with Loctite 243.

Attach slewing cylinder (1) with bushing (2) to fork head (4).
Reattach upper part (5) to fork head (4) with screws (6).

Item (1) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:

hexagon socket head wrench

BG 110: size 8
BG 130: size 8
BG 160: sizes 10
BG 190: sizes 10
BG 240: sizes 10

Standardized parts: (6)

BG 110: screw M 10-10.9
BG 130: screw M 10-10.9
BG 160: screw M 12-10.9
BG 190: screw M 12-10.9
BG 240: screw M 12-10.9

Starting torques: (6)

BG 110: M_T=63 Nm
BG 130: M_T=63 Nm
BG 160: M_T=108 Nm
BG 190: M_T=108 Nm
BG 240: M_T=108 Nm

Equipment:

Loctite 243

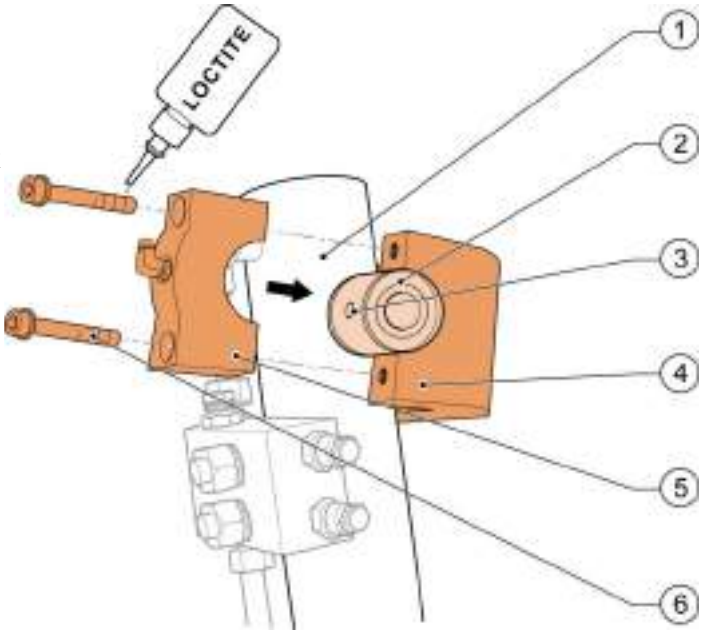


Fig. 67 Attach slewing cylinder to fork head bearing

NOTE

Lubrication hole (3) in bushing (2) must face grease fitting!
Slewing cylinder (1) must move freely within fork head bearing!

Step 4

Reconnect all hose lines (3) on lowering valve (2) to the slewing cylinder (1) with flat wrench.

Item (1) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:

open-end wrench

BG 110: sizes 27
BG 130: sizes 27
BG 160: sizes 27
BG 190: sizes 27
BG 240: sizes 27

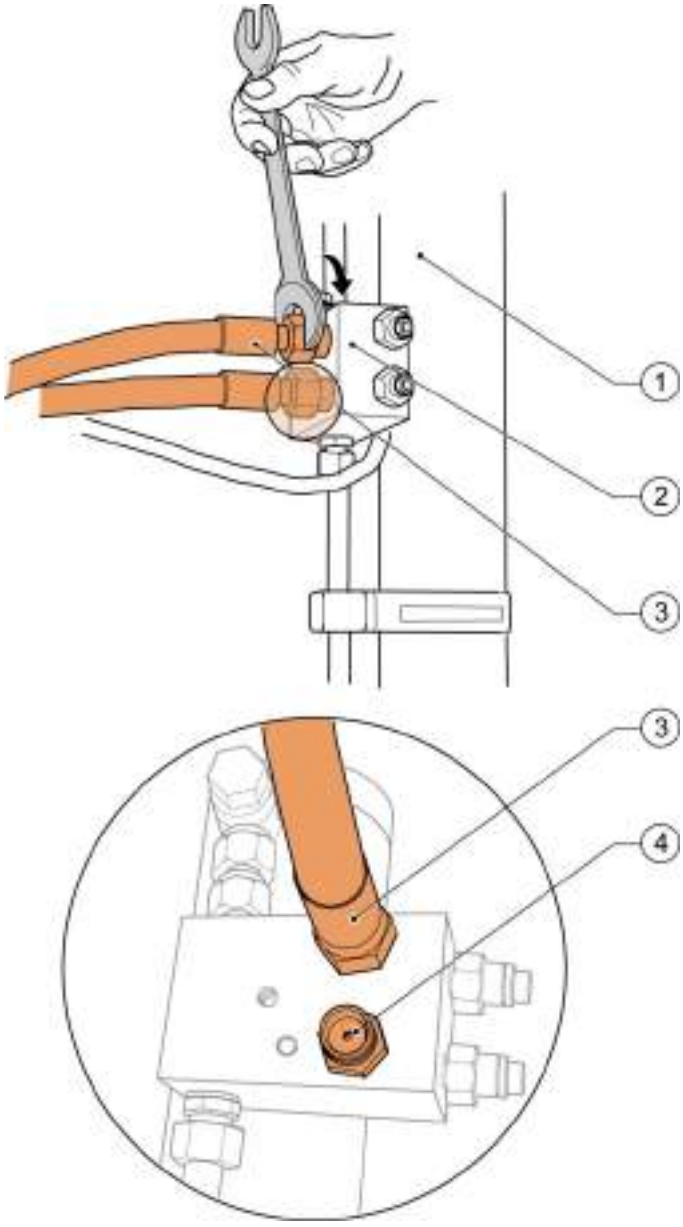


Fig. 68 Connect hose lines to slewing cylinder

⚠ CAUTION

Risk of damage to property. When connecting the hose line (3) to the slewing cylinder, watch the restrictor (4)!

Step 5

Start the drive motor of the grader and extend the slewing cylinder (2) until it fits on the journal pin (1).

Using an aluminium mandrel (4) and hammer, raise the slewing cylinder (2) on journal pins (1).

Item (2) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:

Aluminum mandrel,
hammer

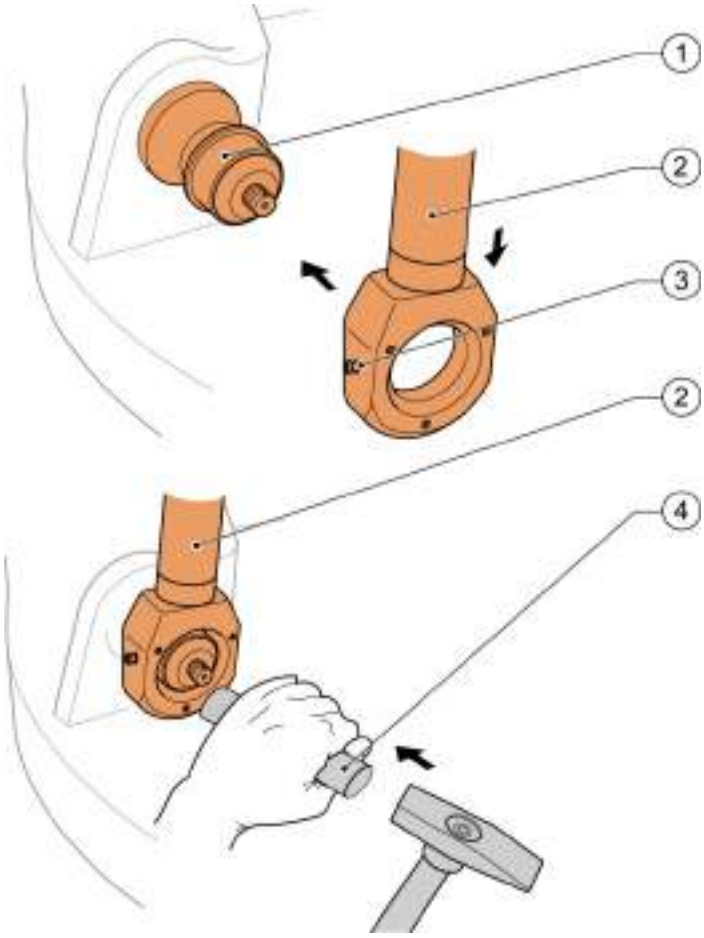


Fig. 69 Raise the slewing cylinder on the journal pin

NOTE
Notice! Position the slewing cylinder (2) so that the grease fittings (3) face outward!

Step 6

Place the washer (3) on the journal pin.

Tighten the nuts (crown nuts) (4) with flat wrench on the journal pin until the key (2) fits.

Secure the key (2) with flat nose pliers.

Fill inside of cover (5) with grease and fasten with 3 cylinder screws (6).

Item (1) represents the following cylinder:
- slewing cylinder (Fig. 2, Item 7)

Tools:

torque wrench, screwdriver

BG 110: size 30
BG 130: size 30
BG 160: size 30
BG 190: sizes 36
BG 240: sizes 36

Standardized parts: (4)

BG 110: nut M 20 DIN 937
BG 130: nut M 20 DIN 937
BG 160: nut M 20 DIN 937
BG 190: nut M 24 DIN 937
BG 240: nut M 24 DIN 937

Starting torques: (4)

BG 110: M_T=380 Nm
BG 130: M_T=380 Nm
BG 160: M_T=380 Nm
BG 190: M_T=680 Nm
BG 240: M_T=680 Nm

fencing pliers,
screwdriver

Equipment:
lubricating grease

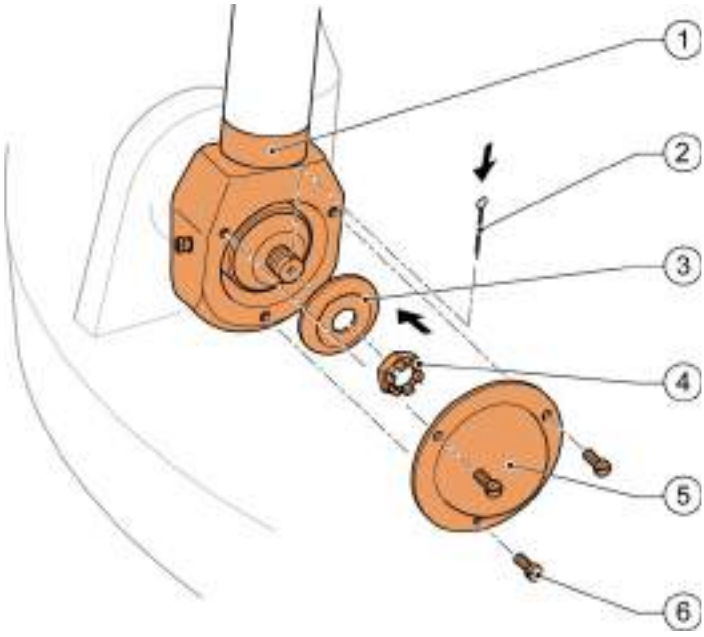


Fig. 70 Mount lubrication points on slewing cylinder

Step 7

Reconnect the lubrication points (2) to the slewing cylinder (1) with the connecting pieces (3) and the lubrication lines (4).

Item (1) represents the following cylinders:
- slewing cylinder (Fig. 2, Item 7)

Tools:

open-end wrench

BG 110: sizes 11, 12, 14
BG 130: sizes 11, 12, 14
BG 160: sizes 11, 12, 14
BG 190: sizes 11, 12, 14
BG 240: sizes 11, 12, 14

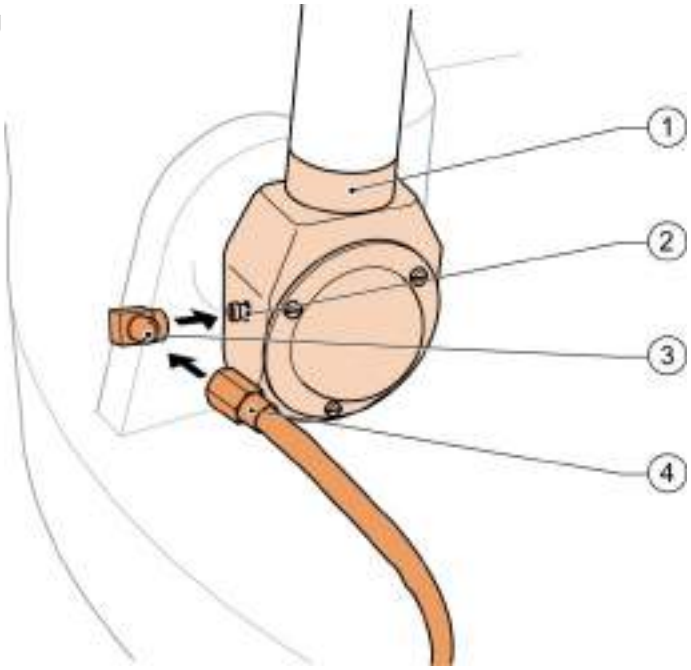


Fig. 71 Connect lubrication lines to slewing cylinders

5.2.2 Replacing lifting cylinder

Fig. 72 lifting cylinder

1 Lifting cylinder, left

2 Lifting cylinder, right

5.2.2.1 Dismounting lifting cylinder

Step 1

Loosen the 3 cylinder screws (5) on the cover (4) using a screwdriver.
Remove the key (2) 4x40 with flat nose pliers.
Loosen and remove the nuts (crown nuts) (3) with flat wrench.

Item (1) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

open-end wrench

BG 110: size 30
BG 130: size 30
BG 160: size 30
BG 190: sizes 36
BG 240: sizes 36

screwdriver,
fencing pliers

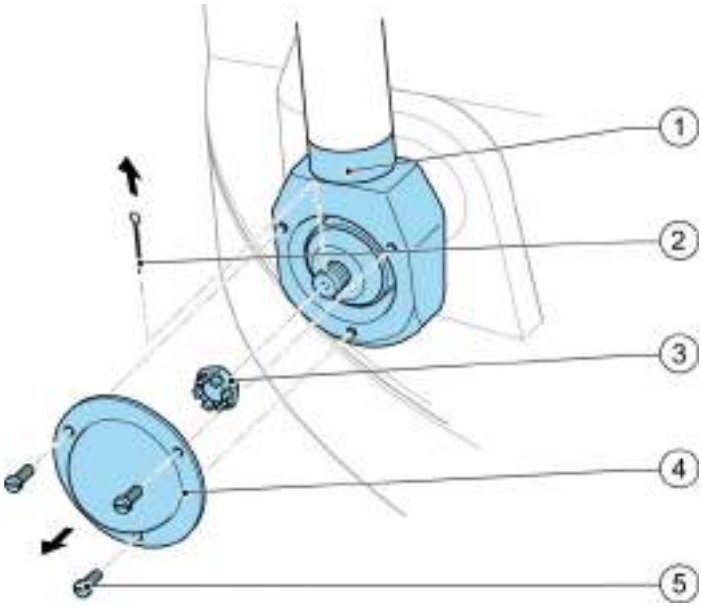


Fig. 73 Loosen screwed connection on the lifting cylinders

Step 2

Disconnect both lifting cylinders (1):
Tap the lug of the cylinder (1) from the pin (3) using hammer and aluminum mandrel (2).

Tools:
hammer,
Aluminum mandrel

Retract both lifting cylinders (1).

Item (1) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

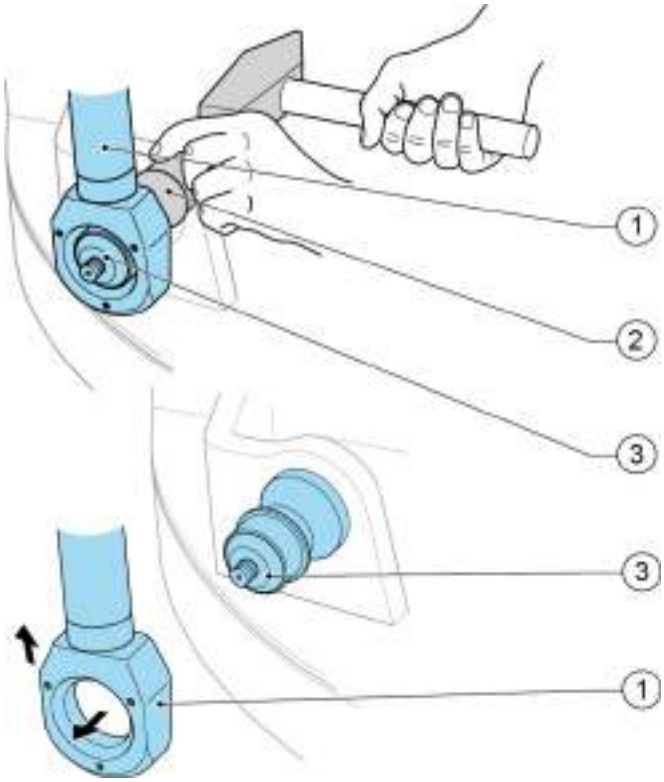


Fig. 74 Disconnect lifting cylinder from pin and retract

Step 3

Remove hose lines (3) from the lifting cylinders (5) with flat wrench and close with closure material (4).

Disassemble lubrication lines (1) on fork head bearing (2) with flat wrench.

Item (5) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Closure material:

ROV 15-LA AN 9321352
M15-LA AN 560605131
VK15-LA AN 560335007

Tools:

open-end wrench

BG 110: sizes 11, 12, 14, 27
BG 130: sizes 11, 12, 14, 27
BG 160: sizes 11, 12, 14, 27
BG 190: sizes 11, 12, 14, 27
BG 240: sizes 11, 12, 14, 27

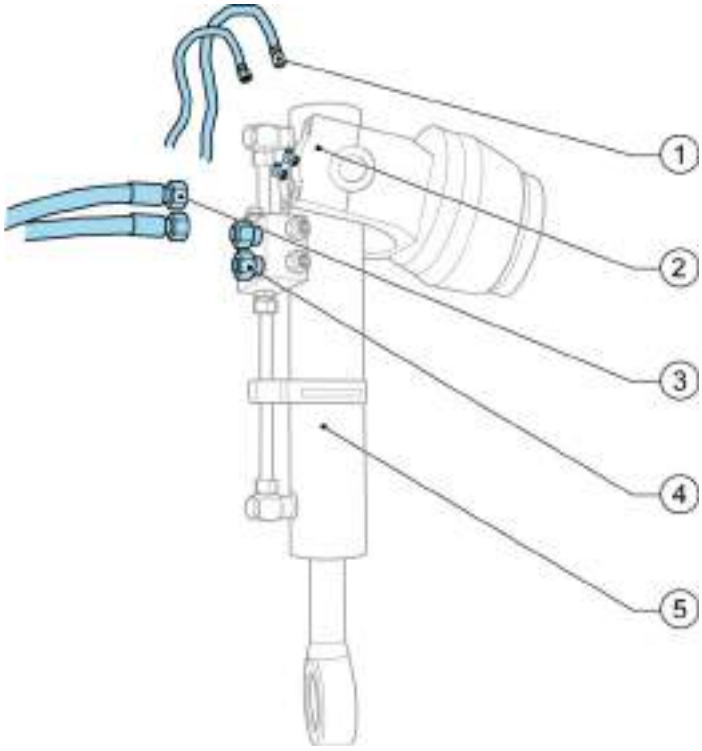


Fig. 75 Disconnect hose and lubrication lines from lifting cylinders

Step 4

Mark (3) the installation position of the fork head (2) with a marking pen completely prior to disassembly.

Suspend lifting cylinder (4) on crane with a cable (1) and remove screws (5) from fork head bearing (2) with Allen wrench.

Item (4) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9).

Tools:

hexagon socket head wrench

BG 110: sizes 10
BG 130: sizes 10
BG 160: sizes 10
BG 190: sizes 10
BG 240: sizes 10

Weight

BG 110: approx. 30 kg
BG 130: approx. 30 kg
BG 160: approx. 30 kg
BG 190: approx. 30 kg
BG 240: approx. 30 kg

Equipment:

marking pen or similar.,
lift apparatus,
cable

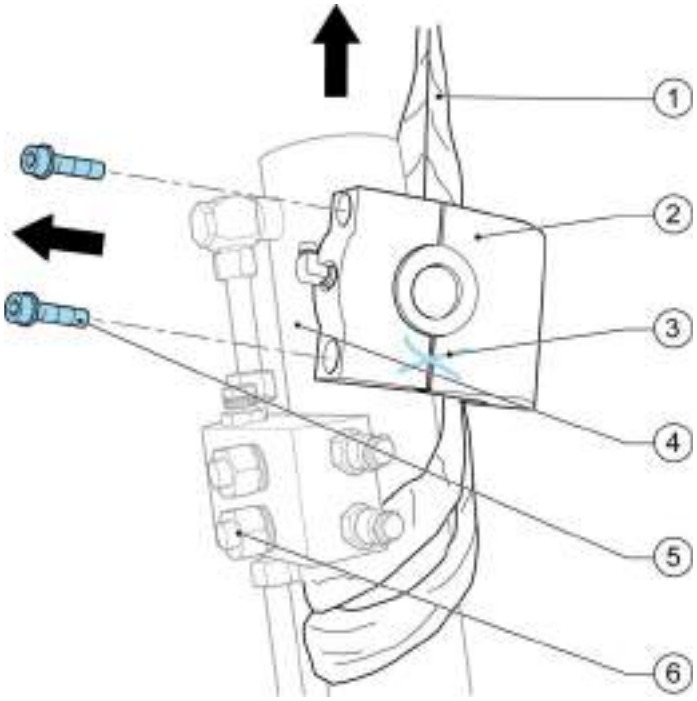


Fig. 76 Disconnect fork head bearings on the lifting cylinders

Step 5

Using a screwdriver, leverage the front part of the fork head bearing (2) off of the lifting cylinders (3).

For the further disassembly, place the lifting cylinders (3) securely on the floor using crane and rope (1).

Item (3) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

screwdriver,

Equipment:

lift apparatus,
cable

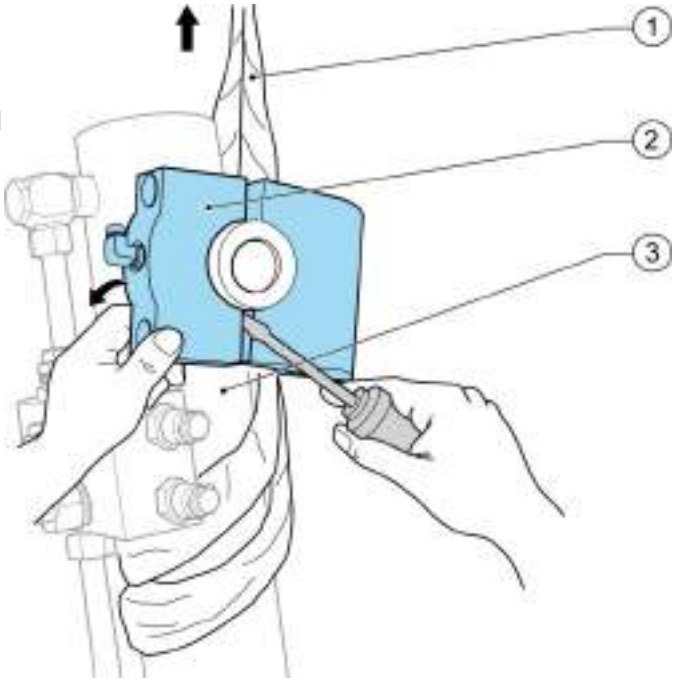


Fig. 77 Disconnect fork head bearings from lifting cylinders

Step 6

Using a screwdriver, leverage the bushings (1) out of the lifting cylinders (2).

Disassemble all pipelines (3) from the lifting cylinders (2).

Item (2) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

screwdriver

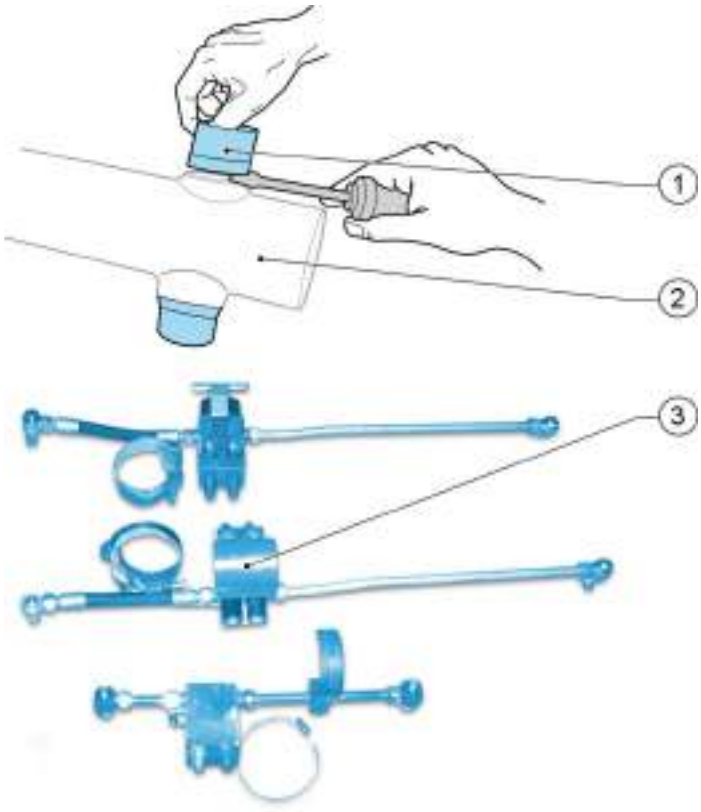


Fig. 78 Loosen bushings and pipelines from lifting cylinders

5.2.2.2 Mounting lifting cylinder

Step 1

Reuse lowering valves (2) and hose lines (1) to assemble the lifting cylinders (4).

Item (4) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

open-end wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: sizes 24
BG 190: sizes 24
BG 240: sizes 24

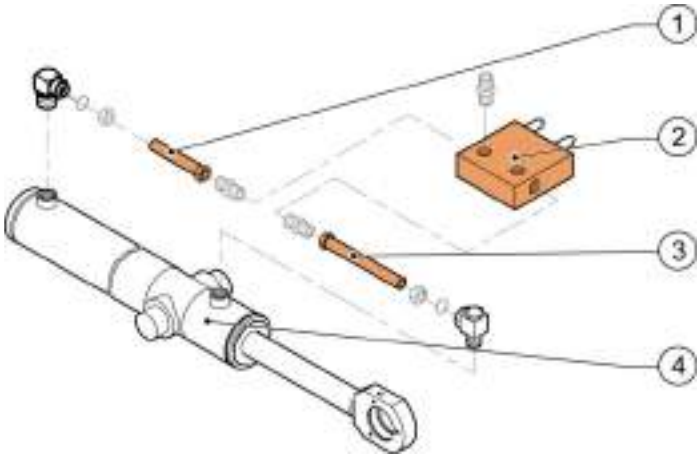


Fig. 79 Assemble hose lines on lifting cylinders

Step 2

Clean journal pins (3) on the lifting cylinders (1) and lubricate with grease.

Attach bushing (2).

Item (3) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Equipment:

lubricating grease

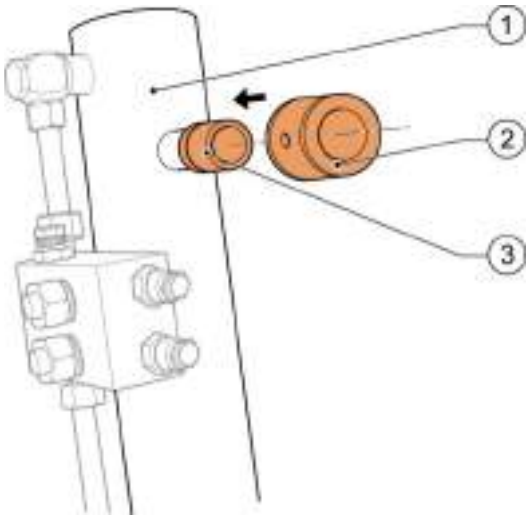


Fig. 80 Attach bushing on lifting cylinder

Step 3

First disassemble new fork head:
Loosen screws (6) with Allen wrench and remove upper part (5) from fork head (4).

Coat screws (6) with Loctite.

Attach the lifting cylinders (1) with bushing (2) to fork head (4).
Reattach upper part (5) to fork head (4) with screws (6).

Item (1) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

hexagon socket head wrench

BG 110: size 8
BG 130: size 8
BG 160: sizes 10
BG 190: sizes 10
BG 240: sizes 10

Standardized parts: (6)

BG 110: Screw M 10-10.9
BG 130: Screw M 10-10.9
BG 160: Screw M 10-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

Starting torques: (6)

BG 110: M_T=63 Nm
BG 130: M_T=63 Nm
BG 160: M_T=108 Nm
BG 190: M_T=108 Nm
BG 240: M_T=108 Nm

Equipment:

Loctite 243

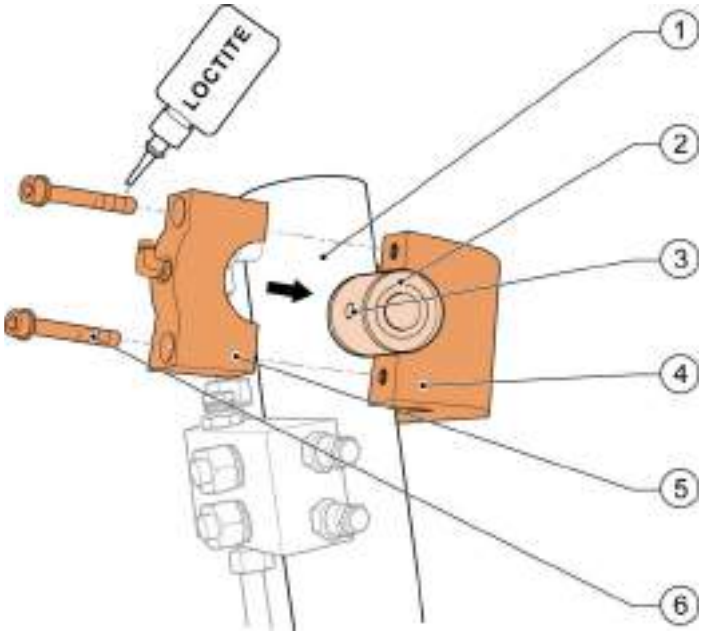


Fig. 81 Attach lifting cylinders to fork head bearing

NOTE

Lubrication hole (3) in bushing (2) must face grease fitting!
Lifting cylinders (1) must move freely within fork head bearing!

Step 4

Reconnect all hose lines (3) on lowering valve (2) to the lifting cylinders (1) with flat wrench.

Item (1) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

open-end wrench

BG 110: size 27 hose
BG 130: size 27 hose
BG 160: size 27 hose
BG 190: size 27 hose
BG 240: size 27 hose

BG 110: size 24 socket
BG 130: size 24 socket
BG 160: size 24 socket
BG 190: size 24 socket
BG 240: size 24 socket

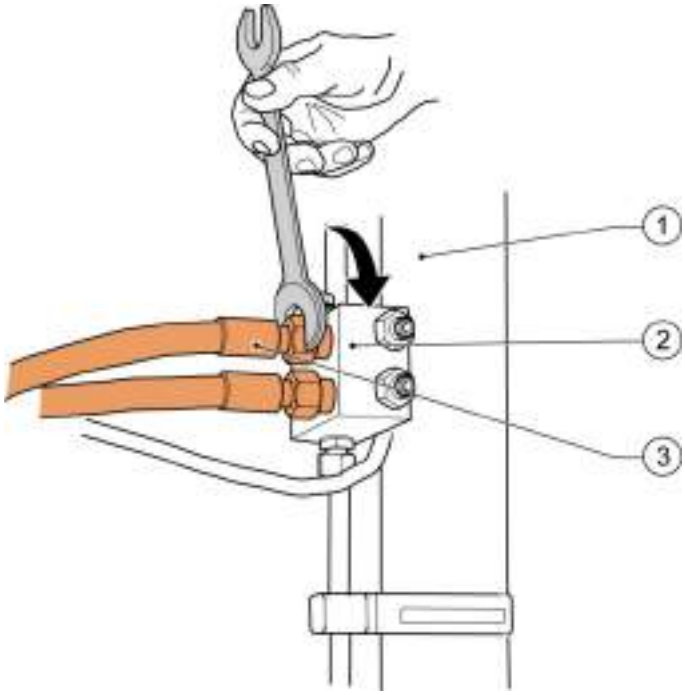


Fig. 82 Connect hose lines to lifting cylinders

Step 5

Start the drive motor of the grader and extend the lifting cylinders (2) until they fit on the journal pins (1).

Using an aluminium mandrel (4) and hammer, raise the lifting cylinders (2) on journal pins (1).

Item (2) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

Aluminum mandrel,
hammer

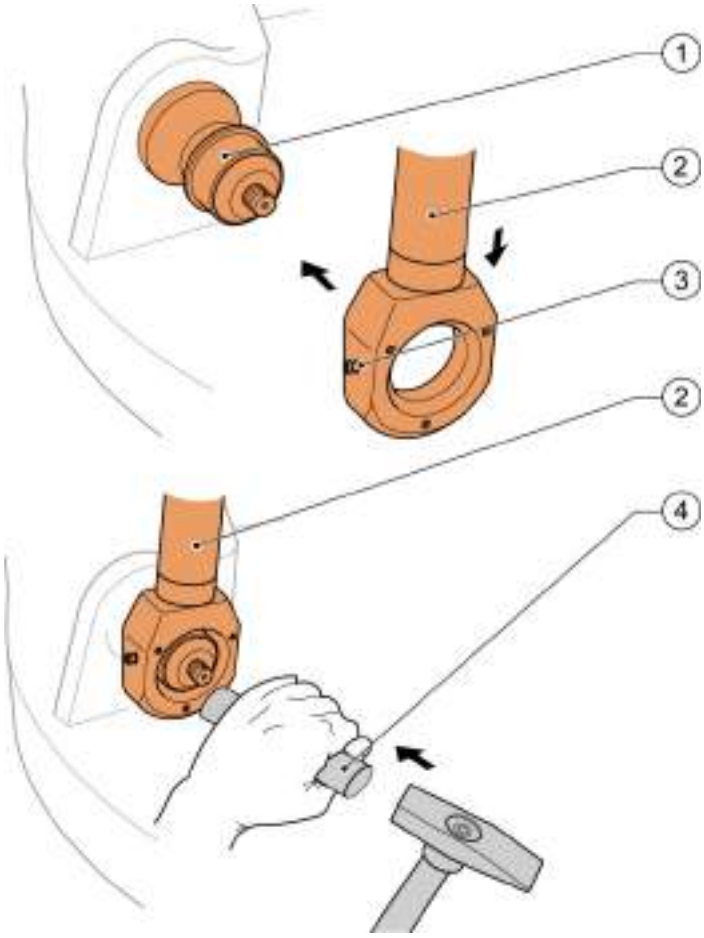


Fig. 83 Raise lifting cylinders on journal pins

NOTE
Notice! Align lifting cylinders (2) so that the grease fittings (3) face outward!

Step 6

Place the washer (3) on the journal pin.

Tighten the nuts (crown nuts) (4) with flat wrench on the journal pin.

Secure the key (2) with flat nose pliers.

Fill inside of cover (5) with grease and fasten with 3 cylinder screws (6).

Item (1) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

torque wrench, screwdriver

BG 110: size 30
BG 130: size 30
BG 160: size 30
BG 190: sizes 36
BG 240: sizes 36

Standardized parts: (4)

BG 110: nut M 20 DIN 937
BG 130: nut M 20 DIN 937
BG 160: nut M 20 DIN 937
BG 190: nut M 24 DIN 937
BG 240: nut M 24 DIN 937

Starting torques: (4)

BG 110: M_T=380 Nm
BG 130: M_T=380 Nm
BG 160: M_T=380 Nm
BG 190: M_T=680 Nm
BG 240: M_T=680 Nm

fencing pliers,
screwdriver

Equipment:

lubricating grease

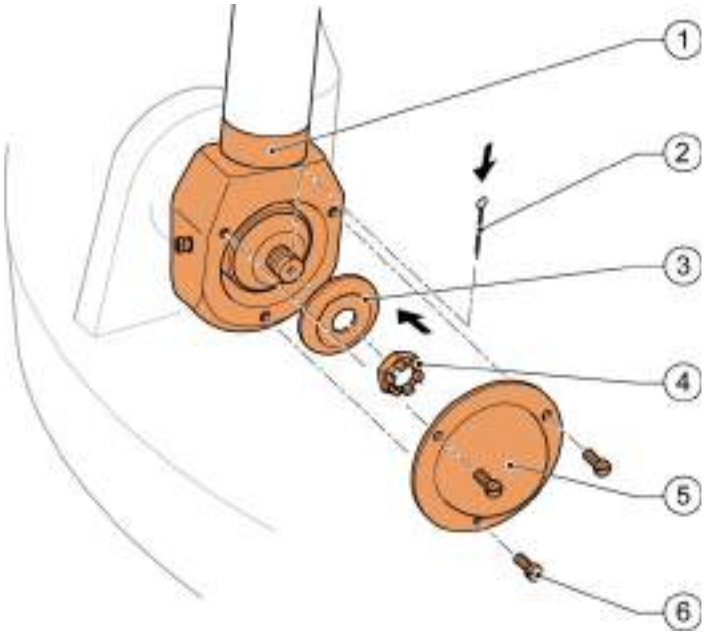


Fig. 84 Screw lubrication points on lifting cylinders

Step 7

Reconnect the lubrication points (2) to the cylinder (1) with the connecting pieces (3) and the lubrication lines (4).

Item (1) represents the following cylinders:
- lifting cylinder (Fig. 2, Item 6 and 9)

Tools:

open-end wrench

BG 110: sizes 11, 12, 14
BG 130: sizes 11, 12, 14
BG 160: sizes 11, 12, 14
BG 190: sizes 11, 12, 14
BG 240: sizes 11, 12, 14

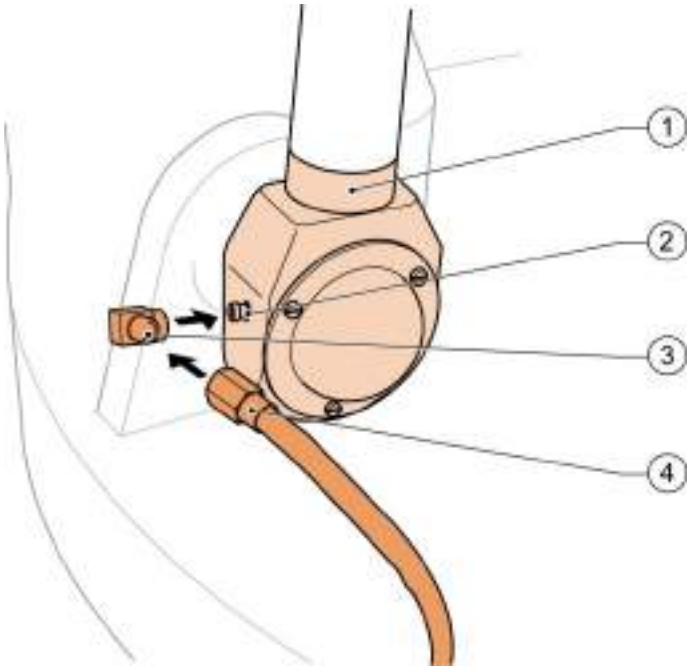


Fig. 85 Connect lubrication lines to lifting cylinders

5.2.3 Change cutting angle cylinder

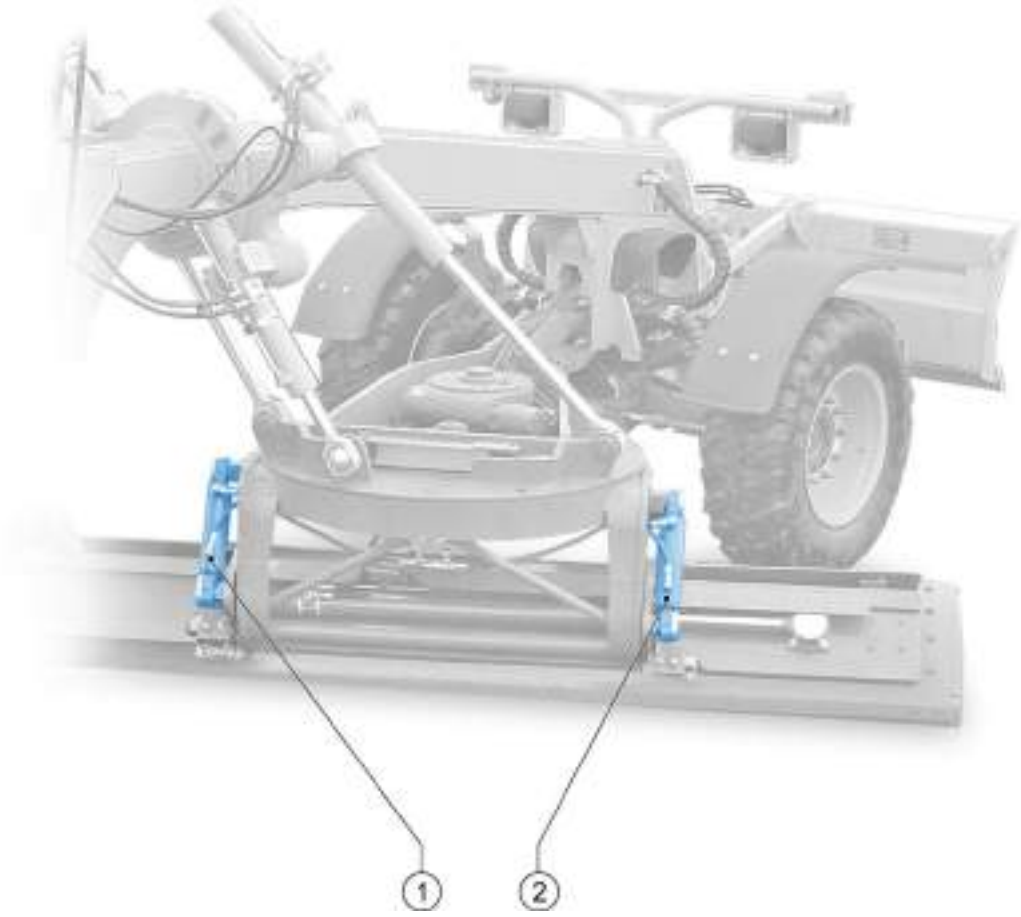


Fig. 86 Cutting angle cylinder, vertical position

1 Cutting angle cylinder, left 2 Cutting angle cylinder, right

5.2.3.1 Dismounting cutting angle cylinder

Step 1

Position blade at a right angle to the grader and set down on the floor.

Retract the cutting angle cylinder.

Secure the upper edge of the blade against tipping forward by laying squared timber or other suitable material underneath.

Start on one side.
Disconnect the hose lines with a flat wrench. Lock using closure material.

Remove the cover on the piston side and floor side:
Loosen the cylinder screws on the cover.
Remove the guard ring and sealing ring.

Press the cutting angle cylinder from the journal pin.

Remove the banjo from the connecting pieces of the cylinder and close the cylinder.

Tools:

open-end wrench

BG 110: size 12 hose
BG 130: size 12 hose
BG 160: size 12 hose
BG 190: size 12 hose
BG 240: size 12 hose

Closure material:

M15-LA, VK 15-LA

5.2.3.2 Mounting cutting angle cylinder

Step 1

Remove the plugs on the new cutting angle cylinder.

Provisionally fasten the banjos.

Clean and lubricate the bearings in the piston rod and piston head.

Press the bearing onto the journal pin.

Install the sealing ring and guard ring.

Fasten the cover with cylinder screws.

Remove the closure material. Connect the hose lines.

Firmly tighten the banjos.

Lubricate all bearing points.

Proceed as above on the other side.

Tools:

open-end wrench

BG 110: sizes 27
BG 130: sizes 27
BG 160: sizes 27
BG 190: sizes 27
BG 240: sizes 27

hex wrench

BG 110: sizes 5
BG 130: sizes 5
BG 160: sizes 5
BG 190: sizes 5
BG 240: sizes 5

snapring pliers (exterior),

Equipment:

grease gun,
cleaning agent

5.2.4 Replacing blade sliding cylinder

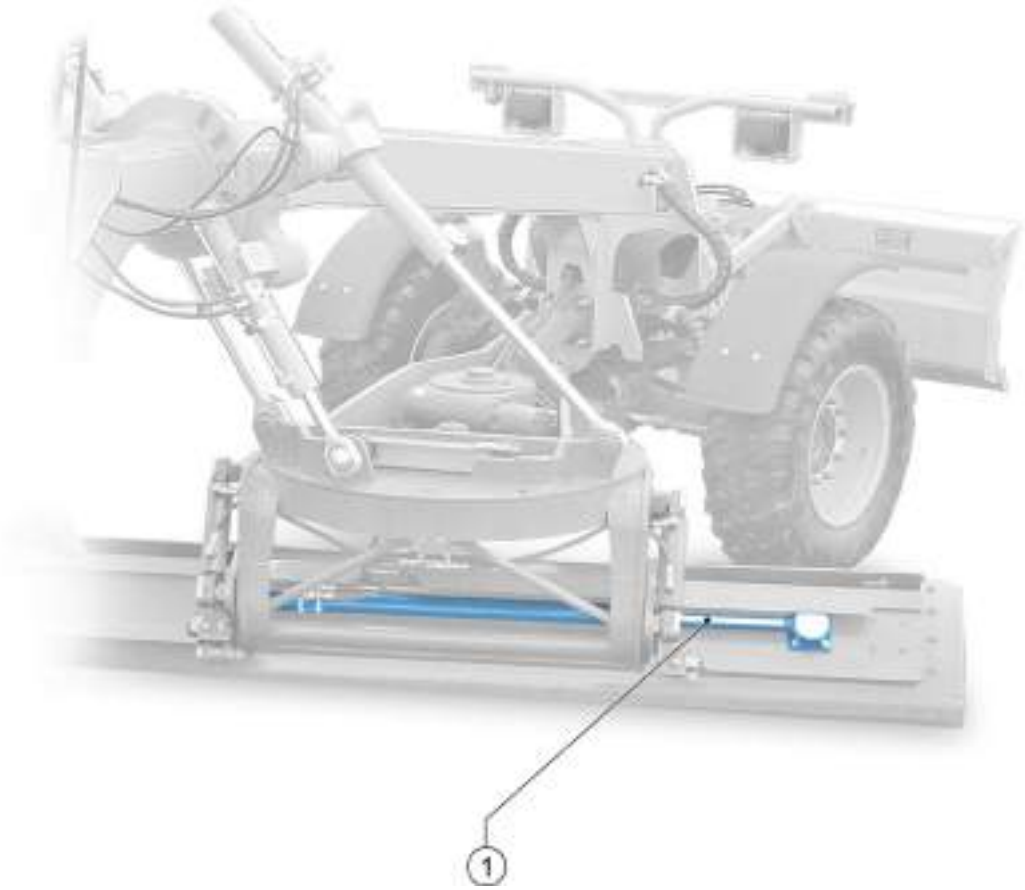


Fig. 87 Blade sliding cylinder

1 Blade sliding cylinder

5.2.4.1 Dismounting blade sliding cylinder

Step 1

Set down the blade. Remove cylinder cover.
Loosen all screws with a flat wrench.
Disassemble 5x covering sheets.

See spare parts catalogues:

BG 110: Item 14.040-01
BG 130: Item 14.040-01
BG 160: Item 14.024-01
BG 190: Item 14.025-01
BG 240: Item 14.031-01

Extend the cutting angle cylinder so that the blade stands upright.

Set the blade down on a squared timber. (Lay squared timber under guide rails).

Remove cover from piston rod bearing.
Detach the guard ring and press the piston rod from the pin.

Retract the piston rod. Secure the cylinder.

Dismantle the blade holder top and bottom left.

See spare parts catalogues:

BG 110: Item 14.002-05
BG 130: Item 14.002-05
BG 160: Item 14.002-05
BG 190: Item 14.001-05
BG 240: Item 14.002-05

Carefully move back with the grader (blade remains on the squared timber).

Remove cover from cylinder floor support:
Remove the guard ring.

Disconnect the hose lines from the cylinder and close.

Press the blade sliding cylinder towards the floor and remove.

Disassemble hose lines and screwed connections.
Close the blade sliding cylinder

Tools:

open-end wrench

BG 110: sizes 13, 17, 27
BG 130: sizes 13, 17, 27
BG 160: sizes 13, 17, 27
BG 190: sizes 13, 17, 27
BG 240: sizes 13, 17, 27

hex wrench

BG 110: sizes 5
BG 130: sizes 5
BG 160: sizes 5
BG 190: sizes 5
BG 240: sizes 5

snapring pliers (exterior),
screwdriver

Equipment:

square timber

5.2.4.2 Mounting blade sliding cylinder

Step 1

Connect hose lines to the new blade sliding cylinder.
Push the sealing ring onto the journal pin. Clean bearing and press towards floor onto journal pin.
Secure the cylinder with guard rings. Mount cover.
Reconnect hose lines.
Secure the cylinder.
Slowly advance the grader again to the blade.
Reattach the holders and wear plates.
Extend the piston rod until it can be remounted on the journal pin.
Press the piston rod onto the journal pin, secure with guard ring and remount the cover.
Lubricate the cylinder bearings.
Remount the covering sheets.

Tools:

open-end wrench

BG 110: sizes 13, 17, 27
BG 130: sizes 13, 17, 27
BG 160: sizes 13, 17, 27
BG 190: sizes 13, 17, 27
BG 240: sizes 13, 17, 27

hex wrench

BG 110: sizes 5
BG 130: sizes 5
BG 160: sizes 5
BG 190: sizes 5
BG 240: sizes 5

snapring pliers (exterior),
screwdriver

Equipment:

grease gun, wire

5.3 Swivelling bridge assembly

5.3.1 Replacing swivelling bridge

5.3.1.1 Dismounting swivelling bridge

NOTE
On BG 110 and BG 130 the lock is on the left in the direction of travel. On BG 160, BG 190 and BG 240 the lock is on the right. The construction is the same for all grader types.

Step 1

Remove all lubrication and hose lines (2) on the swivelling bridge (1) with flat wrench and set down.

Tools:

open-end wrench

BG 110: sizes 10, 12, 14
BG 130: sizes 10, 12, 14
BG 160: sizes 10, 12, 14
BG 190: sizes 10, 12, 14
BG 240: sizes 10, 12, 14

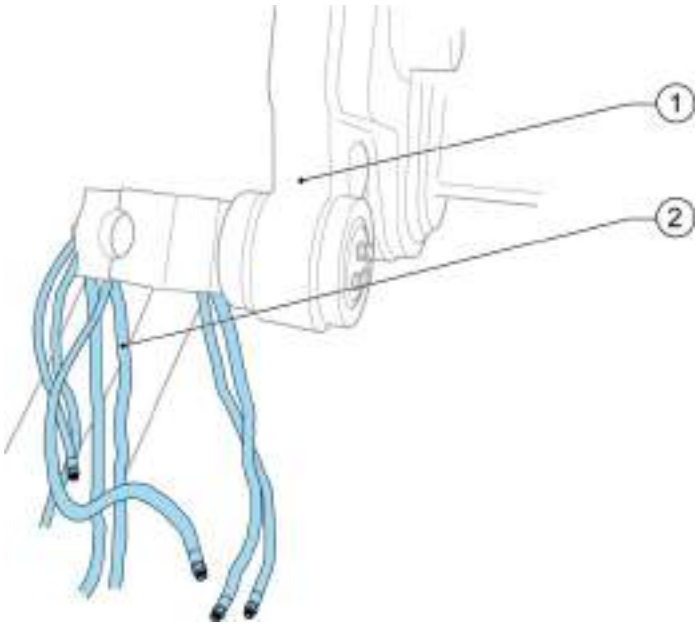


Fig. 88 Remove lubrication and hose lines on swivelling bridge

Step 2

Secure the swivelling bridge (1) against turning with anti-rotation device (2).

Antirotation device:

Thick squared timber or something similar

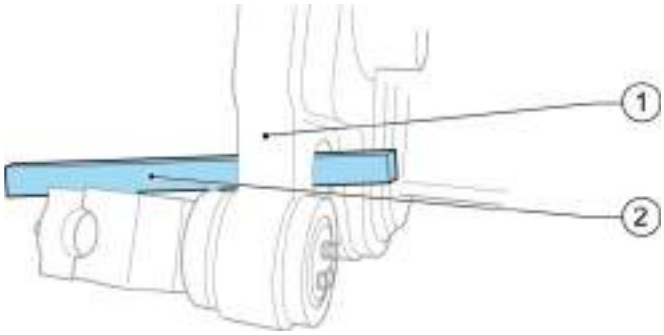


Fig. 89 Secure swivelling bridge with anti-rotation device

Step 3

Secure the lock (locking cylinder) (1) with the device on the swivelling bridge (2).

Equipment:

fixture

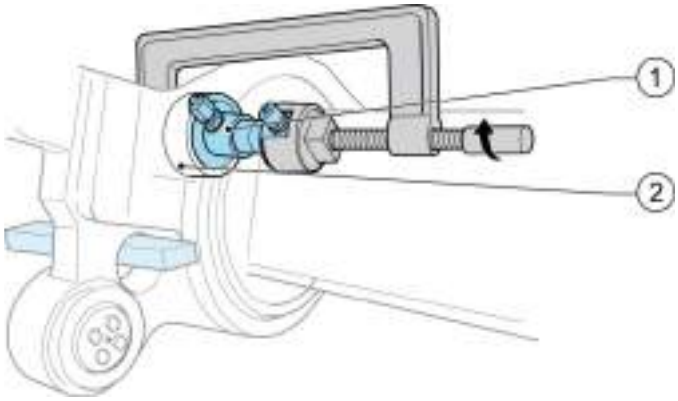


Fig. 90 Secure lock on swivelling bridge

Step 4

Loosen the guard ring (2) on the lock (locking cylinder) (1) with snapring pliers.

Tools:

snapring pliers (internal)

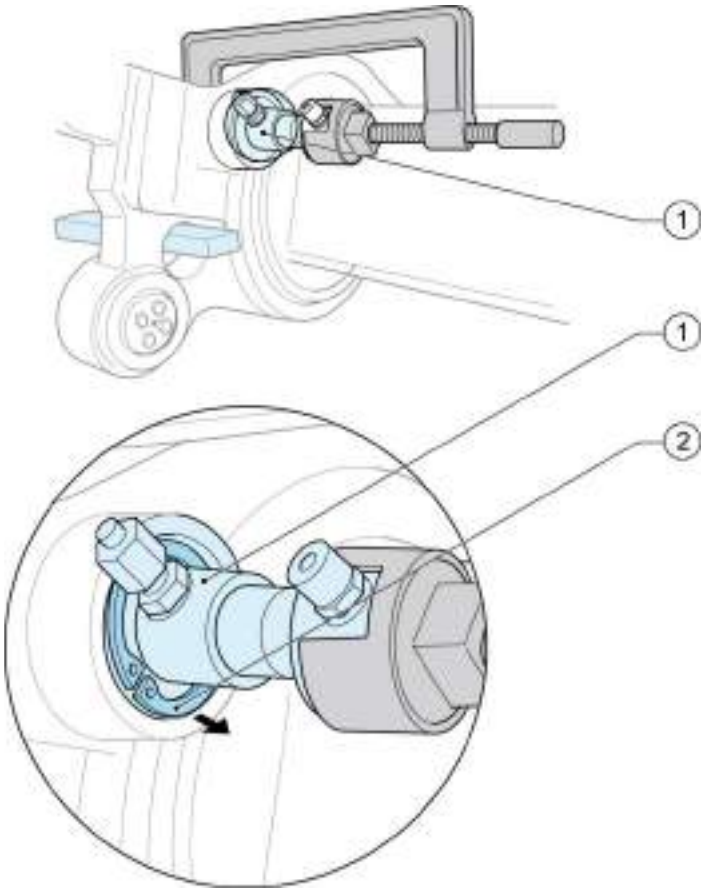


Fig. 91 Loosen guard ring on lock

Step 5

Loosen the fixture again.

Remove the lock (locking cylinder) (1) and the bushings (2) and (3) completely from the lock mount (4).

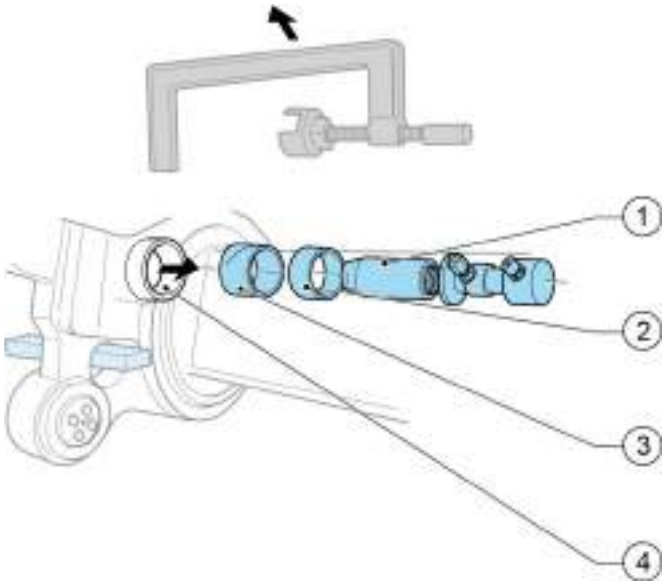


Fig. 92 Pull the lock from the lock mount

Step 6

Loosen and remove all screws (1) and HT washers (2) but one on the **top** swivelling bridge fixture with socket wrench.

Leave one screw (3) on each side as a safety.

Tools:

open-end wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: size 30
BG 190: size 30
BG 240: size 30

Standardized parts: (1)

BG 110: 4x M 16 screws
BG 130: 4x M 16 screws
BG 160: 6x M 20 screws
BG 190: 6x M 20 screws
BG 240: 6x M 20 screws

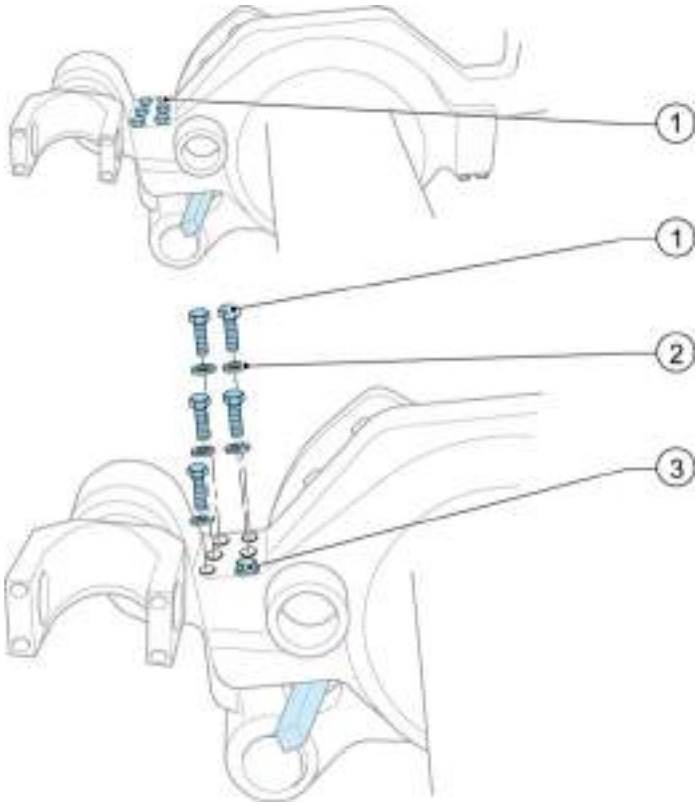


Fig. 93 Loosen the top swivel bridge fixture

Step 7

Loosen and remove all screws (1) and HT washers (3) but one on the **bottom** swivelling bridge fixture with socket wrench.

Leave one screw (2) on each side as a safety.

Tools:

open-end wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: size 30
BG 190: size 30
BG 240: size 30

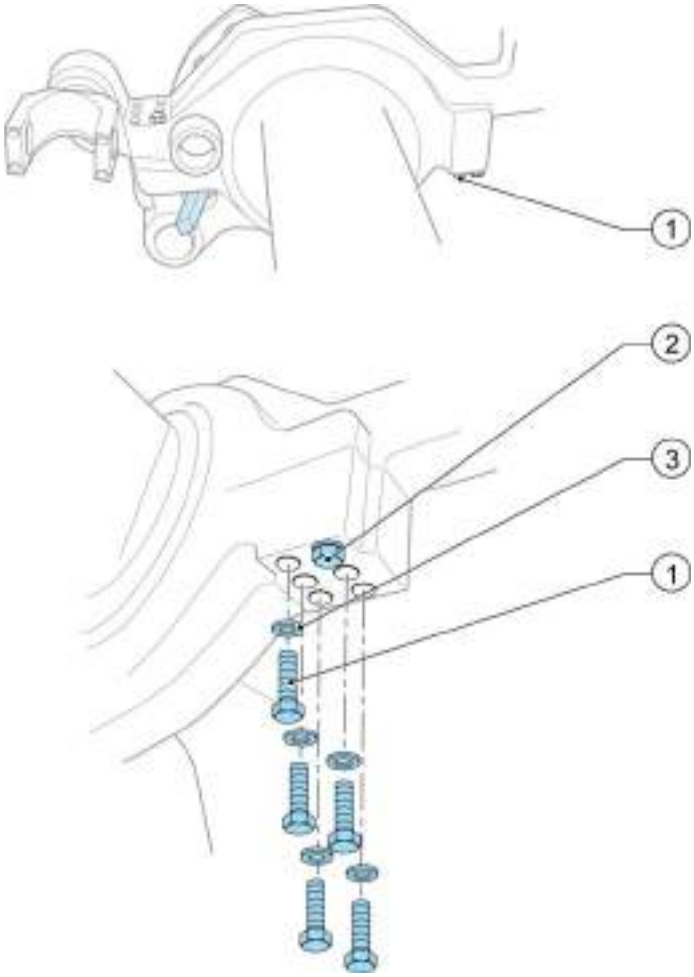


Fig. 94 Loosen the bottom swivel bridge fixture

Step 8

Pull the anti-rotation device (2) out of the opening (3) and push into the lock mount (1).

Antirotation device:

Thick squared timber or something similar

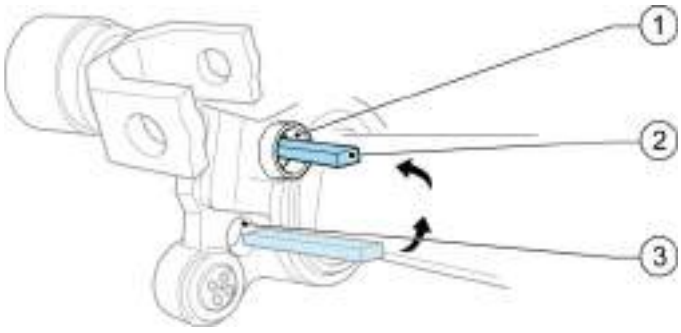


Fig. 95 Anti-rotation device in lock mount

Step 9

Secure the lower half of the swivelling bridge (1) using a forklift (2) and pallet (3).

Equipment:

forklift truck,
pallet

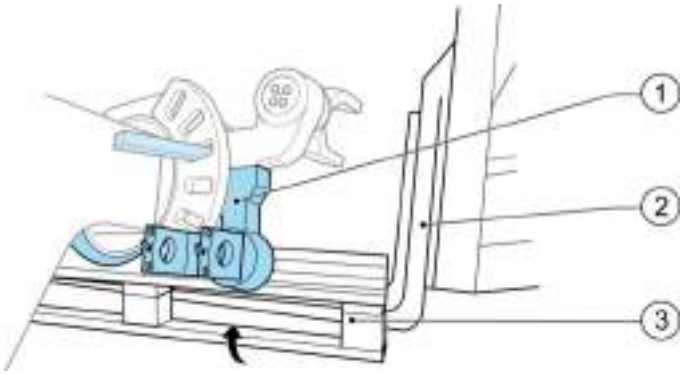


Fig. 96 Secure lower half of swivelling bridge

Step 10

Unscrew the last screws (1) on **top** (2) and **bottom** (3) swivelling bridge fixture with socket wrench.

Tools:

socket wrench

BG 110: size 24
BG 130: size 24
BG 160: size 30
BG 190: size 30
BG 240: size 30

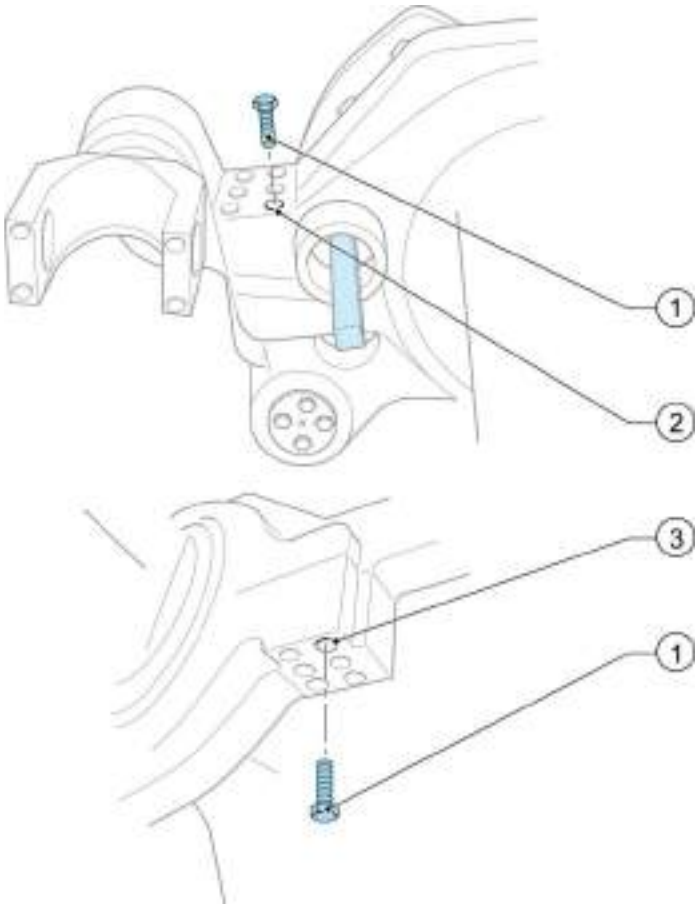


Fig. 97 Completely dismantle the swivelling bridge fixtures

Step 11

Securely set down the lower half of the swivelling bridge (1) on the floor using a forklift (2) and pallet (3).

Equipment:

forklift truck,
pallet

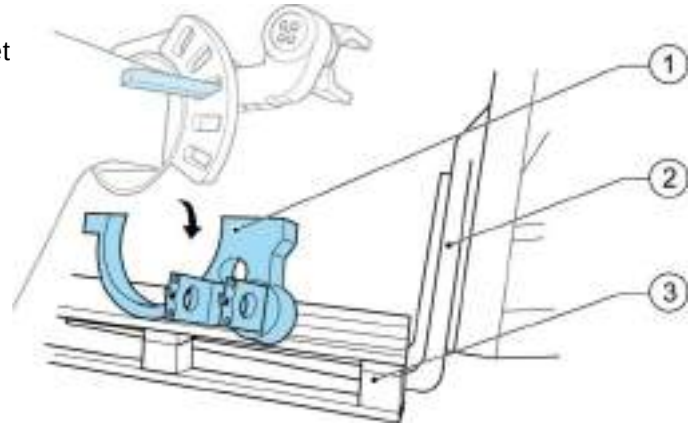


Fig. 98 Remove lower half of swivelling bridge

Step 12

Sling the top half of the swivelling bridge (2) using a crane and cable (1).

Equipment:

lift apparatus,
cable

Weight Upper part without lock

BG 110: approx. 120 kg
BG 130: approx. 120 kg
BG 160: approx. 180 kg
BG 190: approx. 180 kg
BG 240: approx. 285 kg

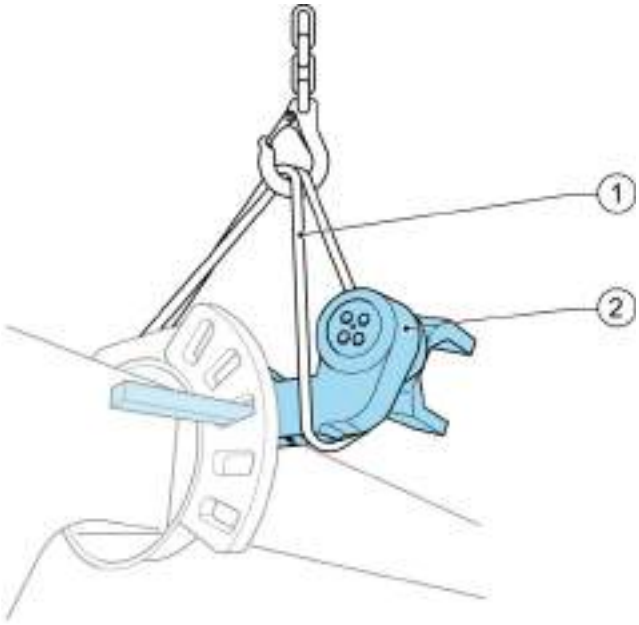


Fig. 99 Upper half of swivelling bridge on crane

Step 13

Remove the anti-rotation device (3) and raise the top half of the swivelling bridge (2) using a crane and cable (1) and safely set it down.

Equipment:

lift apparatus,
cable

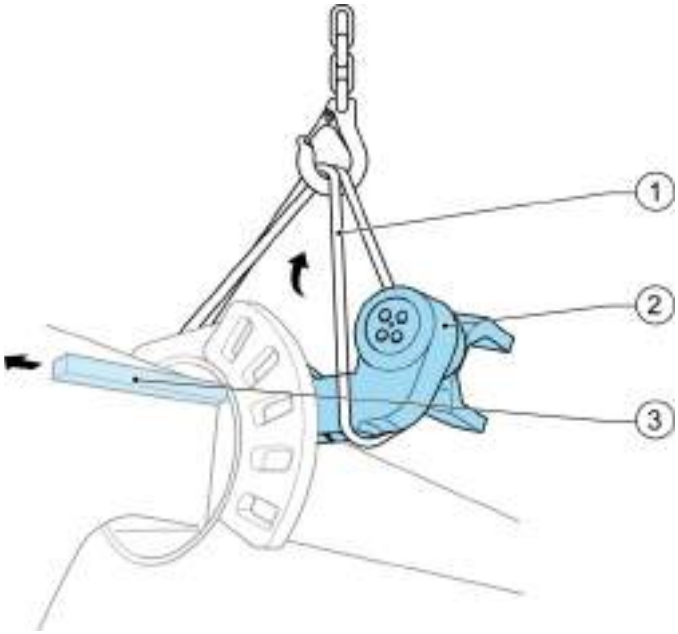


Fig. 100 Raise top half of swivelling bridge

5.3.1.2 Mounting swivelling bridge

NOTE
On BG 110 and BG 130 the lock is on the left in the direction of travel. On BG 160, BG 190 and BG 240 the lock is on the right. The construction is the same for all grader types.

Step 1

Dismantle the new swivelling bridge (1) consisting of the top half (4) and bottom half (5) of the swivelling bridge:

Loosen all screws (2) and HT washers (3).

Remove any burrs on the running and fitting surfaces with a file.

Tools:

file,

open-end wrench

BG 110: sizes 24
BG 130: sizes 24
BG 160: size 30
BG 190: size 30
BG 240: size 30

Standardized parts:

BG 110: 4x M 16 screws (2)
BG 130: 4x M 16 screws (2)
BG 160: 6x M 20 screws (2)
BG 190: 6x M 20 screws (2)
BG 240: 6x M 20 screws (2)

Starting torques:

BG 110: M_T=100 Nm (4)
BG 130: M_T=100 Nm (4)
BG 160: M_T=100 Nm (4)
BG 190: M_T=230 Nm (4)
BG 240: M_T=230 Nm (4)

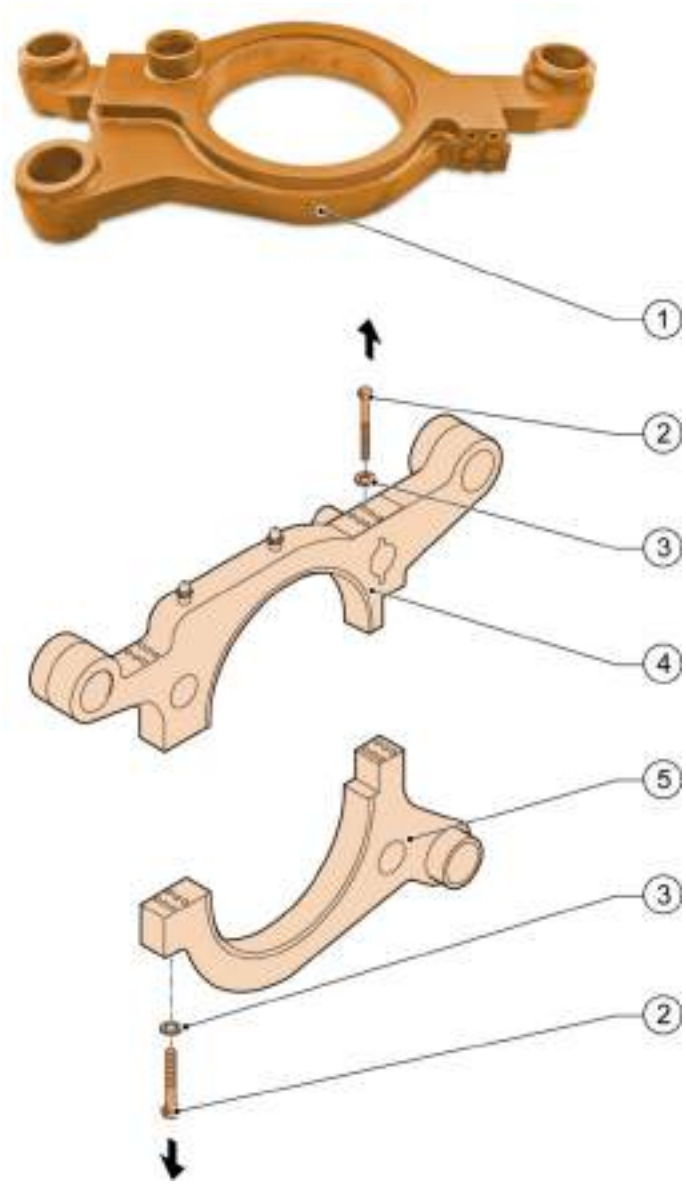


Fig. 101 Dismantle new swivelling bridge

Step 2

Turn the top and bottom halves of the swivelling bridge so that the wide collar (8) faces upwards.

Install the fork head (1) 2x in the top half of the swivelling bridge and in the bottom half 1x as follows:

Mount guard ring (4) and intermediate ring (6), hammer hinged bearing (5) in and secure with guard ring (4).

Install spacer ring (3) with round ring (2).

Hammer fork head (1) in.

Turn the top and bottom halves of the swivelling bridge so that the following can be installed in the narrow collar (arrow direction from below):

Insert spacer ring (8) and hinged bearing (5).

Remove cover (9):
Apply Loctite 243 to cover (9) with 4x screws (11) and tighten with torque wrench.

Install grease fitting (10) and lubricate until the grease comes out.

Tools:

torque wrench

BG 110 sizes: 8, 17
BG 130 sizes: 8, 17
BG 160 sizes: 8, 17, 19
BG 190 sizes: 8, 19
BG 240: sizes: 8, 19

Standardized parts: (11)

BG 110: 4x screws M10-8.8
BG 130: 4x screws M10-8.8
BG 160: 4x screws M12-8.8
BG 190: 4x screws M12-8.8
BG 240: 4x screws M12-8.8

Starting torques: (4)

BG 110: M_T=40 Nm
BG 130: M_T=40 Nm
BG 160: M_T=65 Nm
BG 190: M_T=65 Nm
BG 240: M_T=65 Nm

snapring pliers,
Aluminum mandrel, hammer

Equipment:
Loctite 243, lubricating grease

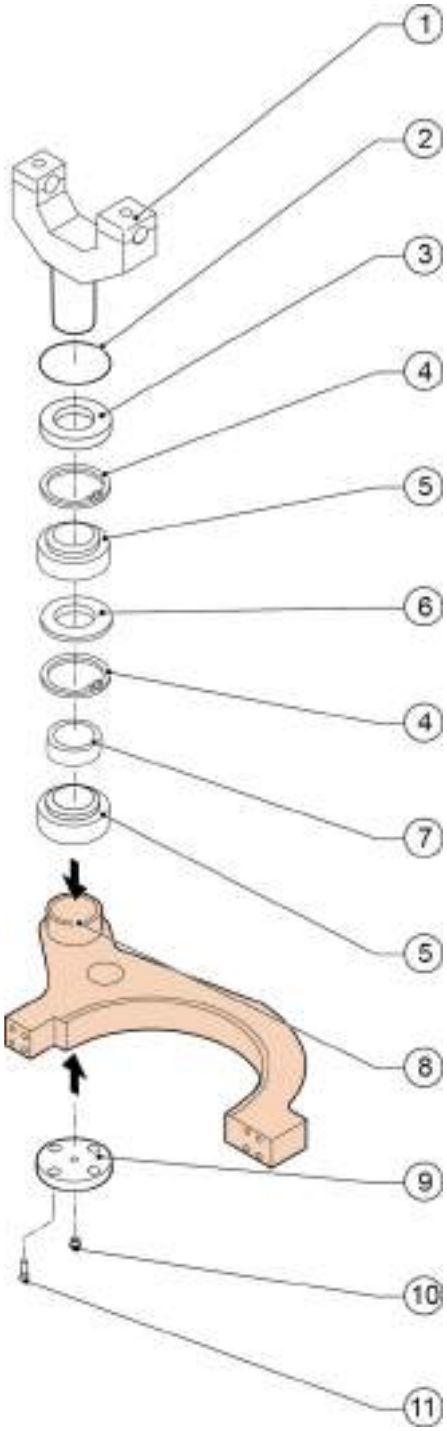


Fig. 102 Mounting swivelling bridge

Step 2

Step 2 in cross section.

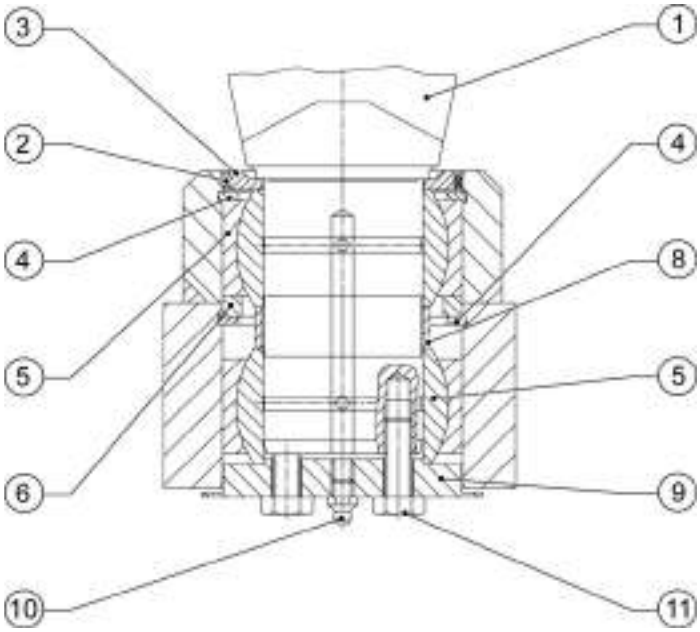


Fig. 103 Swivelling bridge, complete forkhead assembly

Step 3

Install the bushings (2) in the rear lock mount (based on direction of travel), in the top half of the swivelling bridge (1).

The adjusting spring (4) must face the swivelling bridge mount (inside).

Provisionally fasten bushings (2) with the adjusting springs (3) and the screws (5) on the top half of the swivelling bridge (1).

Tighten screws (5) after the complete installation of the lock.

Tools:

hexagon wrench

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 8
BG 240 size: 8

Starting torques: (5)

BG 110: M_T=30 Nm
BG 130: M_T=30 Nm
BG 160: M_T=30 Nm
BG 190: M_T=30 Nm
BG 240: M_T=30 Nm

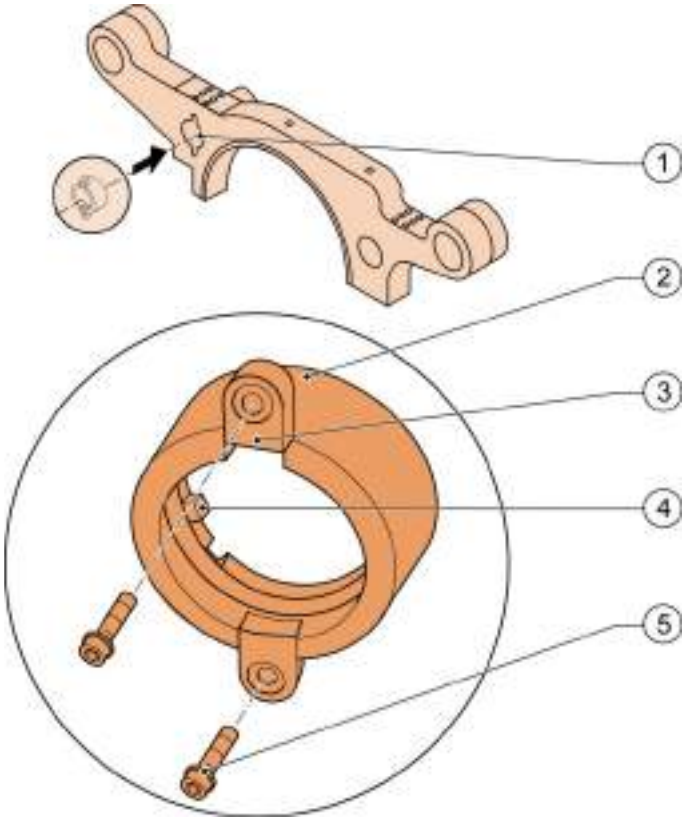


Fig. 104 Bushing for rear lock mount

NOTE

The adjusting spring (4) is already mounted to the bushing (2).

Step 4

Spray the running surface (2) on the front part of the frame with molybdenum disulfide lubricant (Gleitmo-900 spray) (1) and let dry.

After drying, lubricate the running surfaces (2) with lubricating grease.

Equipment:

molybdenum disulfide lubricating varnish (Gleitmo-900 spray),
lubricating grease

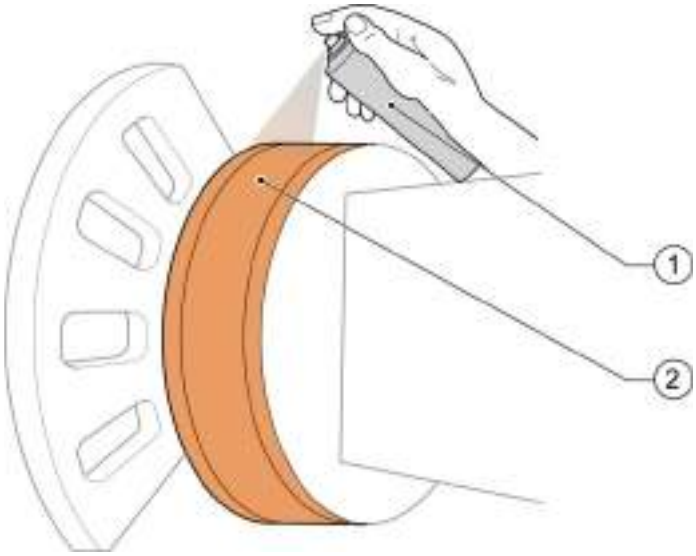


Fig. 105 Running surface for swivelling bridge on front part of frame

Step 5

Sling the top half of the swivelling bridge (2) using a crane and cable (1) and set it down on the lubricated running surface (3).

Equipment:

lift apparatus,
cable

Weight

BG 110: approx. 120 kg
BG 130: approx. 120 kg
BG 160: approx. 180 kg
BG 190: approx. 285 kg
BG 240: approx. 285 kg

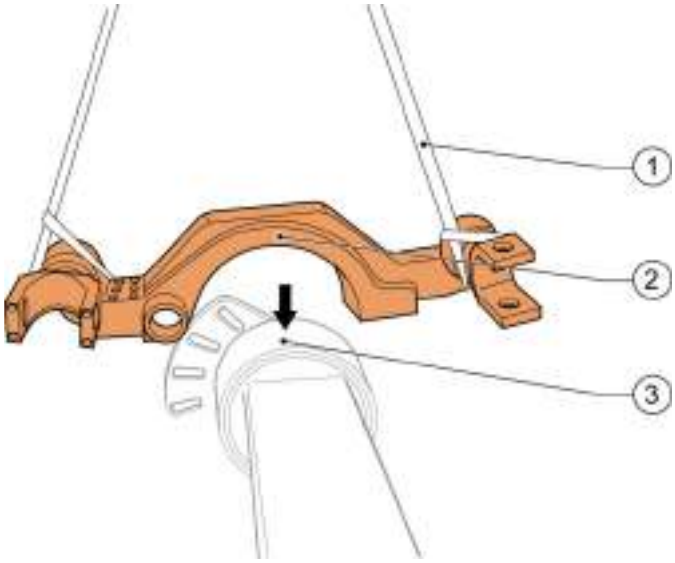


Fig. 106 Use crane to set down upper swivelling bridge

Step 6

Secure the **top** half of the swivelling bridge (1) against turning with anti-rotation device (2).

Antirotation device:

Thick squared timber or similar

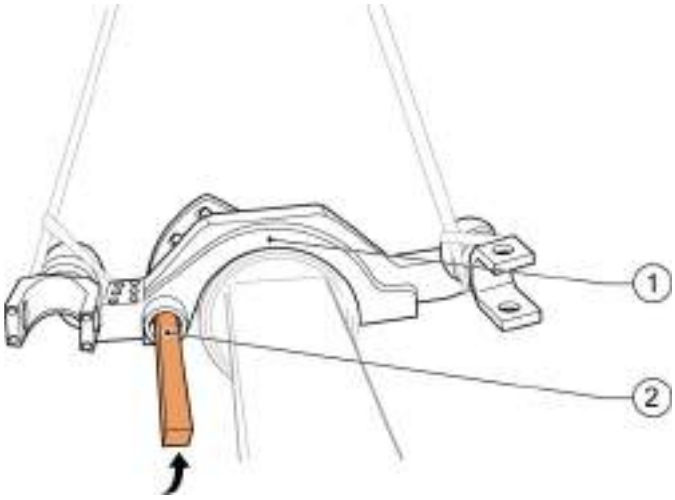


Fig. 107 Secure upper swivelling bridge against turning

Step 7

Apply Loctite 586 to the contact surfaces (7).

Lift the **lower** half of the swivelling bridge (3) on the pallet (5) up to the running surface (2) on the front part of the frame using a forklift (4).

To lock the **top** (1) and **bottom** (3) halves of the swivelling bridge, ensure the correct seating of the cotter pins!

Equipment:

Loctite 586,
forklift truck,
pallet

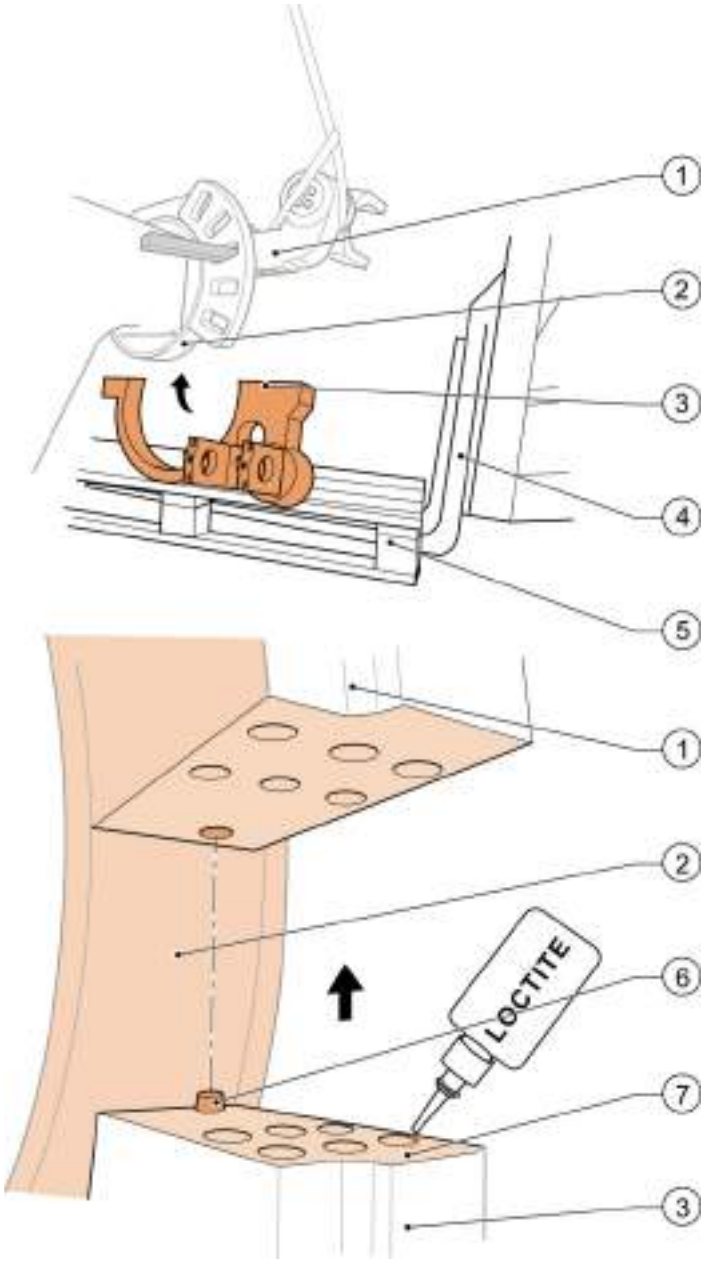


Fig. 108 Install bottom swivelling bridge

Step 8

Secure all hex screws (5) with Loctite 243 (3) and screw down the top (1) and bottom (2) halves of the swivelling bridge with HT washers (4) using a torque wrench.

Tools:

torque wrench

BG 110 size: 24
BG 130 size: 24
BG 160 size: 24
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: Screw M 16-10.9 (5)
BG 130: Screw M 16-10.9 (5)
BG 160: Screw M 20-10.9 (5)
BG 190: Screw M 20-10.9 (5)
BG 240: Screw M 20-10.9 (5)

BG 110: DIN 6916 HT washer 17 mm (4)
BG 130: DIN 6916 HT washer 17 mm (4)
BG 160: DIN 6916 HT washer 21 mm (4)
BG 190: DIN 6916 HT washer 21 mm (4)
BG 240: DIN 6916 HT washer 21 mm (4)

Starting torques:

BG 110: M_T=100 Nm (5)
BG 130: M_T=100 Nm (5)
BG 160: M_T=100 Nm (5)
BG 190: M_T=230 Nm (5)
BG 240: M_T=230 Nm (5)

Equipment: Loctite 243

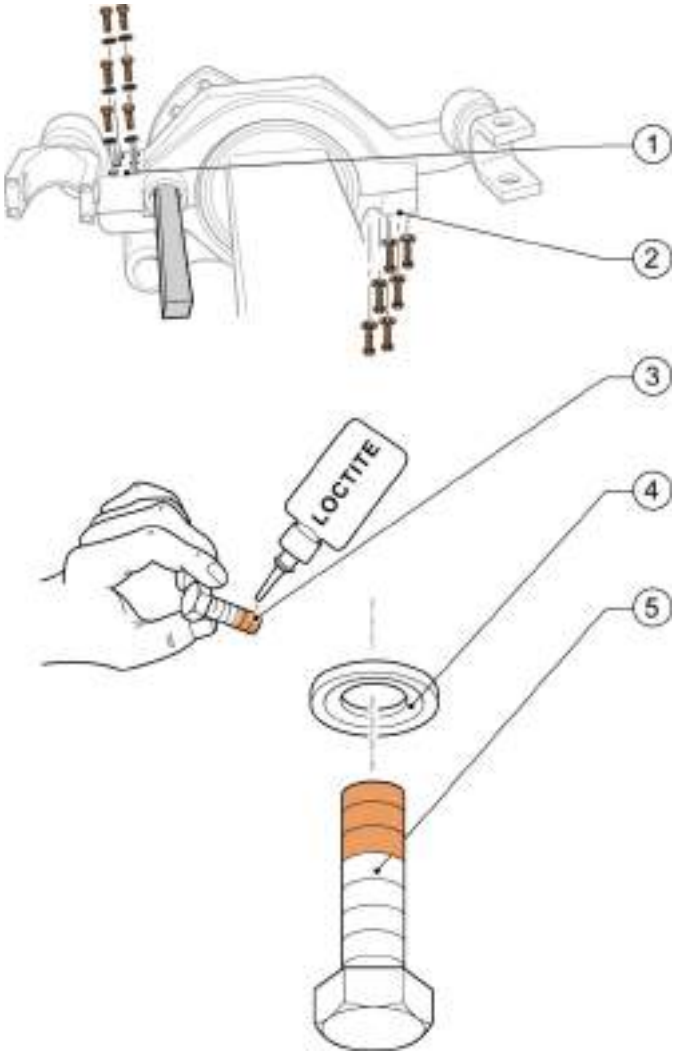


Fig. 109 Screw down swivelling bridge

NOTE

Be sure that the recess of the HT washers (4) faces the screw head!

Step 9

Fill the locking cylinder (2) with oil prior to installation. Spread grease on the spring assembly.

Pull the anti-rotation device (5) out of the lock mount (1) and push into the opening of the bottom swivelling bridge.

Insert the bushings (3) and (4) the lock (locking cylinder) (2) completely into the lock mount (1).

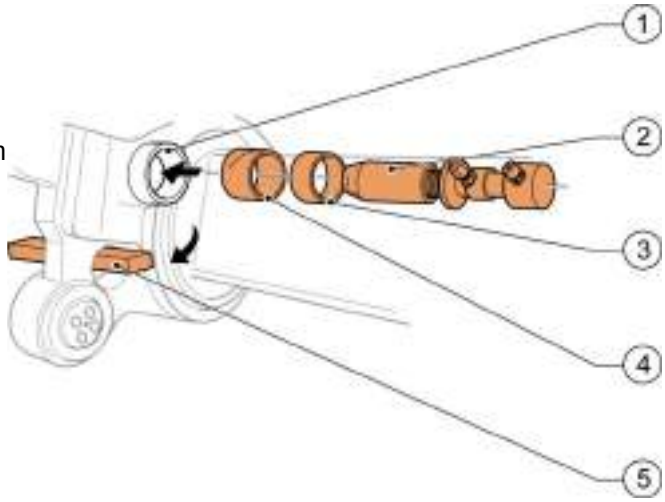


Fig. 110 Insert lock (locking cylinder)

NOTE

When installing the lock (2), take care that the groove in the locking pin engages with the adjusting spring of the bushing of the swivelling bridge (Fig. 68, no. 4)!

Step 10

Press the lock (locking cylinder) (1) against the swivelling bridge (2) with the screw clamp.

Equipment:

fixture

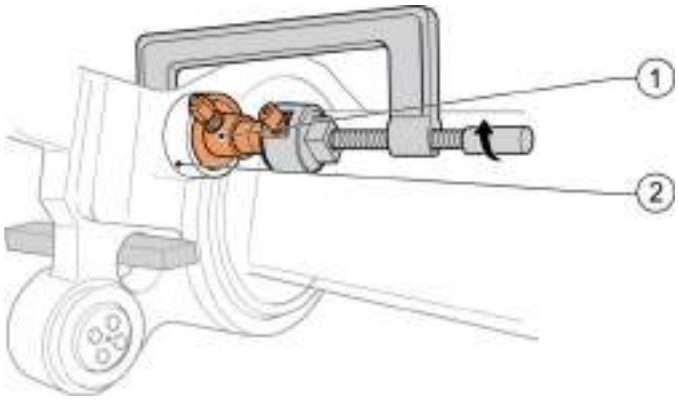


Fig. 111 Press lock (locking cylinder)

Step 11

Secure the lock (locking cylinder) (1) with guard ring (2) in the lock mount. (If necessary turn away the difference of the spacer bushing).

Afterwards loosen it again.

Tighten the adjusting springs of the bushings (Fig. 101, Item 3).
To do this, connect the lock to the hydraulics and twist swivelling bridges.

Tools:

hexagon wrench

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 8
BG 240 size: 8

Equipment:

snapring pliers

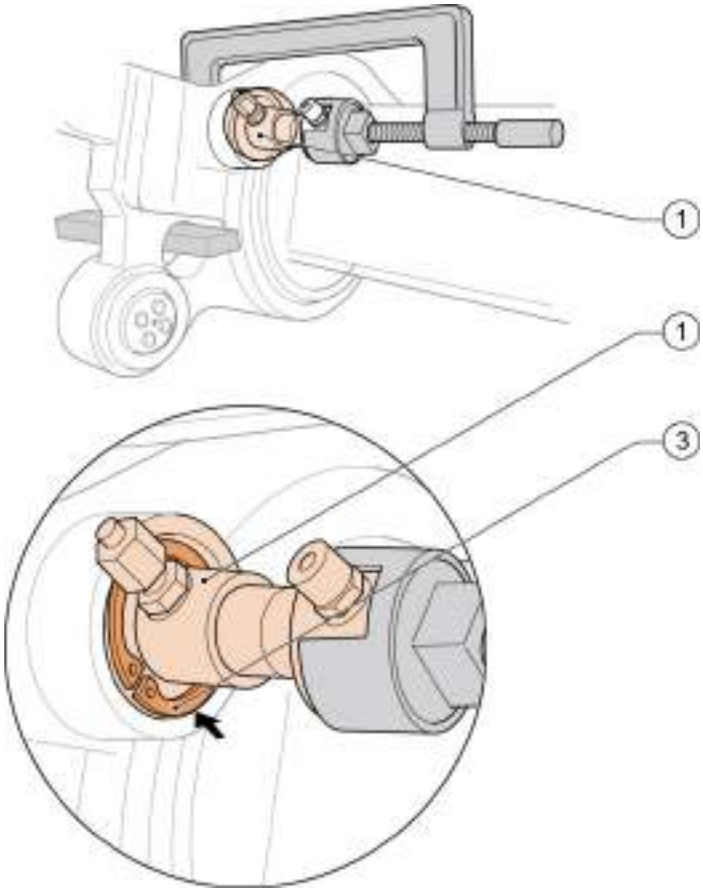


Fig. 112 Secure lock (locking cylinder)

5.4 Rear ripper assembly

5.4.1 Replacing rear ripper

5.4.1.1 Dismounting rear ripper

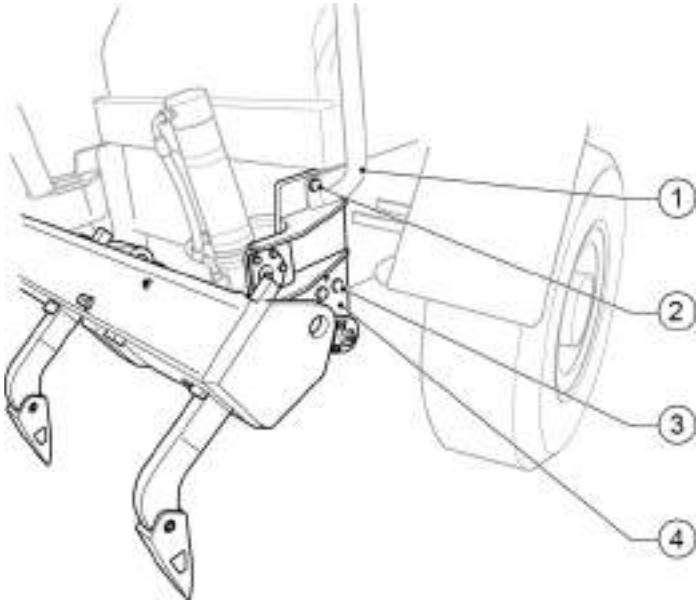
Step 1a	BG 110
Loosen screw (2) of the rear lights (1) with flat wrench. Loosen screws (3) on the console (4) with flat wrench. Tools: open-end wrench BG 110 size: 27 (2) BG 110 size: 30 (3)	

Fig. 113 Loosen the screwed connections on the BG 110

Step 1b	**BG 130 / BG 160 / BG 190 / BG 240**

Disconnect holder with eyelet (2) on left console (3) with flat wrench.

Disconnect eyelet joint (4) from rod (1).

Loosen dowel screw and spacer ring inside and outside on the traverse (5) of the rear mounted ripper.

Tools:

open-end wrench

BG 130 size: 27
BG 160 size: 27
BG 190 size: 27
BG 240 size: 27

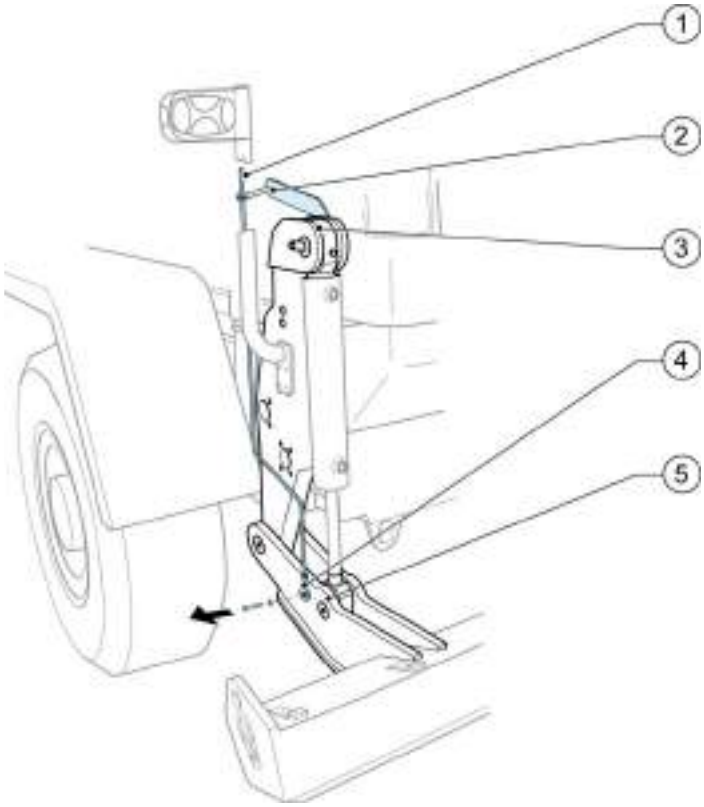


Fig. 114 Loosen depth indicator on left console

Step 2

Remove screws (1) on the rear part of the frame on the back side.

Disconnect threaded bushing (2) GE 15-L OMD.

Loosen pipelines of the lowering valve (5) and on the cylinders (4).

Close pipe and hose lines with closure material.

Tools:

open-end wrench

BG 110 sizes: 24, 27
BG 130 sizes: 24, 27
BG 160 sizes: 24, 27
BG 190 sizes: 24, 27
BG 240 sizes: 24, 27

Closure material:

ROV 15-LA AN 932 1352
M 15-LA AN 560 605 131
VK 15-LA AN 560 335 007

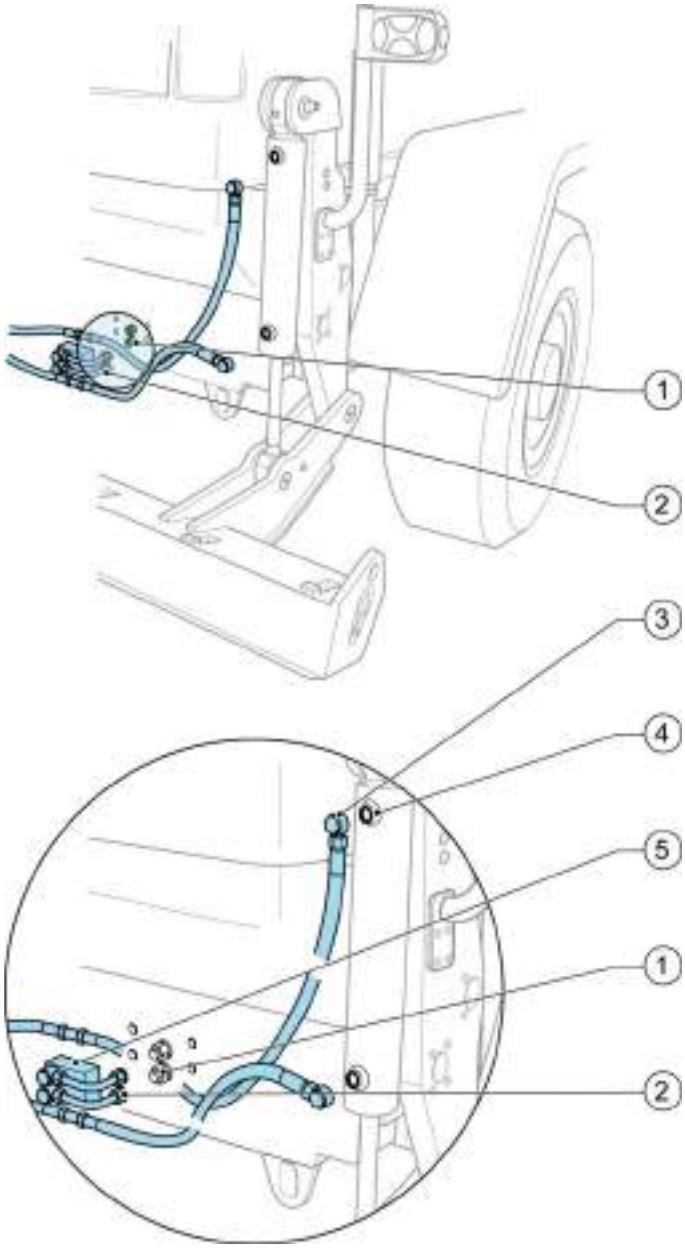


Fig. 115 Disconnect pipelines on rear mounted ripper

Step 3

Disassemble the rear lights (2) on both consoles (1) by loosening the screws (3) using a flat wrench.

Remove rear lights (2) and store to the side.

Loosen the remaining screws (4) on both consoles (1) with flat wrench.

Tools:

open-end wrench

BG 110 sizes: 27, 30
BG 130 sizes: 24, 26
BG 160 sizes: 24, 26
BG 190 sizes: 24, 26
BG 240 sizes: 24, 26

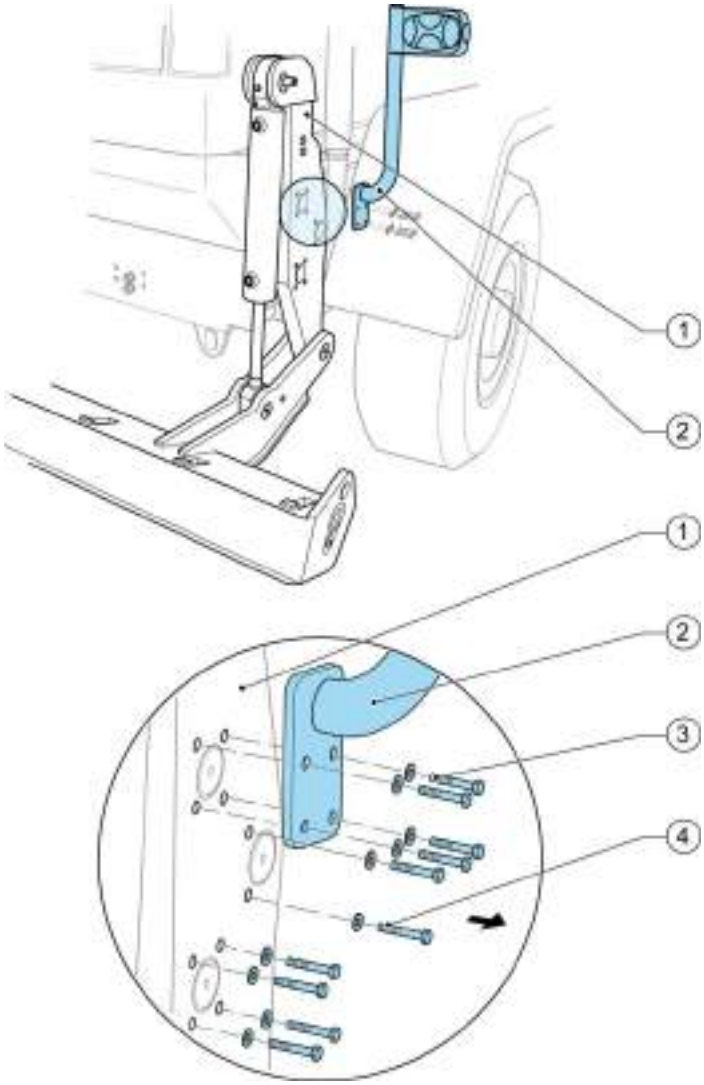


Fig. 116 Loosen the screwed connections on rear lights and consoles

Step 4

Suspend rear mounted ripper from left and right console (2) using cable (1).

Remove guard rings (6) with snapring pliers from the console (2).

Screw the bolts (5) out of the console (2) with pull-off device (4).
Separate consoles (2) from rear frame part (3).

Securely set down rear mounted ripper using crane.

Tools:

snapring pliers (internal),
extractor,

Equipment:

lift apparatus,
cables

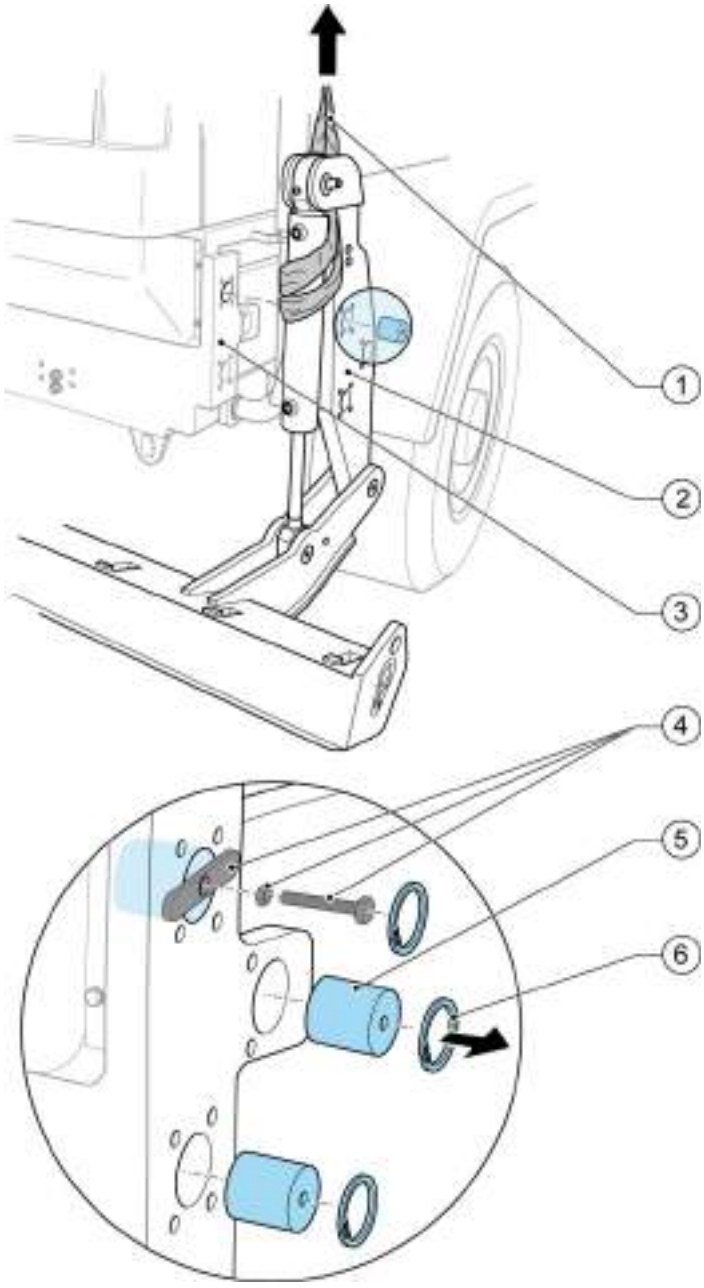


Fig. 117 Loosen bolts from console

NOTE
For all fits, spray with before disassembly.

5.4.1.2 Mounting rear ripper

Step 1

Prepare pre-assembled new rear mounted ripper.

Clean paint residue and dirt from all holes (2) on the left and right console (1).

Equipment:

cutter or similar,
brake cleaner or similar,
sandpaper

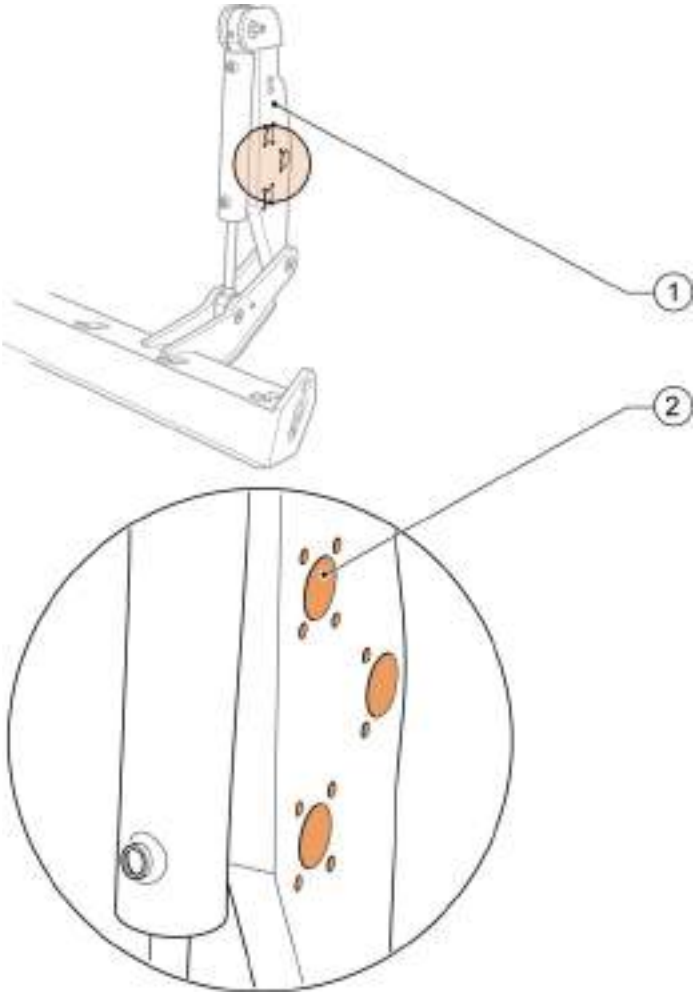


Fig. 118 Clean holes in consoles before assembly

Step 2

Clean paint residue and dirt from all location holes (2) for the rear mounted ripper in the left and right frame (1).

Equipment:

cutter or similar,
brake cleaner or similar,
sandpaper

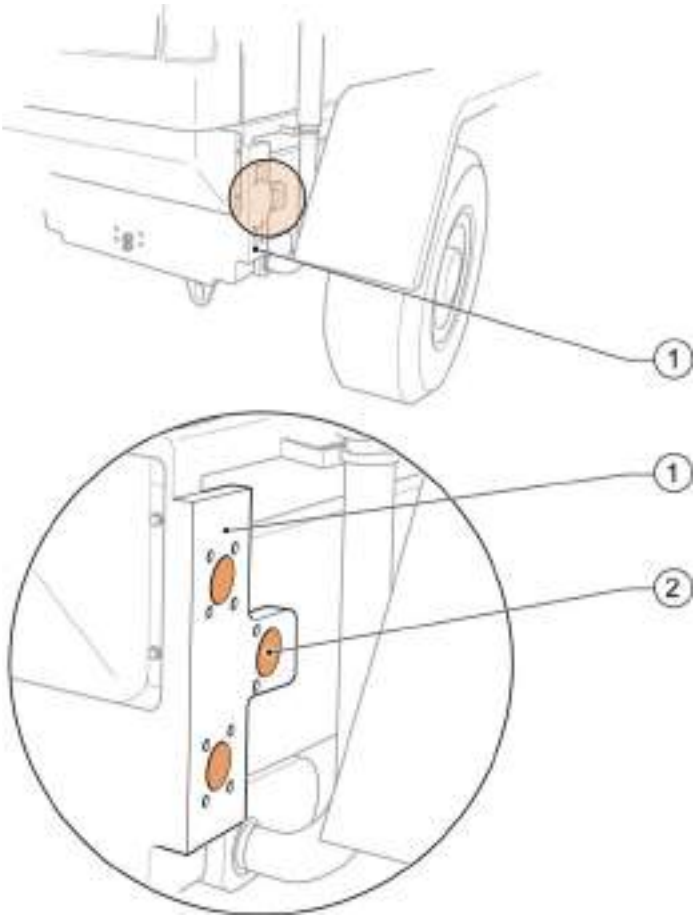


Fig. 119 Clean holes in frame before assembly

Step 3

Clean and grease 6 bolts (4).

Suspend rear mounted ripper from left and right console (2) using cable (1), advance to rear part of frame (3) and align one hole of the rear part of frame (3) with one of console (2).

Insert 1 bolt (4) in the aligned hole and secure with guard ring (5).
Repeat on the other console (2).

Insert all other bolts (4) in both consoles (2) and secure with guard rings (5).

Tools:

Snapring pliers (internal), hammer,
Aluminum mandrel

Equipment:

lubricating grease,
lift apparatus,
cables

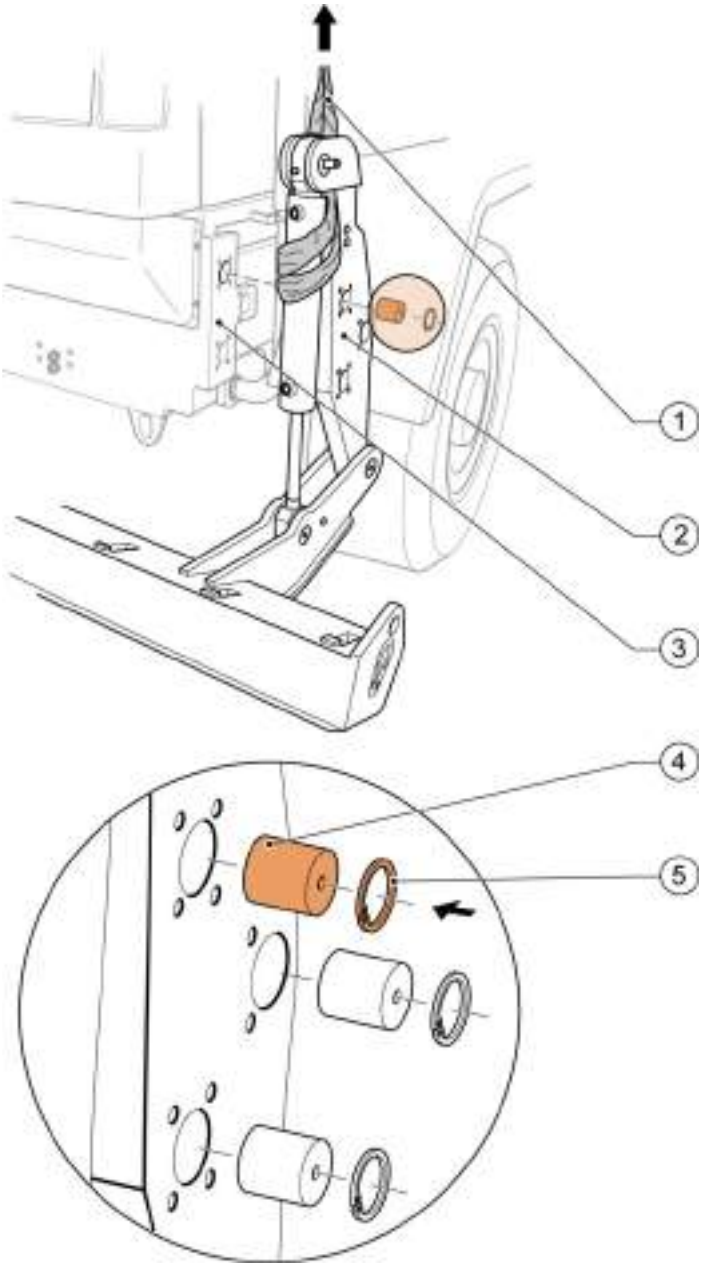


Fig. 120 Install bolts in location holes

Step 4

Remove screws (1) on the rear part of the frame on the back side.

Screw in threaded bushings (2) GE 15-L OMD.

Connect pipelines of the pre-assembled lowering brake valve (5) and rotate upwards until the bottom edge of the lowering brake valve (5) no longer projects below the bottom edge (6) of the frame.

Tighten hose lines on the cylinders (4) with banjos (3) WH15-Lm-KDS/OMD.

Tools:

open-end wrench

BG 110 size: 27
BG 130 size: 27
BG 160 size: 27
BG 190 size: 27
BG 190 size: 27

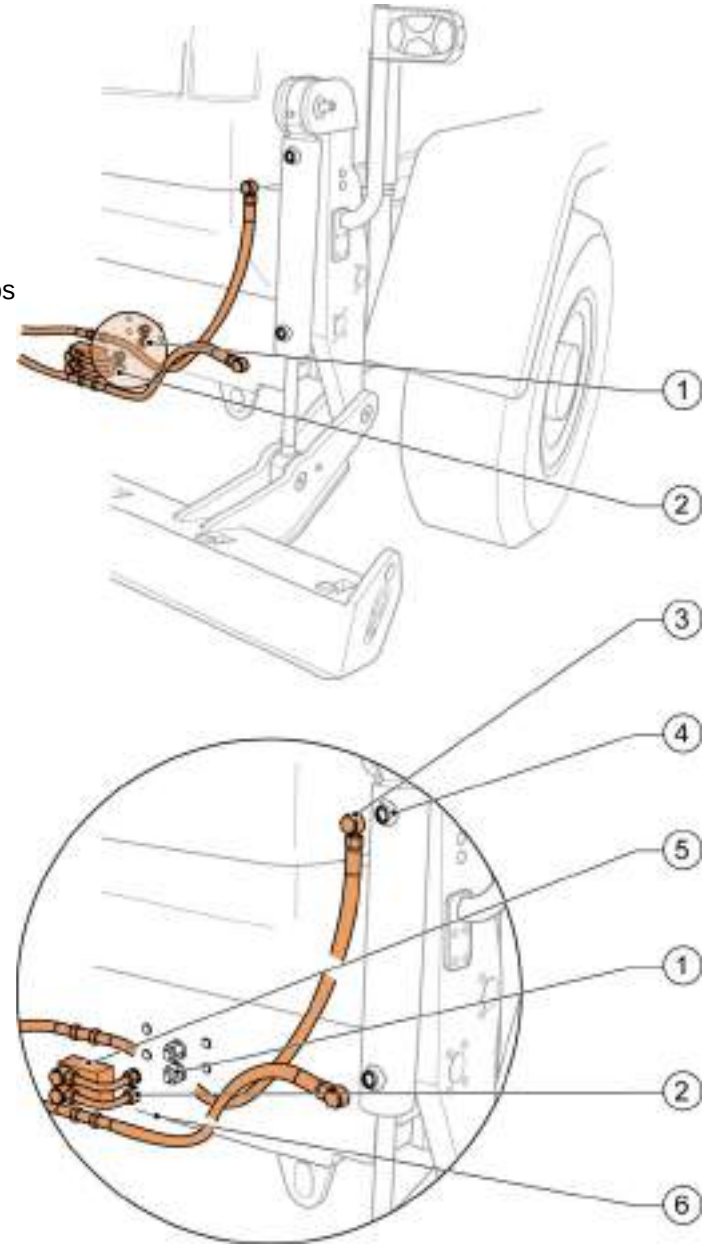


Fig. 121 Connect the hose and pipelines.

Step 5a **BG 110**

Secure screws with Loctite.

Screw in (2) the rear lights (1) with torque wrench.

Screw in the screws (3) on the console (4) with torque wrench.

Tools:

torque wrench

BG 110 sizes: 27 / 30

Standardized parts:

BG 110: screw M 10-10.9 (4)

Starting torques:

BG 110: M_T=510 Nm (4)

Equipment:

Loctite 243

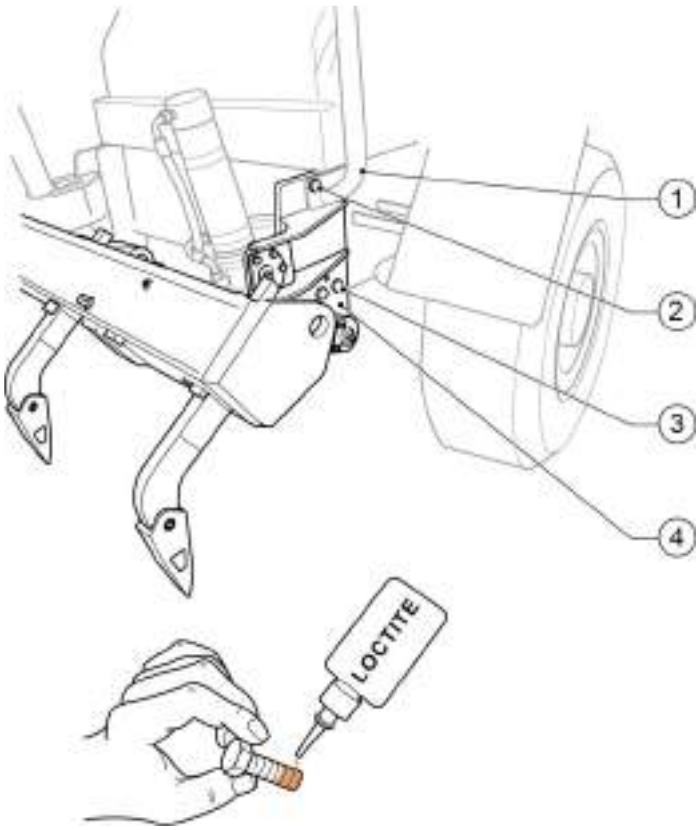


Fig. 122 Install console

Step 5b **BG 130 / BG 160 / BG190 / BG 240**

Secure screws with Loctite.

Attach holder with eyelet (2) on left console (3) with screws.

Fasten eyelet joint (4) on rod (1).

Tighten dowel screw and spacer ring internal and external on the traverse (5) of the rear mounted ripper.

Tools:

open-end wrench

BG 130 size: 27
BG 160 size: 27
BG 190 size: 27
BG 190 size: 27

Standardized parts:

BG 130: hexagon-head screw M16x50 (2)
BG 130: hexagon-head screw M16x30 (4)
BG 160: hexagon-head screw M16x50 (2)
BG 160: hexagon-head screw M16x30 (4)
BG 190: hexagon-head screw M16x50 (2)
BG 190: hexagon-head screw M16x30 (4)
BG 240: hexagon-head screw M16x50 (2)
BG 240: hexagon-head screw M16x30 (4)

Starting torques:

BG 130: M_T=265 Nm (4)
BG 160: M_T=265 Nm (4)
BG 190: M_T=265 Nm (4)
BG 240: M_T=265 Nm (4)

Equipment:

Loctite 243

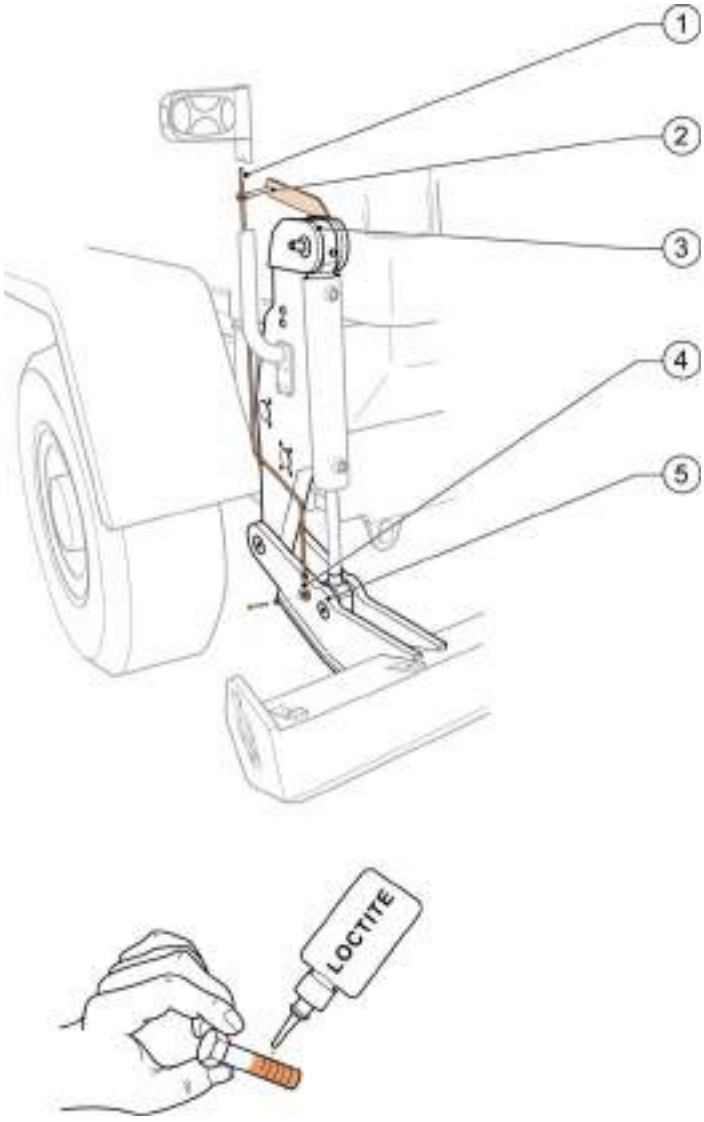


Fig. 123 Install depth indicator on left console

5.5 Dozer blade assembly

5.5.1 Replacing dozer blade

5.5.1.1 Dismounting dozer blade

Step 1

Set the dozer blade (5) and the blade (4) crosswise to the direction of travel, lower and thus lift the grader (1) such that the wheels have space from the ground.

Place a metal support (3) on the front frame at the front receptacle of the front axle as well as under the pivot joint to secure the grader from dropping down.

Place a wood beam as damping between the metal parts!

Ensure access to axle bolt (2) for further installation.

Equipment:
2 x metal supports

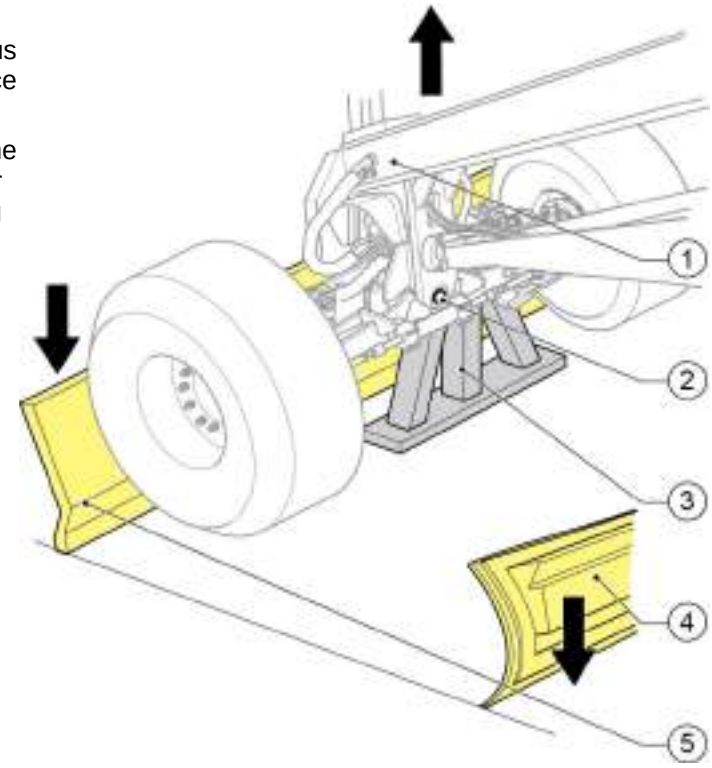


Fig. 124 Lift up and secure grader

DANGER

Risk from lowering of hydraulic assemblies!
Hydraulic assemblies, such as the cylinder, push blade, blade, etc. can lower unexpectedly. After lifting it up, the grader must immediately be secured with a metal support (3) under the pivot joint and the front frame!

Step 2

Secure suitable stopping means on the dozer blade.

Disconnect and close all hose lines from the dozer blade cylinder.

Use socket wrench to loosen all hex screws (3) on the dozer blade (2).

Remove dozer blade (2) from front frame (1).

Tools:

socket wrench

BG 110 size: 30
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Equipment:

crane,
hitching gear

Weight

BG 110 764 kg
BG 130 995 kg
BG 160 764 kg
BG 190 948 kg
BG 240 1112 kg

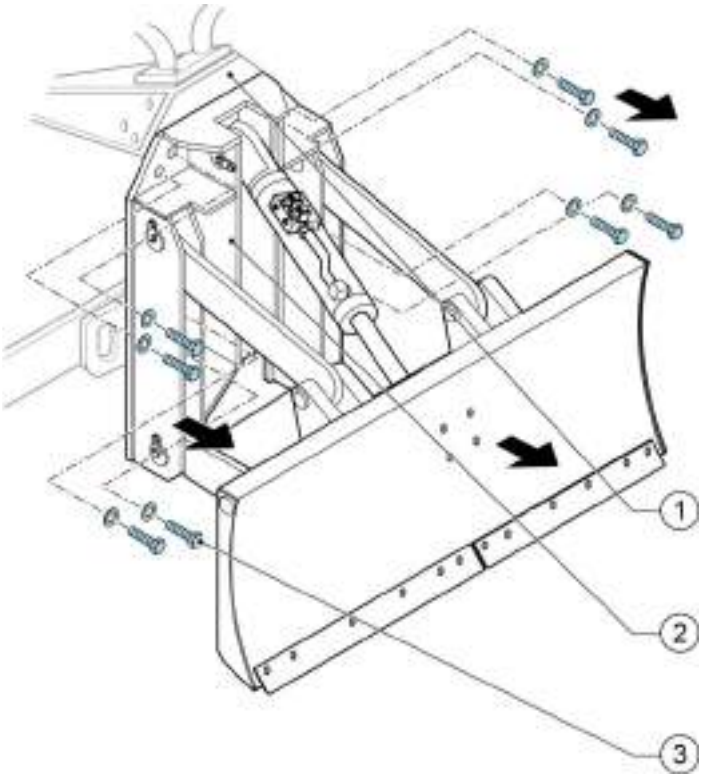


Fig. 125 Dismantle dozer blade

DANGER

Crush or impact risk!
When pulling the wheels off, they can fall or tip.
Lay underlayment (wood or similar) under the wheels. Remove wheels in pairs.

5.5.1.2 Mounting dozer blade

Step 1

Secure suitable hitching gear on the dozer blade (2).

Set dozer blade (2) down on a horizontal surface using crane, place up against front frame (1) and align.

Fasten all hex screws (3) with nuts (4) on dozer blade (2) and front frame (1) with socket wrench.

Connect all hose lines to dozer blade with a flat wrench.

Tools:

open-end wrench

socket wrench

BG 110 size: 30
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: screw M 20-10.8 (3)
BG 130: screw M 20-10.8 (3)
BG 160: screw M 20-10.8 (3)
BG 190: screw M 20-10.8 (3)
BG 240: screw M 20-10.8 (3)

BG 110: nut M 20 DIN 980 (4)
BG 130: nut M 20 DIN 980 (4)
BG 160: nut M 20 DIN 980 (4)
BG 190: nut M 20 DIN 980 (4)
BG 240: nut M 20 DIN 980 (4)

BG 110: tension disk 20 DIN 6796 (5)
BG 130: tension disk 20 DIN 6796 (5)
BG 160: tension disk 20 DIN 6796 (5)
BG 190: tension disk 20 DIN 6796 (5)
BG 240: tension disk 20 DIN 6796 (5)

BG 110: washer 21 DIN 6916 (6)
BG 130: washer 21 DIN 6916 (6)
BG 160: washer 21 DIN 6916 (6)
BG 190: washer 21 DIN 6916 (6)
BG 240: washer 21 DIN 6916 (6)

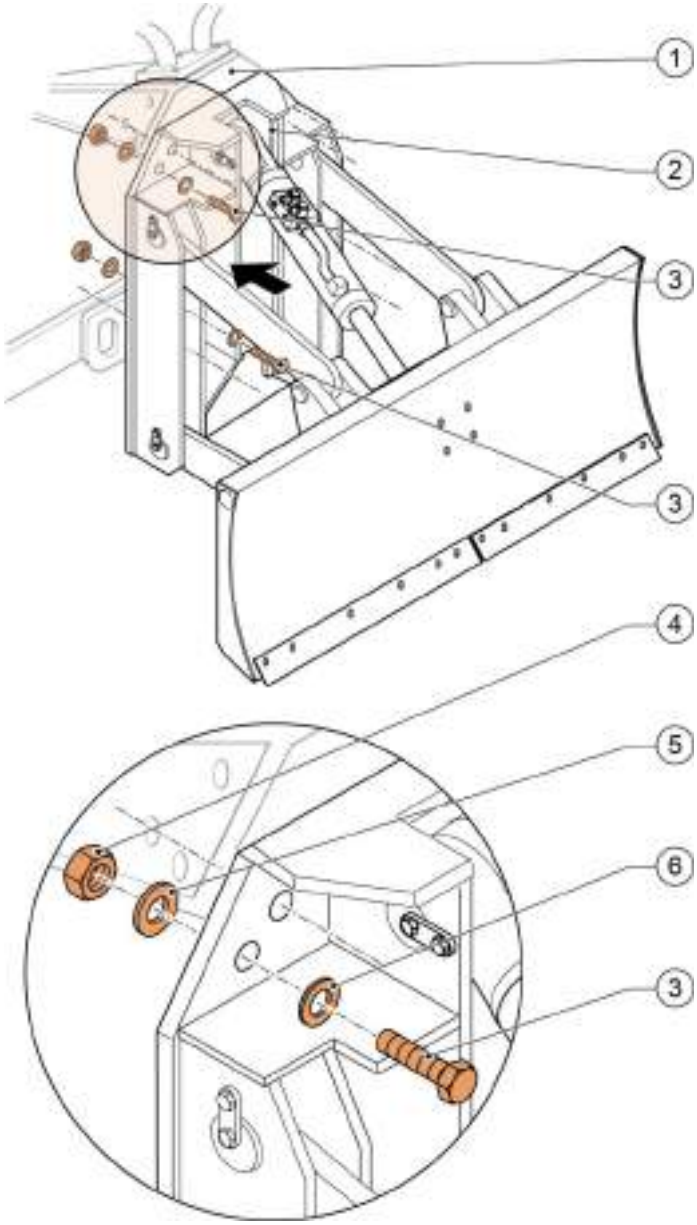


Fig. 126 Install dozer blade

Starting torques: (3)

BG 110: M_T=580 Nm
BG 130: M_T=580 Nm
BG 160: M_T=580 Nm
BG 190: M_T=580 Nm
BG 240: M_T=580 Nm

Weight

BG 110 764 kg
BG 130 995 kg
BG 160 764 kg
BG 190 948 kg
BG 240 1112 kg

Equipment:

crane, hitching gear

NOTE
Install washer (6) under the screw (3). The recess under the washer (6) must face towards the screw head (3). Install spring washer (5) under the nut (4). The bulge of the washer (5) must face towards the nut (4).

NOTE
In BG 130 the dozer blade is installed on the plate. Mount plate and dozer blade together on the dozer blade.

DANGER
Old nuts and spring washers must not be reused!

5.6 Center pivot steering assembly

5.6.1 Center pivot steering overview

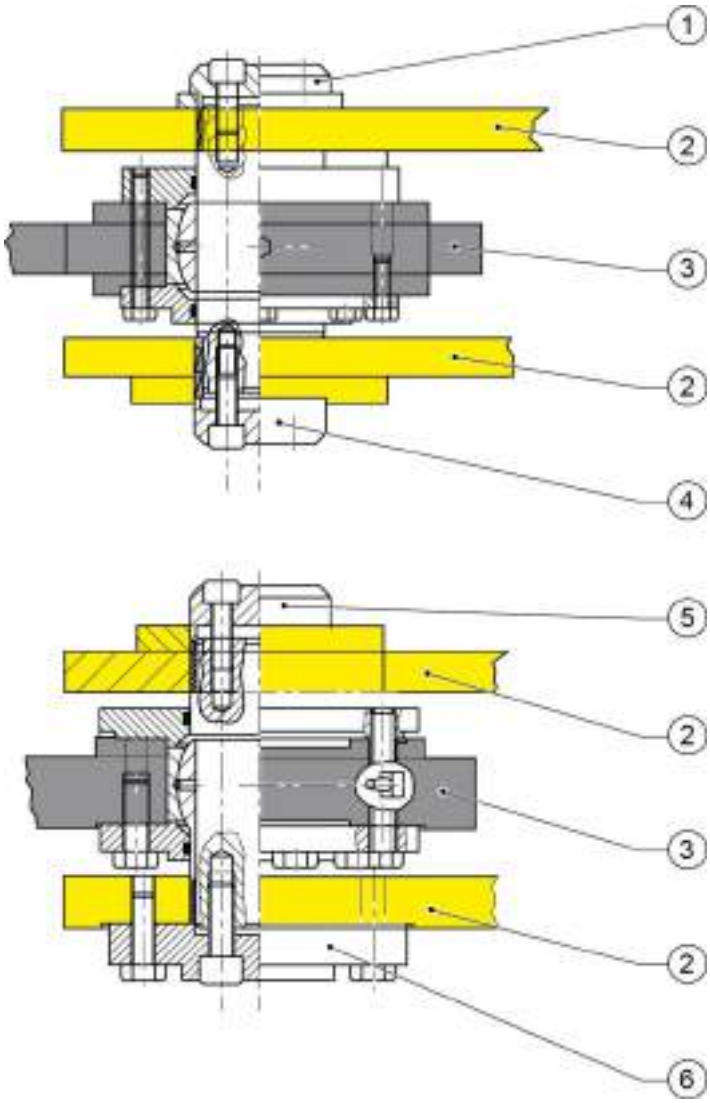


Fig. 127 Center pivot steering overview 1

1 Bearing above - cover above
2 Chassis front section
3 Chassis rear section
4 Bearing above - cover below
5 Bearing below - cover above
6 Bearing below - cover below

5.6.2 Centre pivot steering mounting sequence

The assembly takes place in the order of items 1 through 9.

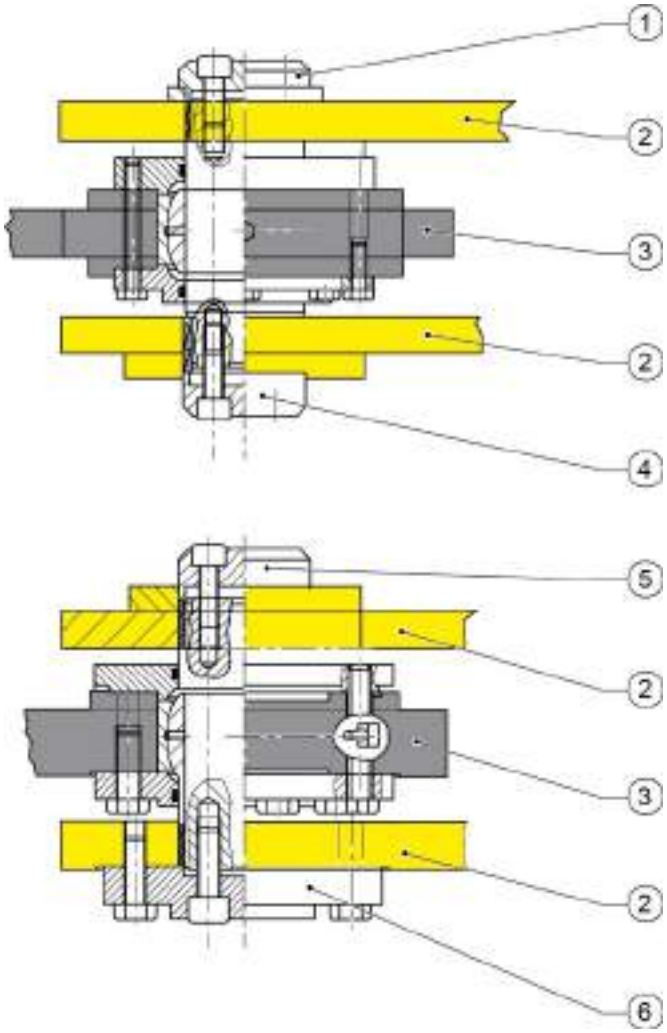


Fig. 128 Centre pivot steering mounting sequence

Item	BG110	BG130/BG160	BG190/240
1	M8 / size 13 / M_T=22 Nm	M12 / size 19 / M_T=70 Nm	M12 / size 10 / M_T=96 Nm
2	M12 / size 10 / M_T=105 Nm	M14 / size 12 / M_T=175 Nm	M16 / size 14 / M_T=236 Nm
3	M10 / size 8 / M_T=69 Nm	M12 / size 103 / M_T=96 Nm	M12 / size 10 / M_T=96 Nm
4	M10 / size 17 / M_T=43 Nm	M12 / size 19 / M_T=70 Nm	M12 / size 10 / M_T=96 Nm
5	M10 / size 17 / M_T=43Nm	M12 / size 19 / M_T=70 Nm	M12 / size 10 / M_T=96 Nm
6	M10 / size 8 / M_T=69Nm	M10 / size 8 / M_T=69 Nm	M12 / size 10 / M_T=96 Nm
7	M10 / size 8 / M_T=69 Nm	M10 / size 8 / M_T=69 Nm	M12 / size 10 / M_T=96 Nm
8	M8 / size 13 / M_T=25 Nm	M8 / size 13 / M_T=25 Nm	M8 / size 13 / M_T=25 Nm
9	M8 / size 13 / M_T=25 Nm	M8 / size 13 / M_T=25 Nm	M8 / size 13 / M_T=25 Nm

NOTE
The assembly of the layer in the rear part of the frame occurs before the assembly of the pivot.

5.6.3 Screwed connections on the pivot joint

Carry out the final tightening of the screwed connections on the pivot joint in the following order using the corresponding torque wrench:

Step 1

Bearing below - front part of frame

Tighten 8x hex screws (1) on sealing cover crosswise with torque wrench.

Tools:

torque wrench

open-end wrench

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19

hex wrench

BG 190 size: 10
BG 240 size: 10

Standardized parts:

BG 110: screw M 10-8.8 (1)
BG 130: screw M 12-8.8 (1)
BG 160: screw M 12-8.8 (1)
BG 190: screw M 12-10.9 (1)
BG 240: screw M 12-10.9 (1)

Starting torques:

BG 110: M_T=22 Nm (4)
BG 130: M_T=70 Nm (4)
BG 160: M_T=70 Nm (4)
BG 190: M_T=96 Nm (4)
BG 240: M_T=96 Nm (4)

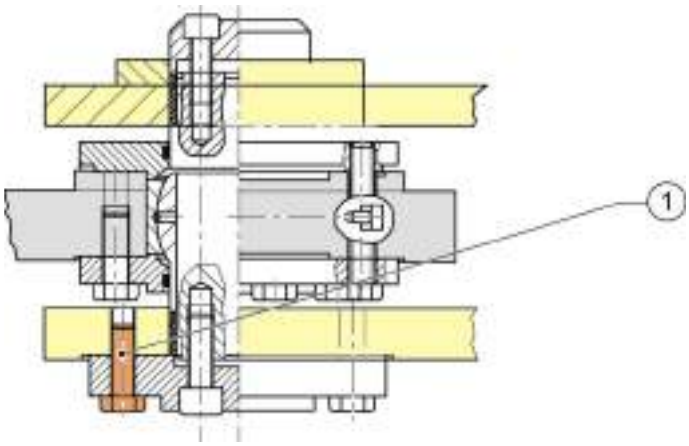


Fig. 129 Firmly tighten hex screws on lower bearing

Step 2

Bearing below - front part of frame cover below

Firmly tighten 4x cylinder screws (2) on sealing cover crosswise with torque wrench.

Tools:

torque wrench

hex wrench

BG 110 size: 10
BG 130 size: 12
BG 160 size: 12
BG 190 size: 14
BG 240 size: 14

Standardized parts:

BG 110: Screw M 12-10.9 (2)
BG 130: Screw M 14-10.9 (2)
BG 160: Screw M 14-10.9 (2)
BG 190: Screw M 16-10.9 (2)
BG 240: Screw M 16-10.9 (2)

Starting torques:

BG 110: M_T=105 Nm (2)
BG 130: M_T=175 Nm (2)
BG 160: M_T=175 Nm (2)
BG 190: M_T=236 Nm (2)
BG 240: M_T=236 Nm (2)

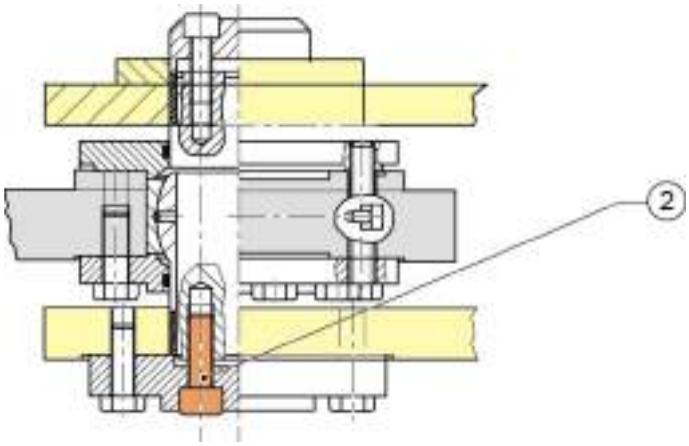


Fig. 130 Firmly tighten cylinder screws on bearing

Step 3

Bearing below - front part of frame:

Firmly tighten 4x cylinder screws (3) on bushing crosswise with torque wrench.

Tools:

hex wrench

BG 110 size: 8
BG 130 size: 10
BG 160 size: 10
BG 190 size: 10
BG 240 size: 10

Standardized parts:

BG 110: Screw M 10-10.9 (3)
BG 130: Screw M 12-10.9 (3)
BG 160: Screw M 12-10.9 (3)
BG 190: Screw M 12-10.9 (3)
BG 240: Screw M 12-10.9 (3)

Starting torques:

BG 110: M_T=69 Nm (3)
BG 130: M_T=96 Nm (3)
BG 160: M_T=96 Nm (3)
BG 190: M_T=96 Nm (3)
BG 240: M_T=96 Nm (3)

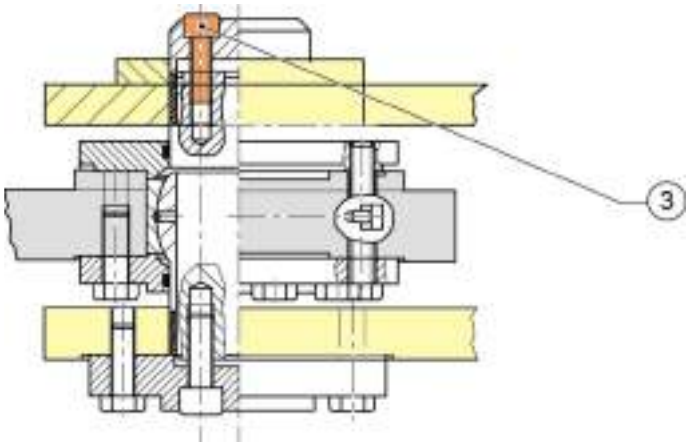


Fig. 131 Firmly tighten cylinder screws on bearing

Step 4

Bearing below - rear part of frame

Tighten hex screws (4) on sealing cover crosswise with torque wrench.

Tools:

open-end wrench

BG 110 size: 17
BG 130 size: 19
BG 160 size: 19

hex wrench

BG 190 size: 10
BG 190 size: 10

Standardized parts:

BG 110: Screw M 10-8.8 (4)
BG 130: Screw M 12-8.8 (4)
BG 160: Screw M 12-8.8 (4)
BG 190: Screw M 12-10.9 (4)
BG 240: Screw M 12-10.9 (4)

Starting torques:

BG 110: M_T=43 Nm (4)
BG 130: M_T=70 Nm (4)
BG 160: M_T=70 Nm (4)
BG 190: M_T=96 Nm (4)
BG 240: M_T=96 Nm (4)

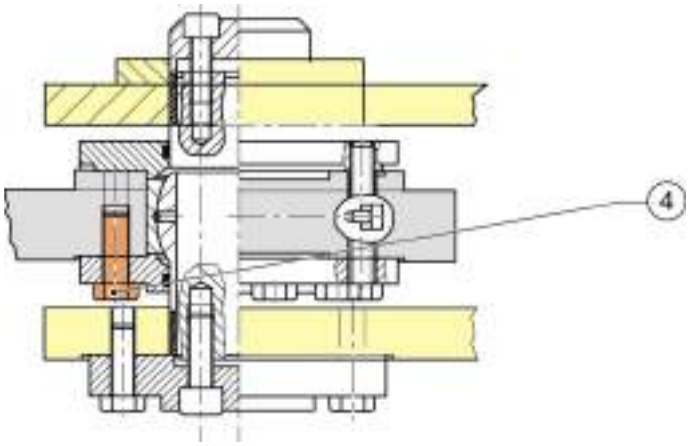


Fig. 132 Firmly tighten hex screws on lower bearing

Step 5

Bearing below - rear part of frame

Tighten hex screws (5) on sealing cover crosswise with torque wrench.

Tools:

open-end wrench

BG 110 size: 17
BG 130 size: 19
BG 160 size: 19

hex wrench

BG 190 size: 10
BG 190 size: 10

Standardized parts:

BG 110: Screw M 10-8.8 (5)
BG 130: Screw M 12-8.8 (5)
BG 160: Screw M 12-8.8 (5)
BG 190: Screw M 12-10.9 (5)
BG 240: Screw M 12-10.9 (5)

Starting torques:

BG 110: M_T=43 Nm (5)
BG 130: M_T=70 Nm (5)
BG 160: M_T=70 Nm (5)
BG 190: M_T=96 Nm (5)
BG 240: M_T=96 Nm (5)

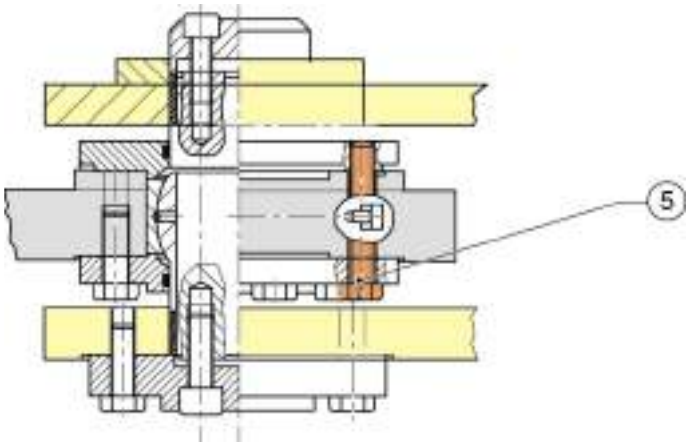


Fig. 133 Firmly tighten hex screws on lower bearing

Step 6

Bearing above

Firmly tighten 4x cylinder screws (6) on cover above crosswise with torque wrench.

Tools:

hex wrench

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Standardized parts:

BG 110: Screw M 10-10.9 (6)
BG 130: Screw M 10-10.9 (6)
BG 160: Screw M 10-10.9 (6)
BG 190: Screw M 12-10.9 (6)
BG 240: Screw M 12-10.9 (6)

Starting torques:

BG 110: M_T=69 Nm (6)
BG 130: M_T=69 Nm (6)
BG 160: M_T=69 Nm (6)
BG 190: M_T=96 Nm (6)
BG 240: M_T=96 Nm (6)

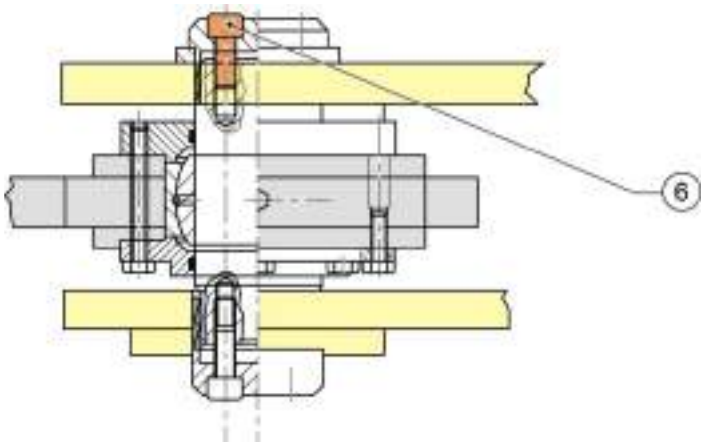


Fig. 134 Firmly tighten cylinder screws on bearing above

Step 7

Bearing above

Firmly tighten 4x cylinder screws (7) on cover below crosswise with torque wrench.

Tools:

hex wrench

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Standardized parts:

BG 110: Screw M 10-10.9 (7)
BG 130: Screw M 10-10.9 (7)
BG 160: Screw M 10-10.9 (7)
BG 190: Screw M 12-10.9 (7)
BG 240: Screw M 12-10.9 (7)

Starting torques:

BG 110: M_T=69 Nm (7)
BG 130: M_T=69 Nm (7)
BG 160: M_T=69 Nm (7)
BG 190: M_T=96 Nm (7)
BG 240: M_T=96 Nm (7)

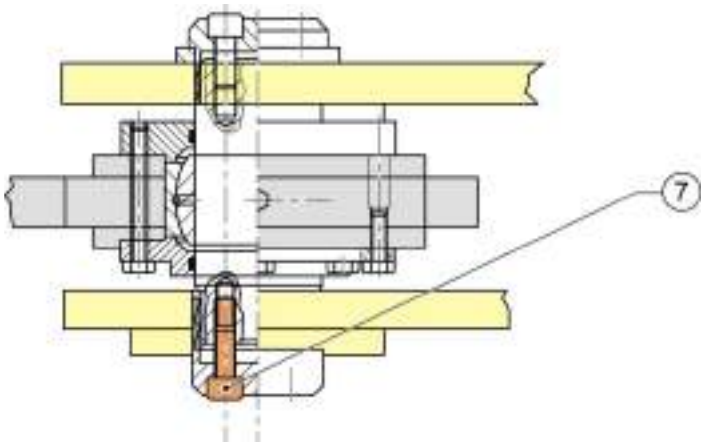
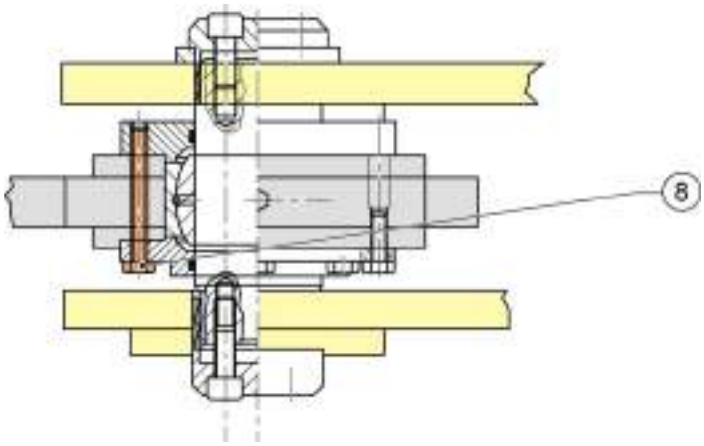


Fig. 135 Firmly tighten cylinder screws on bearing above

Step 8

Bearing above

Tighten hex screws (8) on sealing cover crosswise with torque wrench.



Tools:

open-end wrench

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Standardized parts:

BG 110: Screw M 8-8.8 (8)
BG 130: Screw M 8-8.8 (8)
BG 160: Screw M 8-8.8 (8)
BG 190: Screw M 8-8.8 (8)
BG 240: Screw M 8-8.8 (8)

Starting torques:

BG 110: M_T=25 Nm (8)
BG 130: M_T=25 Nm (8)
BG 160: M_T=25 Nm (8)
BG 190: M_T=25 Nm (8)
BG 240: M_T=25 Nm (8)

Step 9

Bearing above

Tighten hex screws (9) on sealing cover crosswise with torque wrench.

Tools:

open-end wrench

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Standardized parts:

BG 110: Screw M 8-8.8 (9)
BG 130: Screw M 8-8.8 (9)
BG 160: Screw M 8-8.8 (9)
BG 190: Screw M 8-8.8 (9)
BG 240: Screw M 8-8.8 (9)

Starting torques:

BG 110: M_T=25 Nm (9)
BG 130: M_T=25 Nm (9)
BG 160: M_T=25 Nm (9)
BG 190: M_T=25 Nm (9)
BG 240: M_T=25 Nm (9)

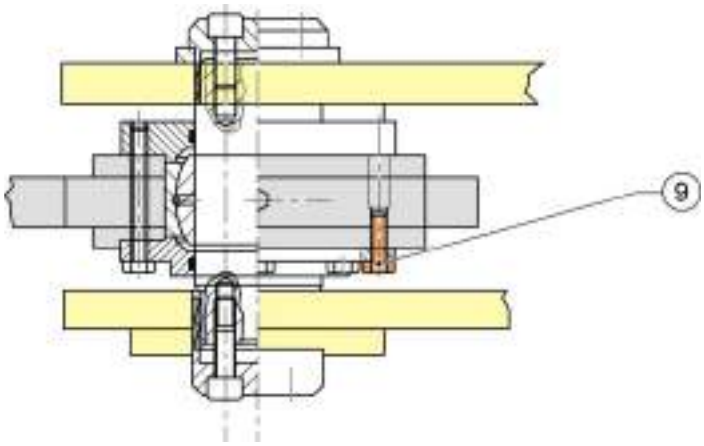


Fig. 136 Firmly tighten hexagon bolts on bearing above

5.6.4 Replacing center pivot steering

5.6.4.1 Dismounting center pivot steering

Step 1

Bearing above on front part of frame:

Use a pneumatic wrench (1) to loosen all cylinder screws (2) on the cover (3) above.

Tools:

pneumatic wrench + internal hex attachment

BG 110 size: 10
BG 130 size: 10
BG 160 size: 10
BG 190 size: 12
BG 240 size: 12

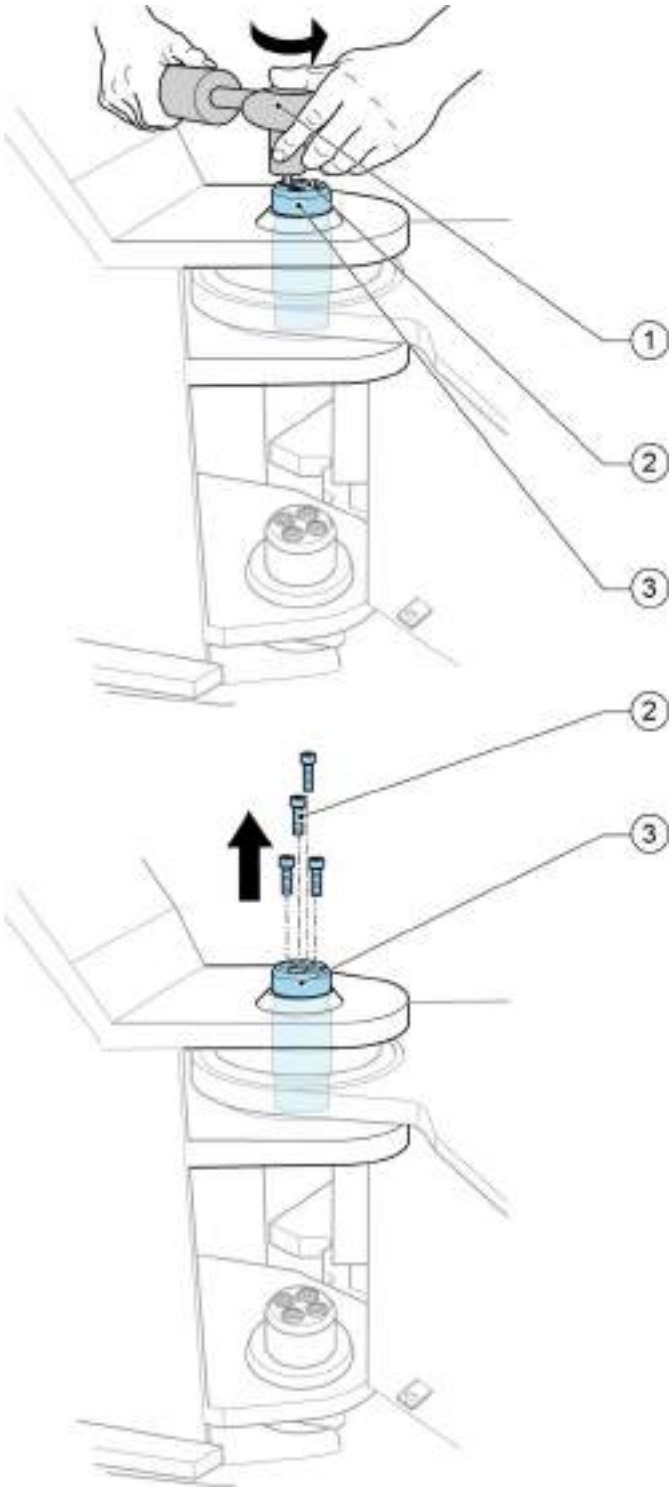


Fig. 137 Loosen all screws above on the bushing

Step 2

Bearing above on front part of frame:

Remove the cover (1) above and remove the clamping pieces (2 + 3) from the bolts (5)

Tools:

screwdriver

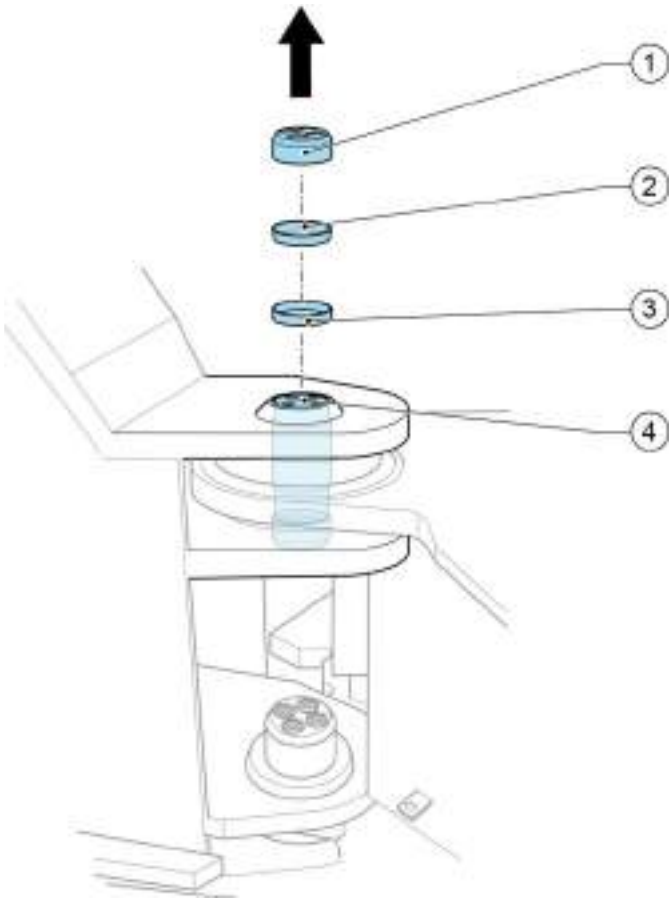


Fig. 138 Remove upper cover and clamping pieces

Step 3

Bearing above on front part of frame:

Use a pneumatic wrench (1) to loosen all cylinder screws (3) on the cover (2) below.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 10
BG 130 size: 10
BG 160 size: 10
BG 190 size: 12
BG 240 size: 12

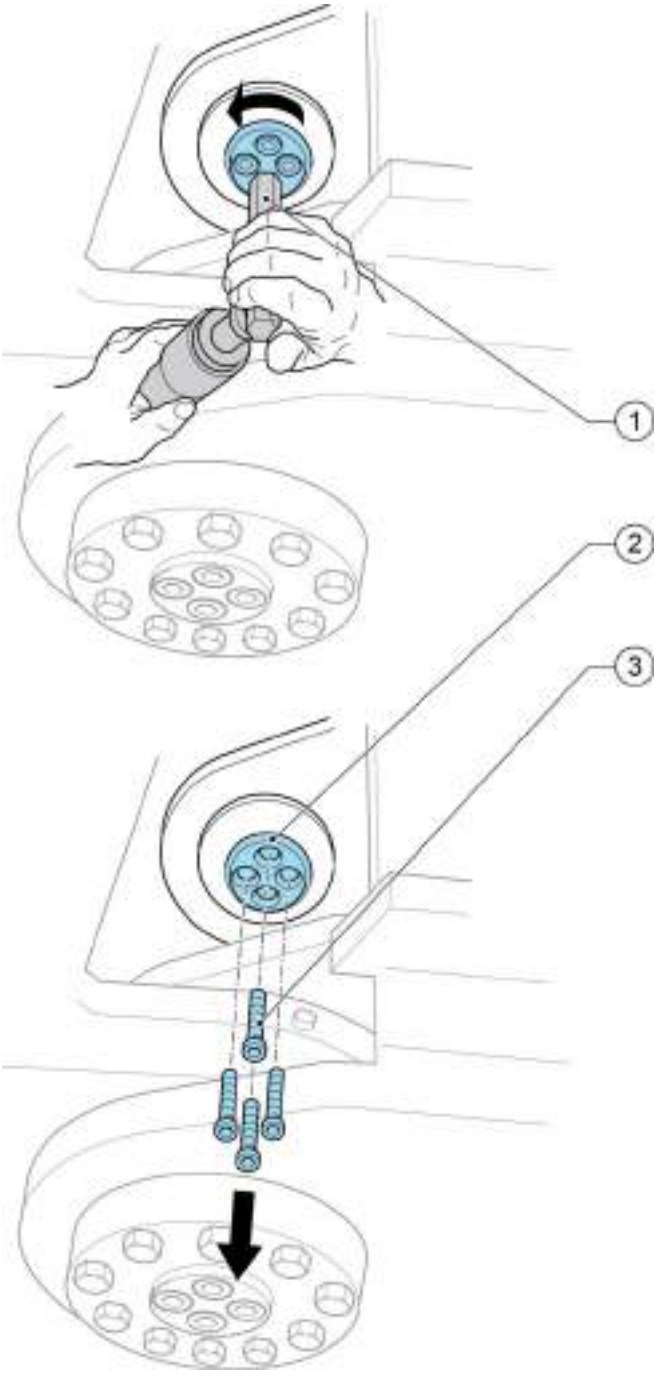


Fig. 139 Loosen all screws on the cover below

Step 4

Bearing above on front part of frame:

Remove the cover (5) below and remove the clamping pieces (2 + 3 + 4) from the bolts (1)

Tools:

screwdriver

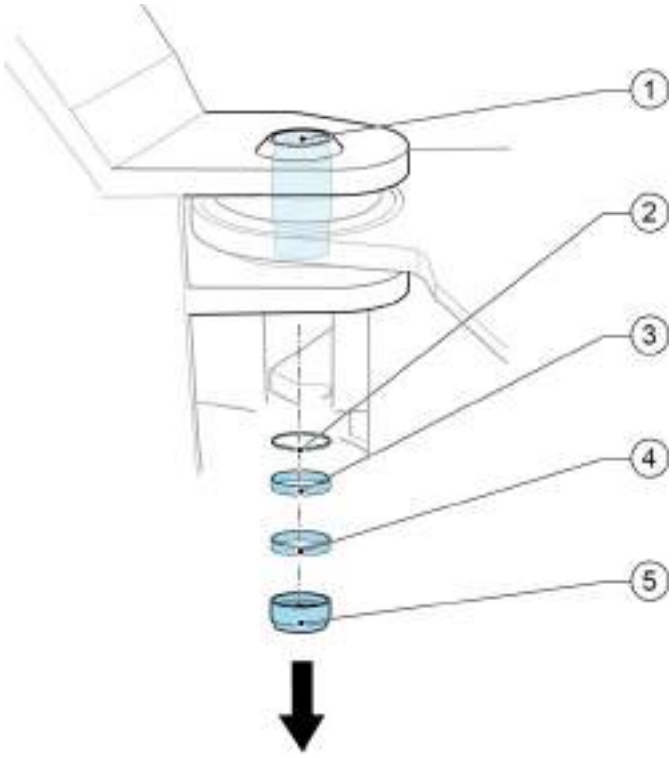


Fig. 140 Remove lower cover and clamping pieces

Step 5

Bearing above on front part of frame:

Knock the bolts (3) above with mandrel (2) and hammer (1) from the bearing.

Tools:

Hammer, mandrel

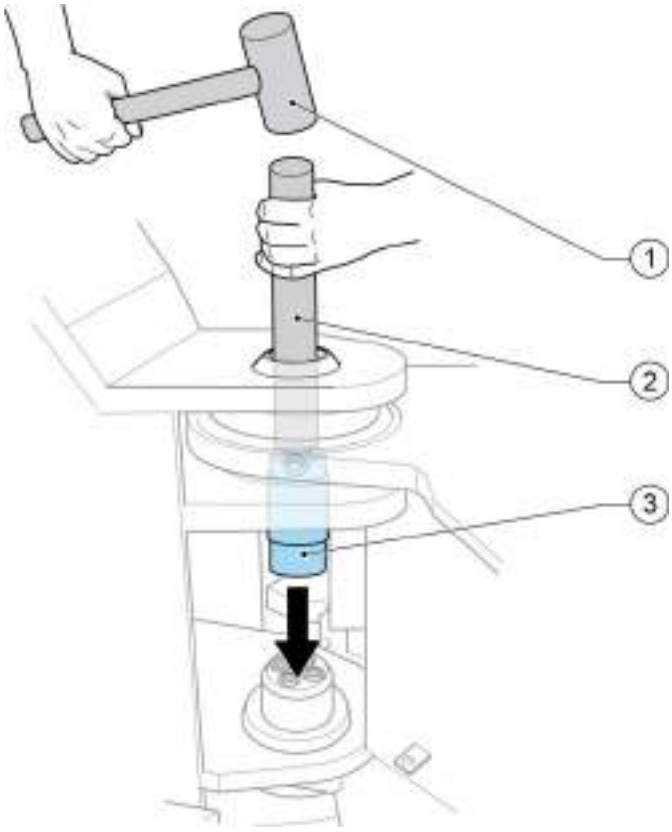


Fig. 141 Knock bolts out of bearing

Step 6

Bearing below on front part of frame:

Use a pneumatic wrench (1) to loosen all cylinder screws (2) on the cover (3) above.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 10
BG 130 size: 10
BG 160 size: 12
BG 190 size: 12
BG 240 size: 12

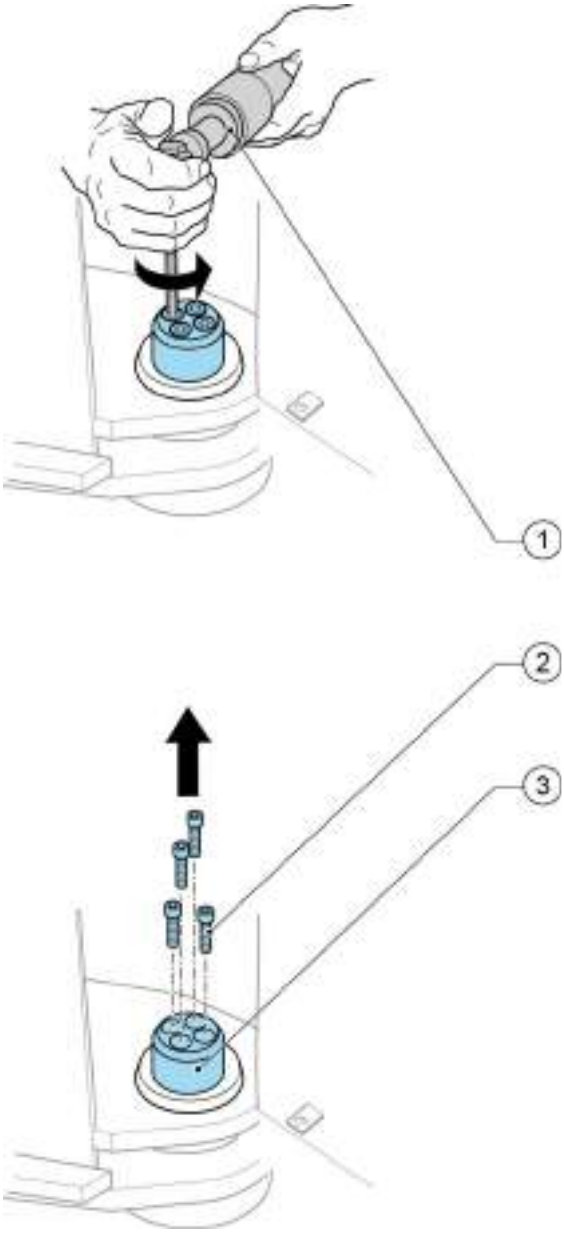


Fig. 142 Loosen all screws on the top of cover

Step 7

Bearing below on front part of frame:

Remove the cover (1) above and remove the clamping pieces (2 + 3) from the bolts (4)

Tools:

screwdriver

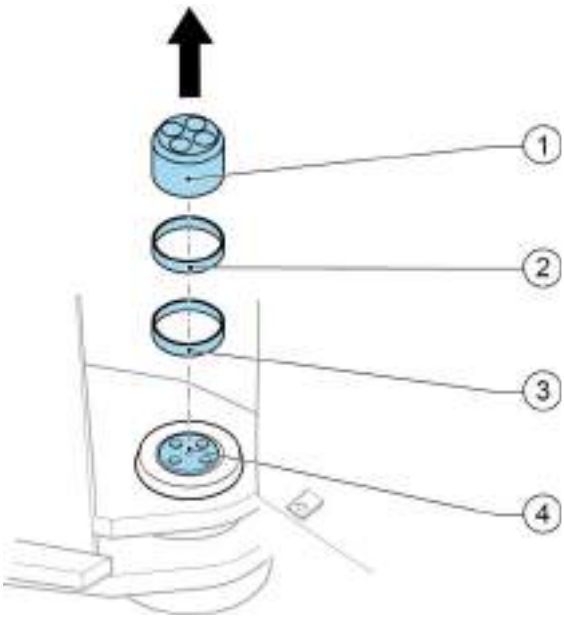


Fig. 143 Remove upper cover and clamping pieces

Step 8

Bearing below on rear part of frame:

Loose all hex screws (3) and all cylinder screws (4) on the sealing cover (2) bottom with pneumatic wrench (1).

Tools:

pneumatic wrench + attachment

hexagon socket (4)

BG 110 size: 10
BG 130 size: 12
BG 160 size: 12
BG 190 size: 14
BG 240 size: 14

Hexagon (3)

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19

hexagon socket (3)

BG 190 size: 10
BG 240 size: 10

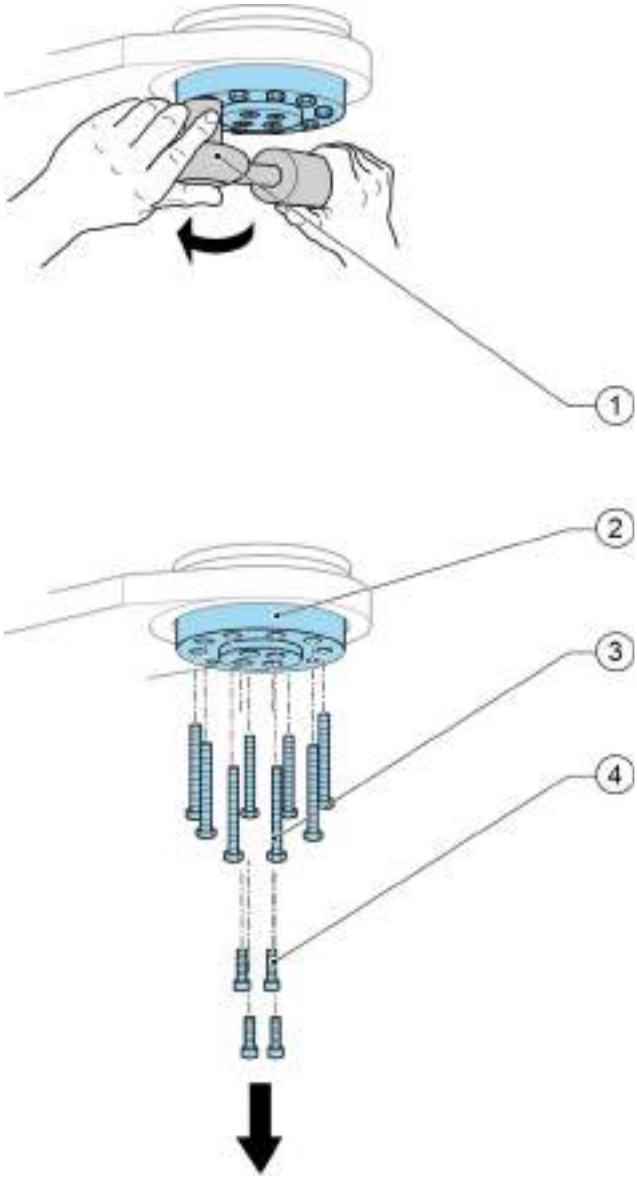


Fig. 144 Loosen below all screws on the sealing cover

Step 9

Bearing below

Remove the sealing cover (5) below and the clamping pieces (3 + 4) and the bushing (2) from the bolts (1)

Tools:

screwdriver

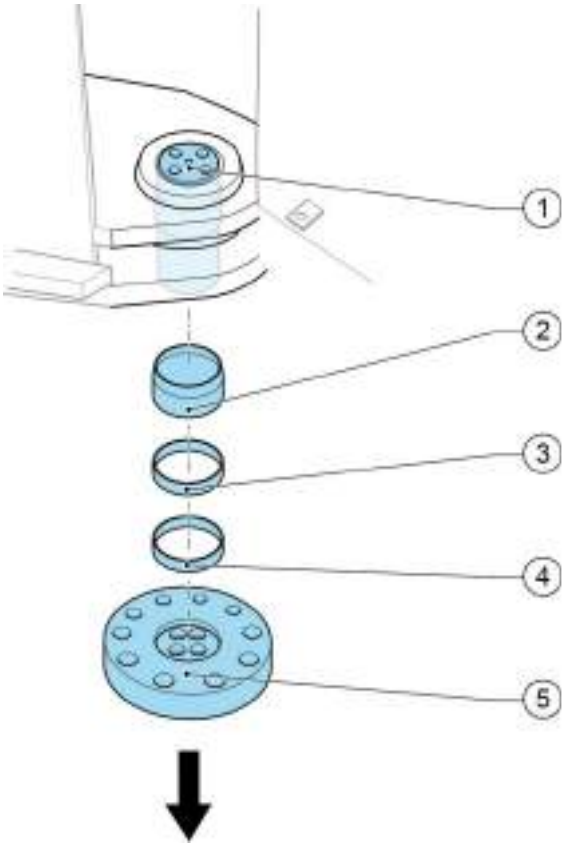


Fig. 145 Remove sealing cover below, clamping pieces and bushing

Step 10

Bearing below:

Knock the bolts (1) from below out of the lower bearing using a mandrel (2) and hammer (3).

Tools:

hammer,
mandrel

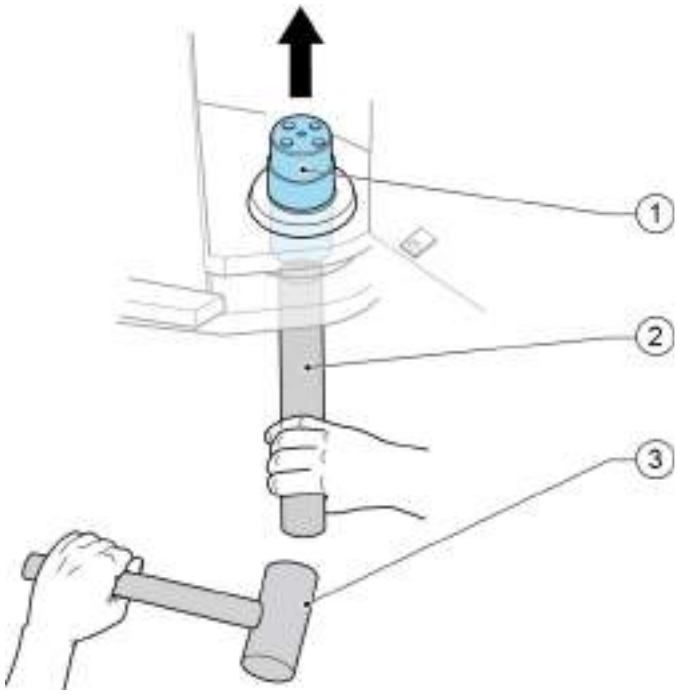


Fig. 146 Knock bolts upward out of bearing from below.

Step 11

Push the front part (2) and the rear part (1) of the frame apart

Tools:

fixture

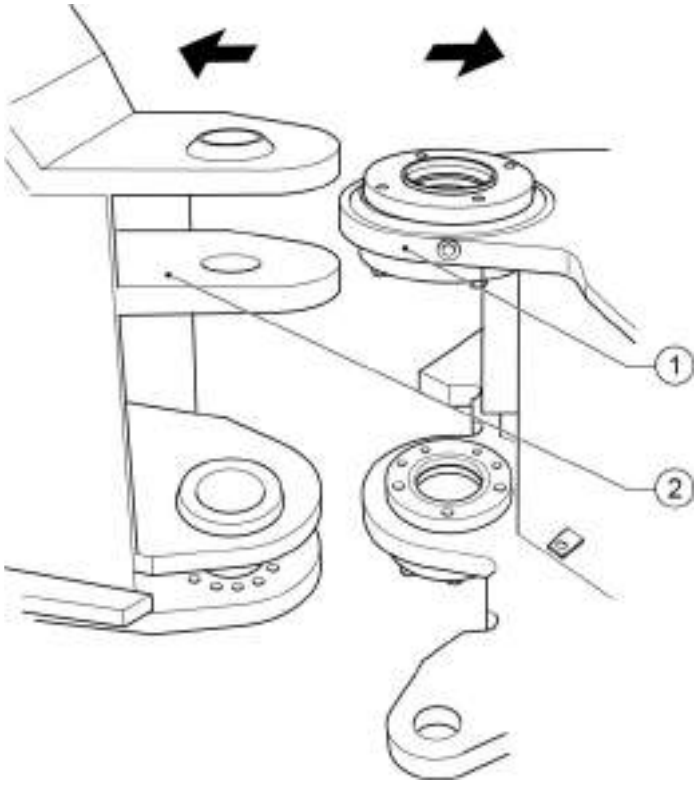


Fig. 147 Push front and rear parts of frame apart

Step 12

Bearing below on rear part of frame:

Dismantle the cover top (1) and cover bottom (2) by loosening all screws (3) on the cover below (2).

Tools:

pneumatic wrench + attachment

hexagon

BG 110 size: 17
BG 130 size: 19
BG 160 size: 19

hexagon socket

BG 190 size: 10
BG 240 size: 10

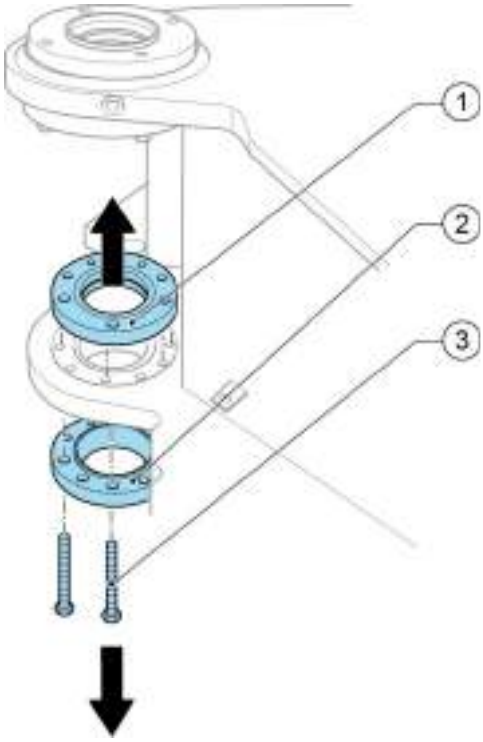


Fig. 148 Cover on bearing from below on the frame rear part

Step 13

Bearing above on rear part of frame:

Dismantle the cover top (1) and cover bottom (2) by loosening all hex screws (3) on the cover below (2).

Tools:

pneumatic wrench + attachment

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

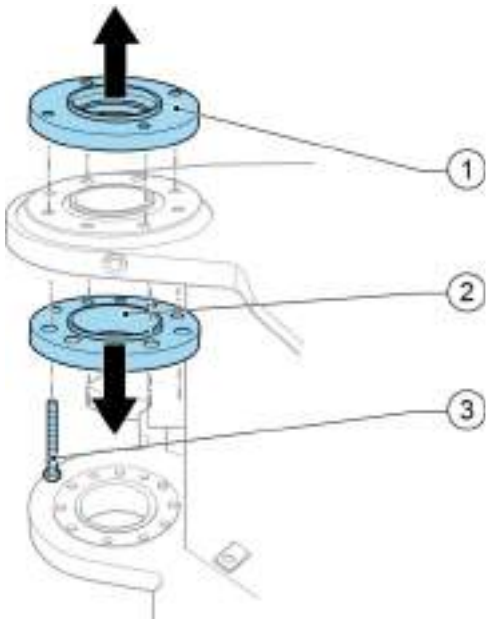


Fig. 149 Cover on bearing from above on the frame rear part

Step 14

Knock bearing top (1) and bearing bottom (3) with hammer (1) and mandrel (2) from the bore holes in the frame rear part.

Tools:

hammer,
mandrel

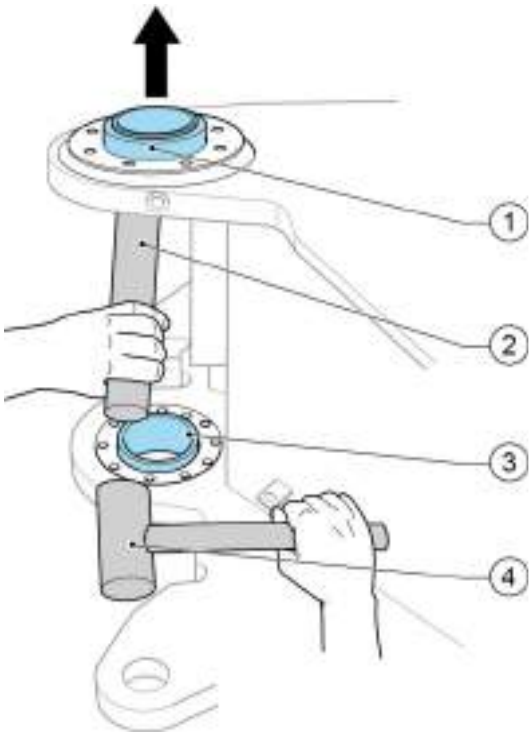


Fig. 150 Knock bearing from the frame rear part

5.6.4.2 Mounting center pivot steering

Step 1

Prepare frame rear part pivot joint (1):

Remove grease and colour from the holes.

Knock in bearing top (3) and bearing bottom (4) with hammer and striking mandrel (2) in the bores.

Tools:

hammer,
striking mandrel

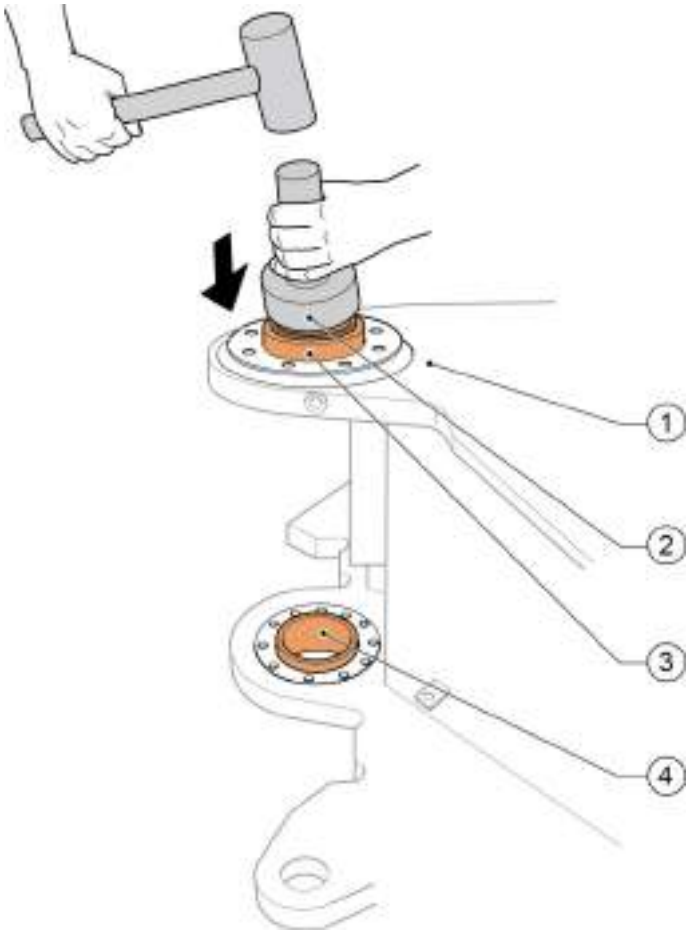


Fig. 151 Knock in the bearing on the frame rear part

Step 2

Bearing above on rear part of frame:

Remove any colour from the cover and the bearing surface of the sealing cap.

Secure screws with Loctite 243.

Insert the round ring (2) in the upper cover (1).

Screw the cover (3) to the cover (1) using hex screws (4) above on the bearing.

Tighten hex screws (4) crosswise.

Tools:

pneumatic wrench + attachment

hexagon

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Standardized parts: (4)

BG 110:
4x screws M 8 x 45-8.8
2x screws M 8 x 25-8.8

BG 130:
4x screws M 8 x 25-10.9
4x screws M 8 x 65-8.8

BG 160:
4x screws M 8 x 25-10.9
4x screws M 8 x 65-8.8

BG 190:
4x screws M 8 x 60-8.8
4x screws M 8 x 30-8.8

BG 240:
4x screws M 8 x 85-8.8
4x screws M 8 x 30-8.8

Starting torques:

BG 110: M_T=25 Nm
BG 130: M_T=25 Nm
BG 160: M_T=25 Nm
BG 190: M_T=25 Nm
BG 240: M_T=25 Nm

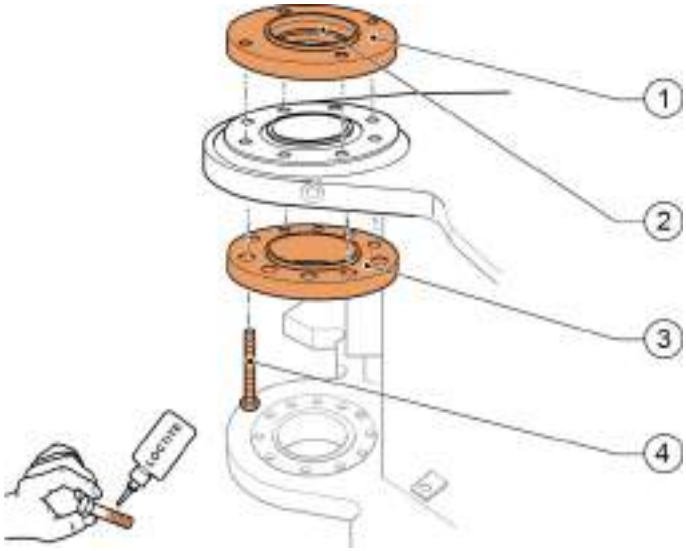


Fig. 152 Cover on the bearing above on the frame rear part

NOTE
Note the screw length during assembly. Screw in the short screws first.

Step 3

Bearing below on rear part of frame:

Remove any colour from the cover and the bearing surface of the sealing cap.

Secure screws with Loctite.

Insert the round ring (2) in the upper cover (1).

Screw the cover (3) to the cover (1) with 7 screws (4) on the bearing below.
Tighten hex screws (4) crosswise.

Tools:

pneumatic wrench + attachment

hexagon
BG 110 size: 17
BG 130 size: 19
BG 160 size: 19

hexagon socket
BG 190 size: 19
BG 240 size: 19

Standardized parts: (4)

BG 110: Screw M 10-8.8
BG 130: Screw M 12-8.8
BG 160: Screw M 12-8.8
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

Starting torques: (4)

BG 110: M_T=43 Nm
BG 130: M_T=70 Nm
BG 160: M_T=70 Nm
BG 190: M_T=96 Nm
BG 240: M_T=96 Nm

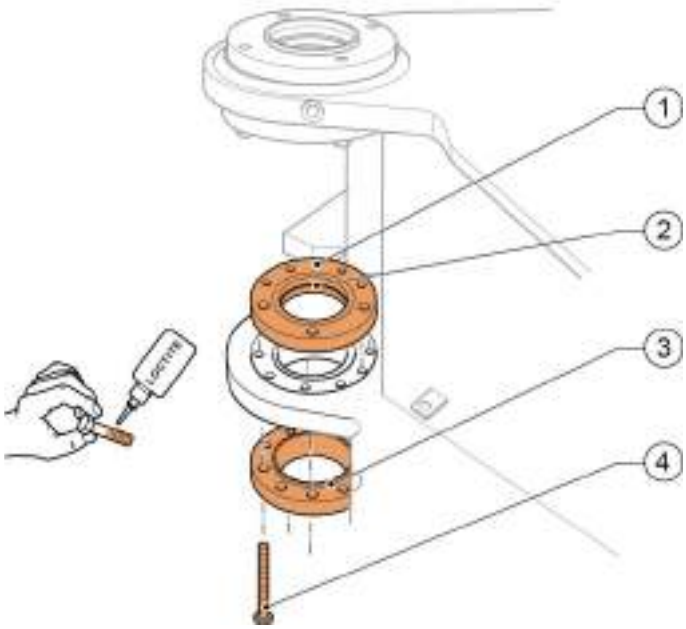


Fig. 153 Cover on the bearing below on the frame rear part

Step 4

Join the front and rear parts of the frame and align with the device.

Tools:

fixture

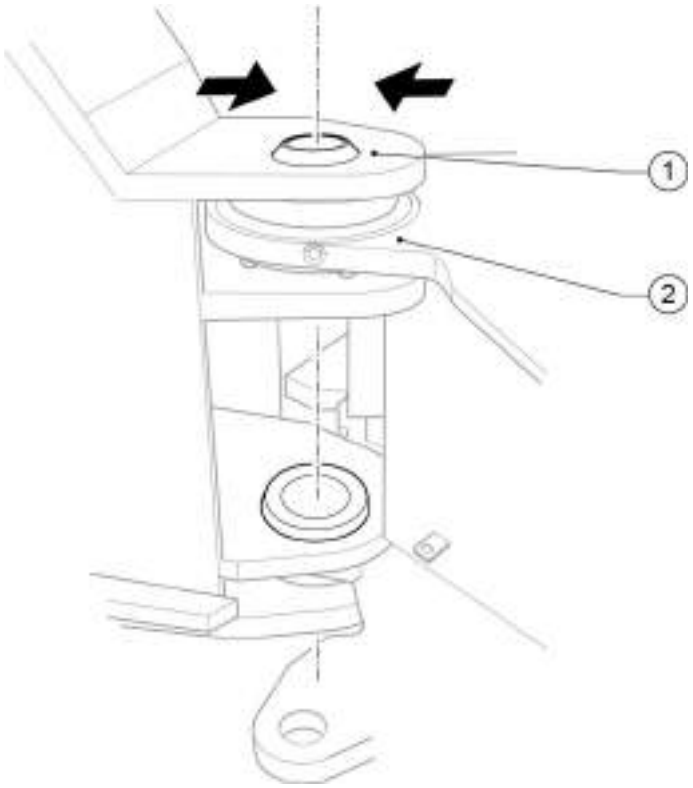


Fig. 154 Align front and rear part of the frame

Step 5

Bearing below on front part of frame:

Oil the bolt (1) and bearing hole bottom (3).

Knock in the bolt (1) and bearing hole bottom (3) from above.

Ensure that the long section (2) of the bolt (1) is down!

Tools:

hammer

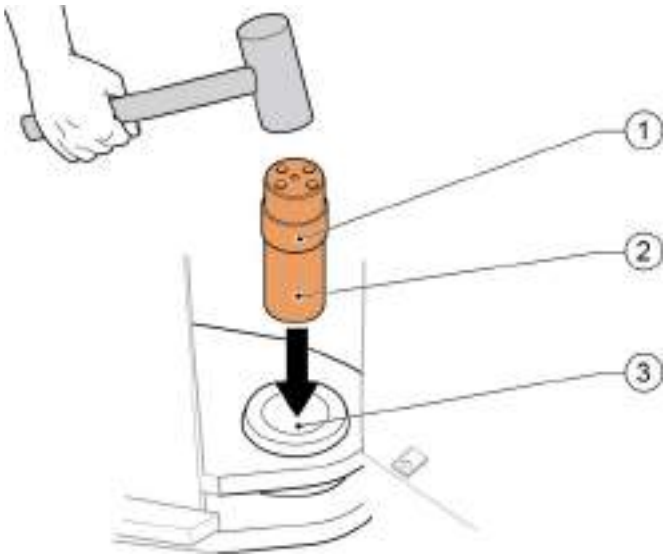


Fig. 155 Knock bolt in bearing below

Step 6

Bearing below on front part of frame:

Push the bushing (3) from below onto the bolt (1). Ensure that the phase (2) is on top.

Push the clamping pieces (4 + 5) from below onto the bolt (1).

To prevent the bolt (1) and the clamping pieces (4 + 5) from falling back out - use 2 screws (7) to secure the sealing cover (6) to the bearing below.

Use 2 cylinder screws (8) to secure the bolt (1) on the sealing cover (6).

Tools:

pneumatic wrench + attachment

hexagon (7)

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19
BG 190 size: 10
BG 240 size: 10

hexagon socket (8)

BG 110 size: 12
BG 130 size: 19
BG 160 size: 19
BG 190 size: 10
BG 240 size: 10

Standardized parts:

BG 110: Screw M 8-8.8 (7)
BG 130: Screw M 12-8.8 (7)
BG 160: Screw M 12-8.8 (7)
BG 190: Screw M 12-10.9 (7)
BG 240: Screw M 12-10.9 (7)

BG 110: Screw M 12-10.9 (8)
BG 130: Screw M 14-10.9 (8)
BG 160: Screw M 14-10.9 (8)
BG 190: Screw M 16-10.9 (8)
BG 240: Screw M 16-10.9 (8)

Starting torques:

BG 110: M_T=22 Nm (7)
BG 130: M_T=70 Nm (7)
BG 160: M_T=70 Nm (7)
BG 190: M_T=96 Nm (7)
BG 240: M_T=96 Nm (7)

BG 110: M_T=105 Nm (8)
BG 130: M_T=175 Nm (8)
BG 160: M_T=175 Nm (8)
BG 190: M_T=236 Nm (8)
BG 240: M_T=236 Nm (8)

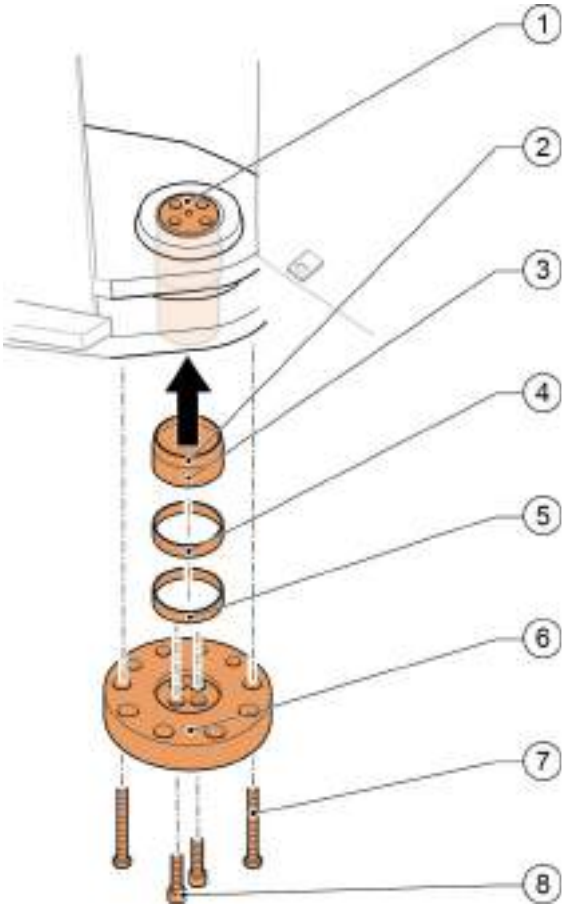


Fig. 156 Clamping pieces from below on bolt bottom

Step 7

Bearing below on front part of frame:

Push the clamping elements (3 + 4) from above on the bolt (5) set into the bearing hole (6).

Set the cover (2) on the bolt (5) and secure with 2 cylinder screws (1).

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 10
BG 160 size: 10
BG 190 size: 10
BG 240 size: 10

Standardized parts: (1)

BG 110: Screw M 10-10.9
BG 130: Screw M 12-10.9
BG 160: Screw M 12-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

Starting torques: (1)

BG 110: M_T=69 Nm
BG 130: M_T=96 Nm
BG 160: M_T=96 Nm
BG 190: M_T=96 Nm
BG 240: M_T=96 Nm

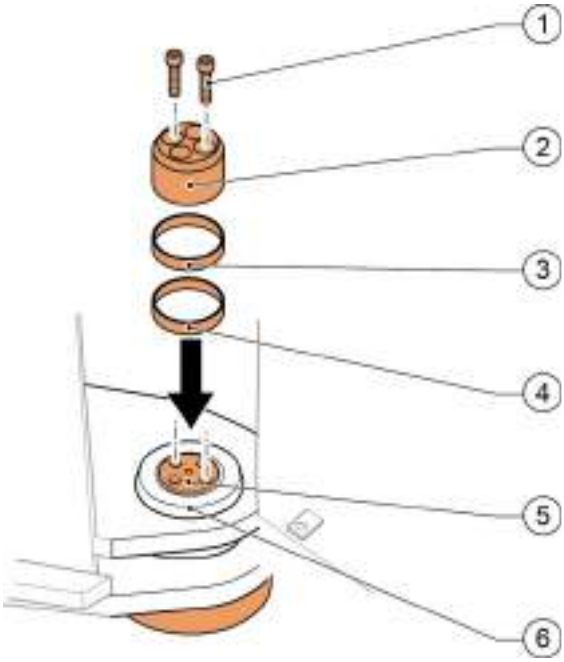


Fig. 157 Clamping piece from above on bolt below

Step 8

Bearing above on front part of frame:

Oil the bolt (1) and bearing hole (3).

Knock in the bolt (1) and bearing hole (3) from above.

Ensure that the long section (2) of the bolt (1) is down!

Tools:

hammer

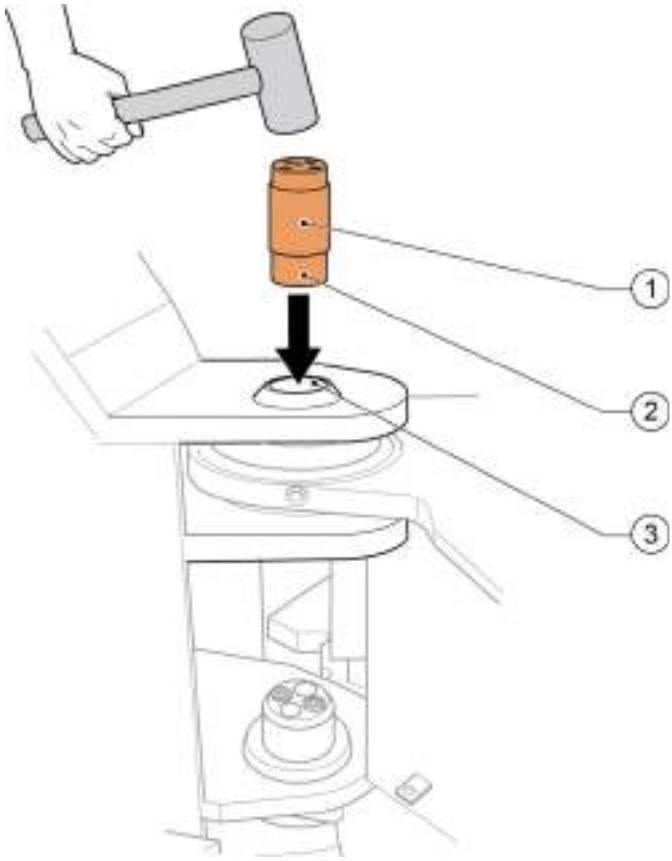


Fig. 158 Knock bolt in bearing above

Step 9

Bearing above on front part of frame:

Set the cover (2) on the bolt (3) and secure with 2 cylinder screws so that the bolt (2) does not fall through below.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Standardized parts: (1)

BG 110: Screw M 10-10.9
BG 130: Screw M 10-10.9
BG 160: Screw M 10-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

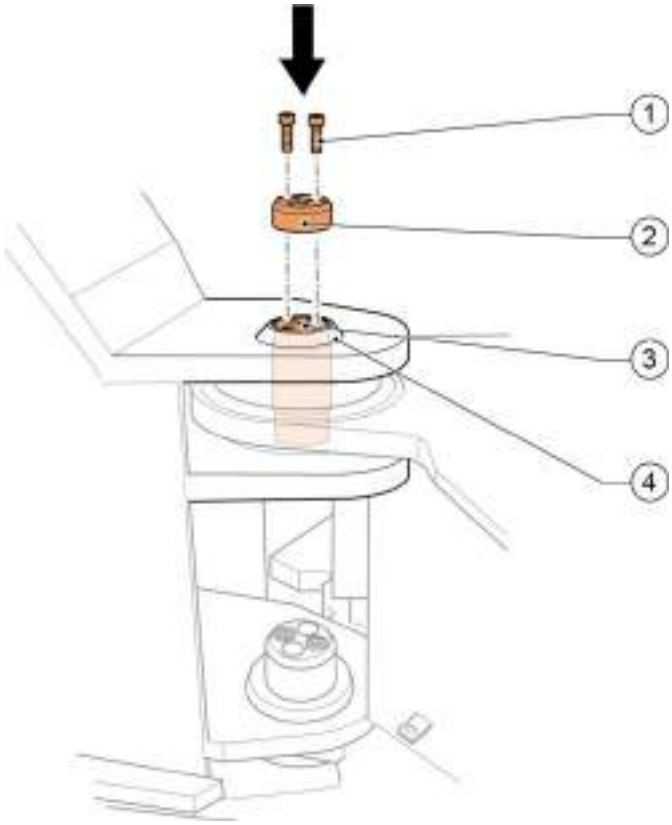


Fig. 159 Secure cover above on bolt top

Step 10

Bearing above front part of frame:

The bolt (2) is held by secured cover (1) top.

Push the clamping pieces (3 + 4 + 5) from below onto the bolt (2).

Use 2 cylinder screws (7) to secure the bushing (6) below on the bolt (2).

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Standardized parts: (7)

BG 110: Screw M 10-10.9
BG 130: Screw M 10-10.9
BG 160: Screw M 10-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

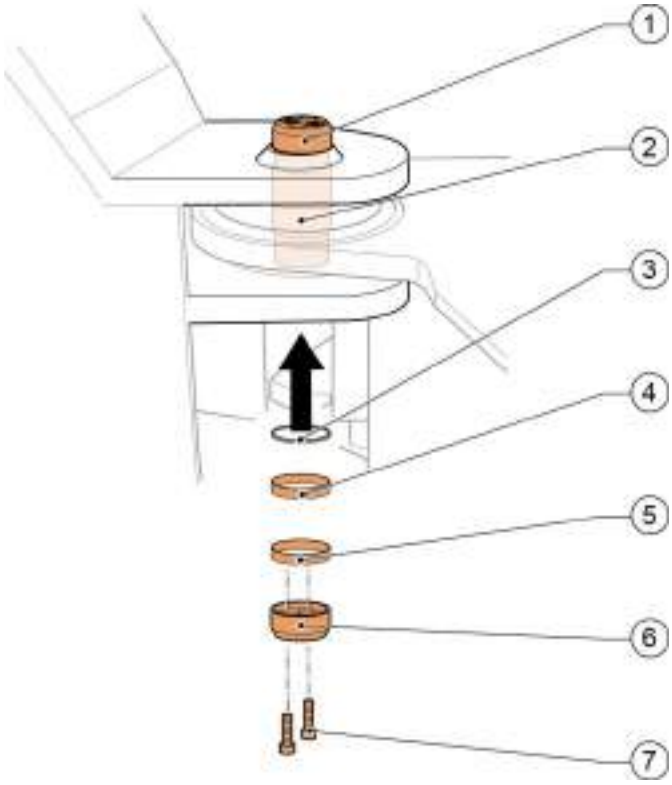


Fig. 160 Clamping pieces from below on bolt top

Step 11

Bearing above on front part of frame:

Loosen and remove the 2 cylinder screws (1) on the cover (2).

The bolt (3) is held through the cover (4) below.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Standardized parts: (1)

BG 110: Screw M 10-10.9
BG 130: Screw M 10-10.9
BG 160: Screw M 10-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

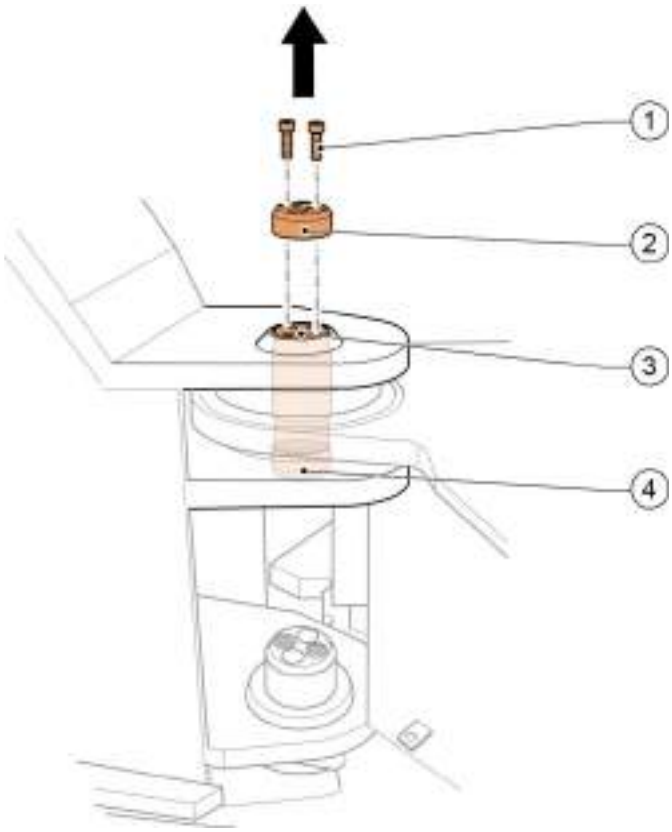


Fig. 161 Loosen cover above from bolt bearing above

Step 13

Bearing above on front part of frame:

Push the clamping pieces (3 + 4) from above onto the bolt (5).
Ensure the correct installation position of the clamping piece (3) - slanting downward.

Use 2 cylinder screws (1) to secure the cover above (2) on the bolt (5).

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 12

Standardized parts: (1)

BG 110: Screw M 10-10.9
BG 130: Screw M 10-10.9
BG 160: Screw M 10-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

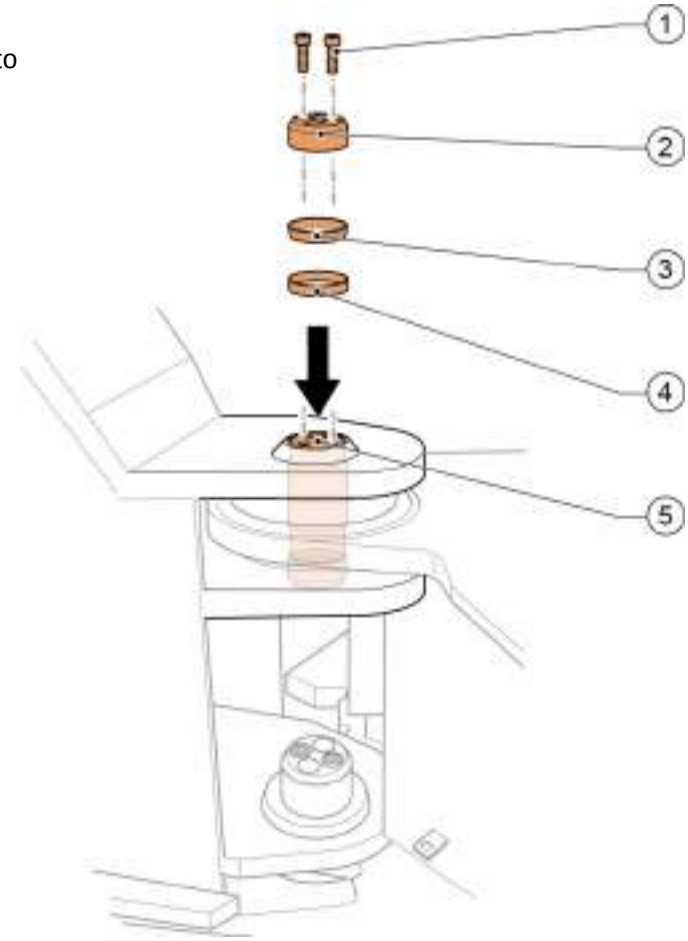


Fig. 162 Clamping piece from above on bolt above

Step 14

Bearing below on front part of frame:

2 hex screws (3) without Loctite hold the sealing cover (2) on the bearing below.

Tighten 2 other hex screws (4) with Loctite (1) and secure on the sealing cover (2).

Tools:

pneumatic wrench + attachment hexagon

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19

hexagon socket
BG 190 size: 10
BG 240 size: 10

Standardized parts: (4)

BG 110: Screw M 8-8.8
BG 130: Screw M 12-8.8
BG 160: Screw M 12-8.8
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

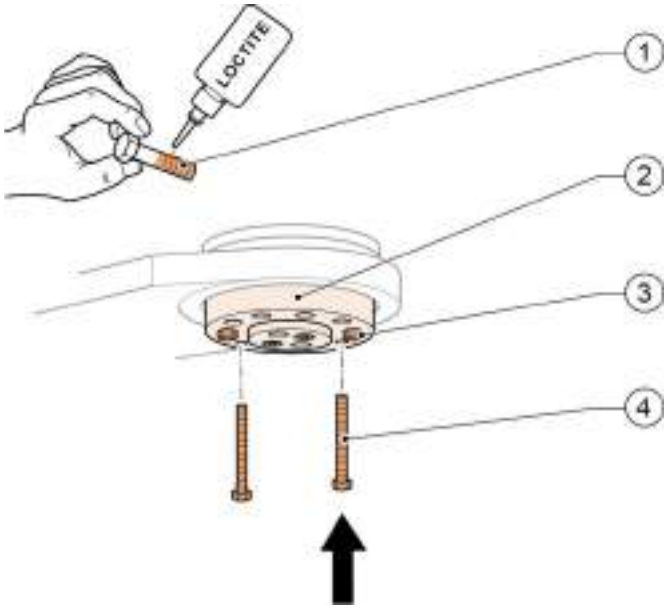


Fig. 163 Hex screw with Loctite on sealing cover below

Step 15

Bearing below on front part of frame:

Unscrew 2 hex screws (2) without Loctite from the sealing cover (2) on the bearing below.

Tools:

pneumatic wrench + attachment
hexagon

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19

hexagon socket
BG 190 size: 10
BG 240 size: 10

Standardized parts: (2)

BG 110: Screw M 8-8.8
BG 130: Screw M 12-8.8
BG 160: Screw M 12-8.8

BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

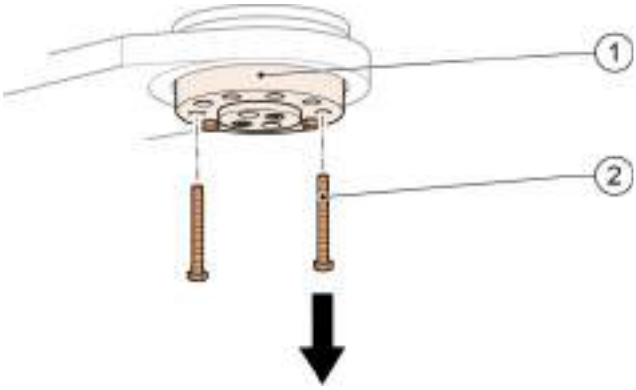


Fig. 164 Hex screws without Loctite off from sealing cover below

Step 16

Bearing below on front part of frame:

Secure all hex screws (3) with Loctite 243 (1) and unscrew the sealing cover (2) on the bearing below.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19

hexagon socket
BG 190 size: 10
BG 240 size: 10

Standardized parts: (3)

BG 110: Screw M 8-8.8
BG 130: Screw M 12-8.8
BG 160: Screw M 12-8.8
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

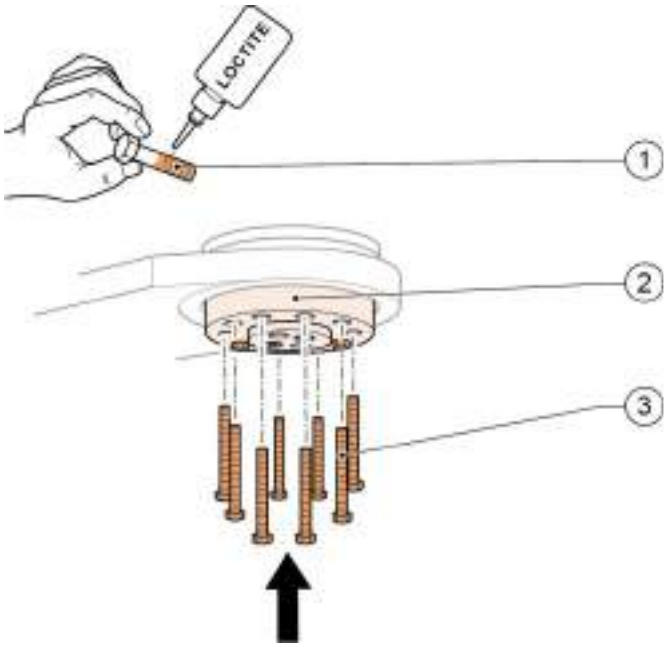


Fig. 165 All hex screws with Loctite on sealing cover below

Step 17

Bearing below - front part of frame:

Secure all cylinder screws (3) with Loctite (1) and screw the bushing (2) on the bolt.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 10
BG 130 size: 12
BG 160 size: 12
BG 190 size: 14
BG 240 size: 14

Standardized parts: (3)

BG 110: Screw M 12-10.9
BG 130: Screw M 14-10.9
BG 160: Screw M 14-10.9
BG 190: Screw M 16-10.9
BG 240: Screw M 16-10.9

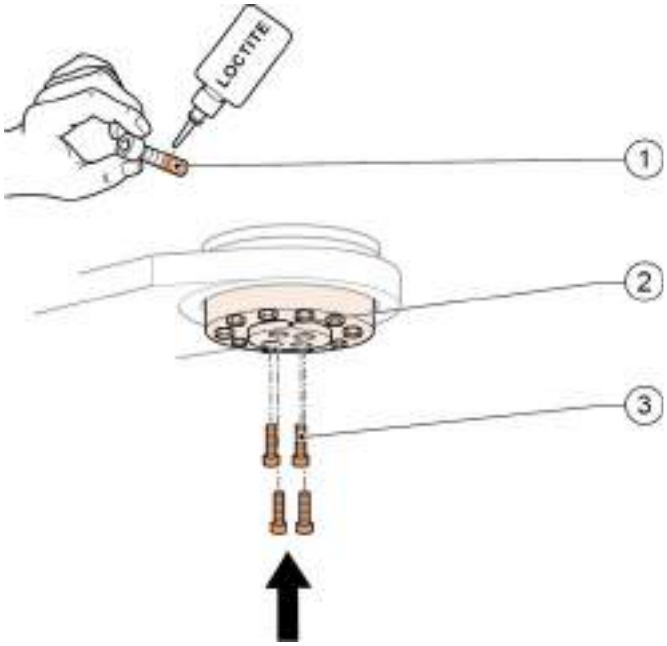


Fig. 166 All hex screws with Loctite on sealing cover below

Step 18

Bearing below - front part of frame:

Use pneumatic wrench (5) to tighten all hex screws (2) on the sealing cover (1).

Use a pneumatic wrench (5) to tighten all cylinder screws (4) to the bushing (3) crosswise.

Tools:

pneumatic wrench + attachment

hexagon (2)

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19

hexagon socket (2)

BG 190 size: 10
BG 240 size: 10

hexagon socket (4)

BG 110 size: 10
BG 130 size: 12
BG 160 size: 12
BG 190 size: 14
BG 240 size: 14

Standardized parts:

BG 110: Screw M 8-8.8 (2)
BG 130: Screw M 12-8.8 (2)
BG 160: Screw M 12-8.8 (2)
BG 190: Screw M 12-10.9 (2)
BG 240: Screw M 12-10.9 (2)

BG 110: Screw M 12-8.8 (4)
BG 130: Screw M 14-8.8 (4)
BG 160: Screw M 14-8.8 (4)
BG 190: Screw M 16-10.9 (4)
BG 240: Screw M 16-10.9 (4)

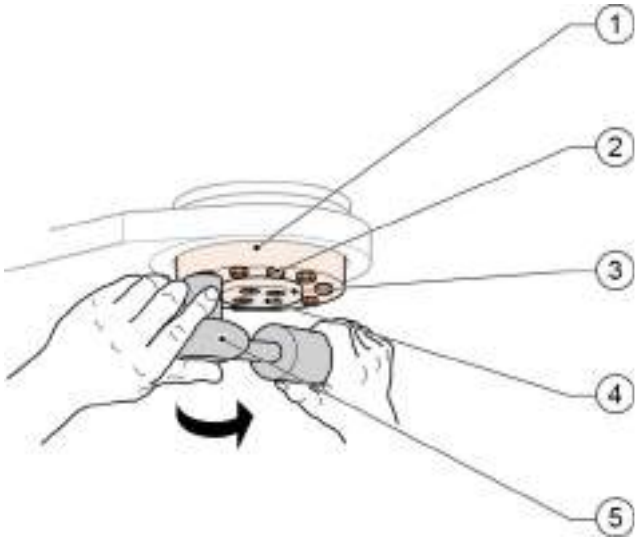


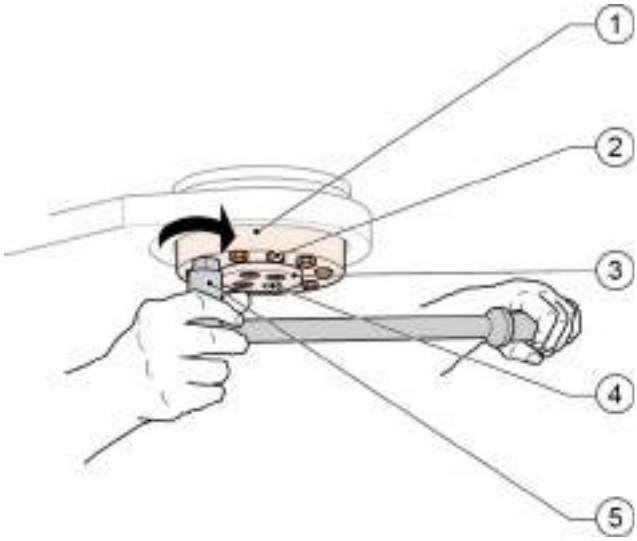
Fig. 167 Tighten all screws on the sealing cover below

Step 19

Bearing below on front part of frame:

Use a torque wrench (5) to retighten all hex screws (2) on the sealing cover (1) crosswise multiple times and check.

Use a torque wrench (5) to retighten all cylinder screws (4) on the bushing (3) crosswise multiple times and check. The bolt is tightened with the clamping pieces.



Tools:

Torque wrench + attachment

Hex (item 2)

BG 110 size: 13
BG 130 size: 19
BG 160 size: 19

hexagon socket (item 2)
BG 190 size: 10
BG 240 size: 10

hexagon socket (item 4)

BG 110 size: 10
BG 130 size: 12
BG 160 size: 12
BG 190 size: 14
BG 190 size: 14

Standardized parts:

BG 110: Screw M 8-8.8 (2)
BG 130: Screw M 12-8.8 (2)
BG 160: Screw M 12-8.8 (2)
BG 190: Screw M 12-10.9 (2)
BG 240: Screw M 12-10.9 (2)

BG 110: Screw M 12-8.8 (4)
BG 130: Screw M 14-8.8 (4)
BG 160: Screw M 14-8.8 (4)
BG 190: Screw M 16-10.9 (4)
BG 240: Screw M 16-10.9 (4)

Starting torques:

BG 110: M_T=22 Nm (2)
BG 130: M_T=70 Nm (2)
BG 160: M_T=70 Nm (2)
BG 190: M_T=96 Nm (2)
BG 240: M_T=96 Nm (2)

BG 110: M_T=22 Nm (4)
BG 130: M_T=175 Nm (4)
BG 160: M_T=175 Nm (4)
BG 190: M_T=236 Nm (4)
BG 240: M_T=236 Nm (4)

Fig. 168 Tighten all if necessary on the sealing cover below

Step 20

Bearing below on front part of frame, cover above:

Two cylinder screws (2) are still attached to the cover (4) on the bolt.

Secure two cylinder screws (3) with Loctite (1) and screw in the two open holes in the cover (4).

Loosen the two cylinder screws (4) without Loctite from the cover (2), secure with Loctite 243 (1) and screw back on the cover (2) on the bolt.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 10
BG 160 size: 10
BG 190 size: 10
BG 240 size: 10

Standardized parts: (2)

BG 110: Screw M 10-10.9
BG 130: Screw M 12-10.9
BG 160: Screw M 12-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

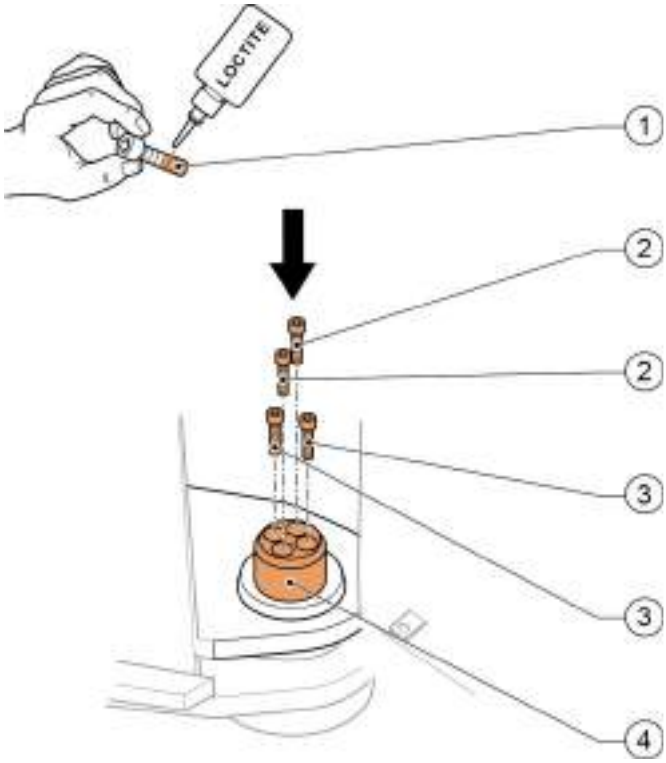


Fig. 169 All screws with Loctite on sealing cover above

Step 21

Bearing below on front part of frame, cover above:

Use pneumatic wrench (1) to tighten all cylinder screws (2) on the cover (3) crosswise.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 10
BG 160 size: 10
BG 190 size: 10
BG 240 size: 10

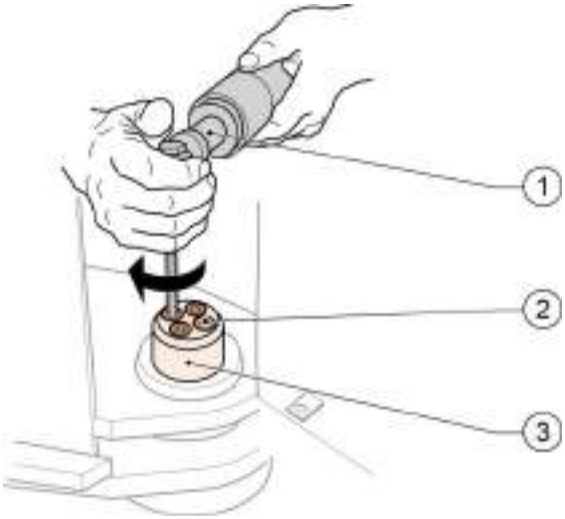


Fig. 170 Tighten all screws on the cover above

Step 22

Bearing below on front part of frame, cover above:

Use a torque wrench (1) to retighten all cylinder screws (2) on the cover (3) multiple times crosswise and check.

The bolt is tightened with the clamping pieces.

Tools:

torque wrench
hexagon socket

BG 110 size: 8
BG 130 size: 10
BG 160 size: 10
BG 190 size: 10
BG 240 size: 10

Starting torques: (2)

BG 110: M_T=69 Nm
BG 130: M_T=96 Nm
BG 160: M_T=96 Nm
BG 190: M_T=96 Nm
BG 240: M_T=96 Nm

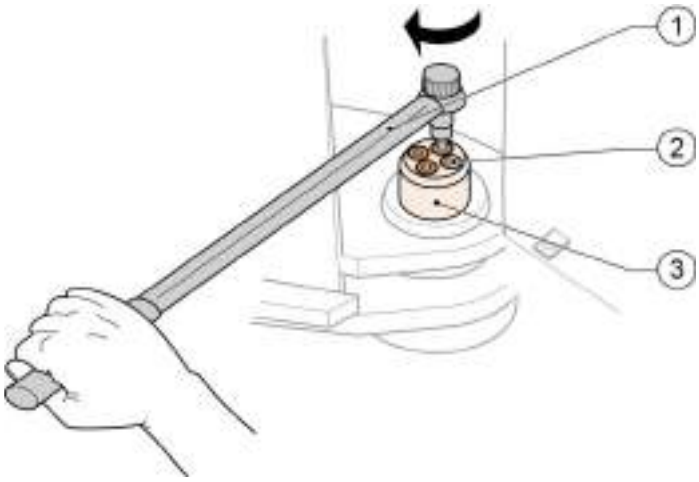


Fig. 171 Retighten all screws on cover above

Step 23

Bearing above on front part of frame:

Two cylinder screws (3) are still attached to the cover (4) on the bolt.

Secure two cylinder screws (2) with Loctite (1) and screw in the two open holes on the cover (4).

Loosen the two cylinder screws (3) without Loctite from the cover (2), secure with Loctite 243 (1) and screw back on the cover (2) on the bolt.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Starting torques:

BG 110: M_T=69 Nm (2+3)
BG 130: M_T=96 Nm (2+3)
BG 160: M_T=96 Nm (2+3)
BG 190: M_T=96 Nm (2+3)
BG 240: M_T=96 Nm (2+3)

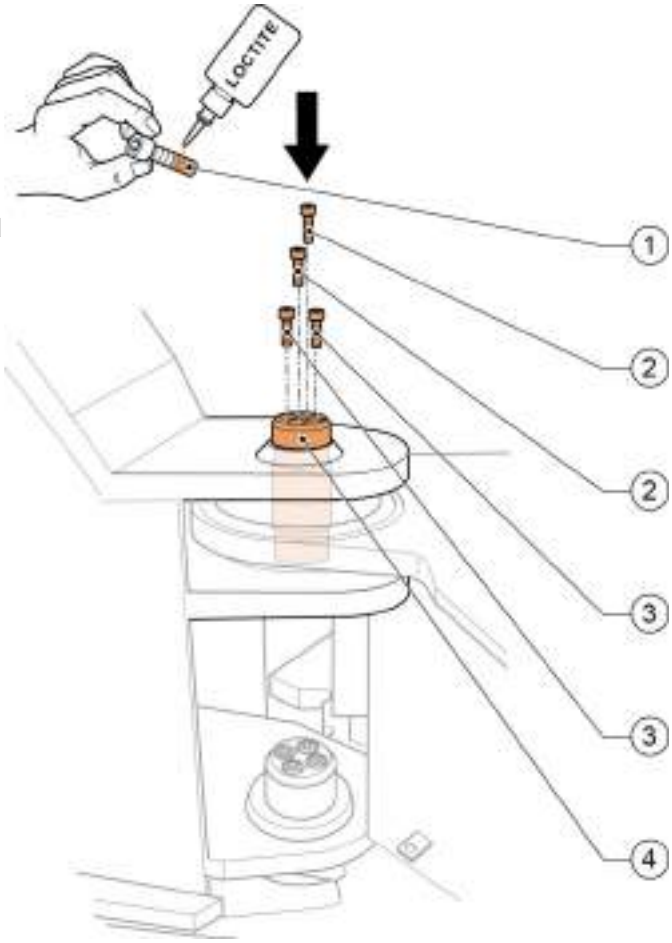


Fig. 172 All screws with Loctite on sealing cover above

Step 24

Bearing above on front part of frame:

Use pneumatic wrench (1) to tighten all cylinder screws (2) on the cover (3) crosswise.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Standardized parts: (2)

BG 110: Screw M 10-10.9
BG 130: Screw M 10-10.9
BG 160: Screw M 10-10.9
BG 190: Screw M 12-10.9
BG 240: Screw M 12-10.9

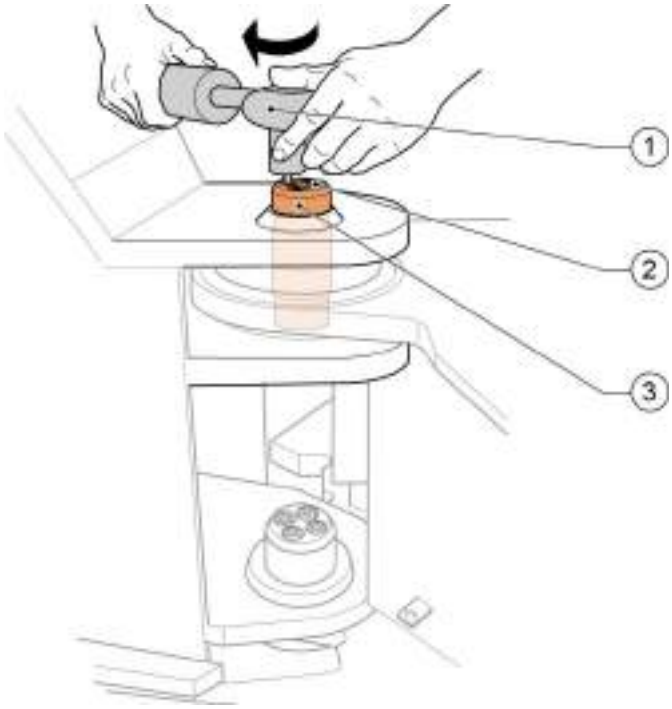


Fig. 173 Tighten all screws on the cover above

Step 25

Bearing above on front part of frame:

Use a torque wrench (1) to retighten all cylinder screws (2) on the cover (3) multiple times crosswise and check.

The bolt is tightened with the clamping pieces.

Tools:

torque wrench
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Starting torques: (2)

BG 110: M_T=69 Nm
BG 130: M_T=69 Nm
BG 160: M_T=69 Nm
BG 190: M_T=96 Nm
BG 240: M_T=96 Nm

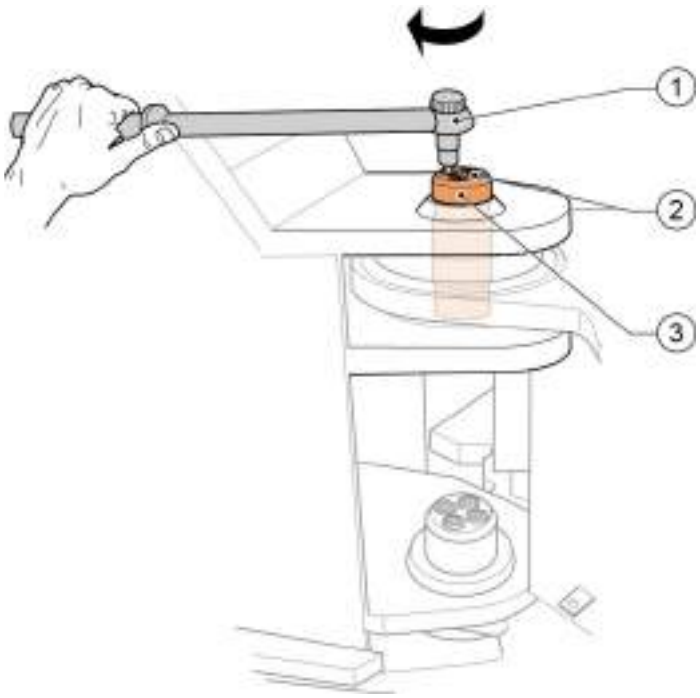


Fig. 174 Retighten all screws on cover above

Step 26

Bearing above on front part of frame:

Two cylinder screws (3) are still attached to the cover (2) on the bolt.

Secure two cylinder screws (3) with Loctite (1) and screw in the two open holes on the cover (2).

Loosen the two cylinder screws (4) without Loctite from the cover (2), secure with Loctite 243 (1) and screw back on the cover (2) on the bolt.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Standardized parts:

BG 110: Screw M 10-10.9 (3+4)
BG 130: Screw M 10-10.9 (3+4)
BG 160: Screw M 10-10.9 (3+4)
BG 190: Screw M 12-10.9 (3+4)
BG 240: Screw M 12-10.9 (3+4)

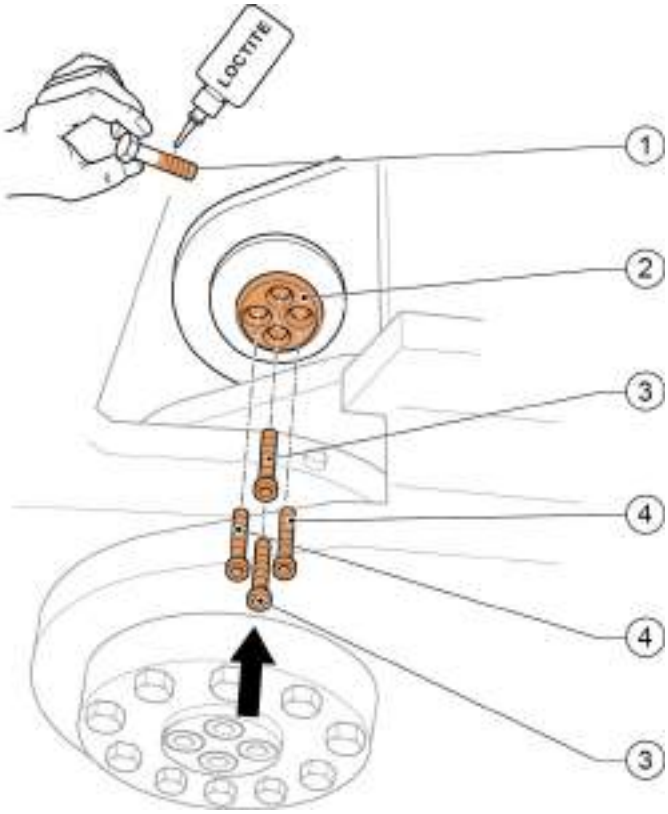


Fig. 175 All screws with Loctite on sealing cover below

Step 27

Bearing above on front part of frame:

Use pneumatic wrench (3) to tighten all cylinder screws (2) on the cover (1) crosswise.

Tools:

pneumatic wrench + attachment
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Fig. 176 Tighten all screws on the cover below

NOTE
Ensure that the cover is on correctly and not tilted!

Step 28

Bearing above on front part of frame:

Use a torque wrench (1) to retighten all cylinder screws (2) on the cover (3) multiple times crosswise and check.

The bolt is tightened with the clamping pieces.

Tools:

torque wrench
hexagon socket

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 10
BG 240 size: 10

Starting torques: (3)

BG 110: M_T=69 Nm
BG 130: M_T=69 Nm
BG 160: M_T=69 Nm
BG 190: M_T=96 Nm
BG 240: M_T=96 Nm

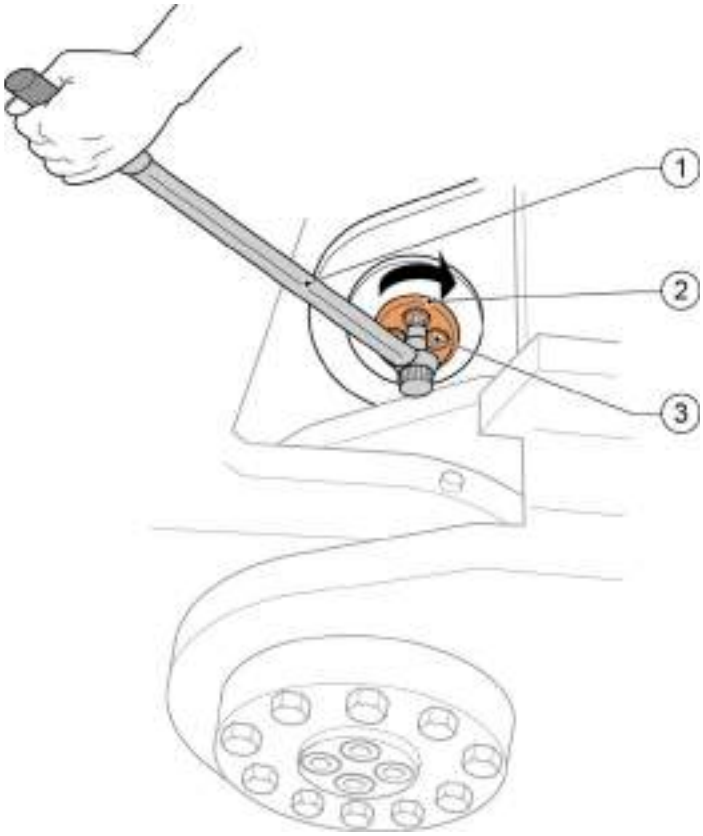


Fig. 177 Retighten all screws on bushing below

Step 29

Use grease gun (3) to grease at the grease fitting of frame rear section (1) and at the grease fitting of frame front section (2).

Check if grease is leaking out.

Tools:

grease gun

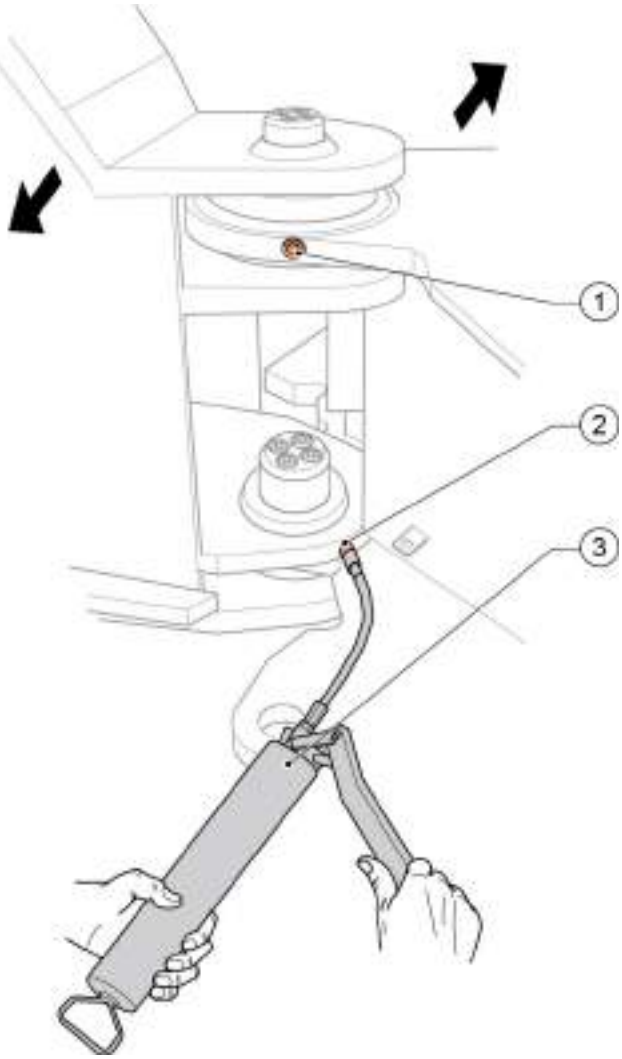


Fig. 178 Lubricating center pivot steering

NOTE
The grease fittings (1) and (2) are staggered. **The pivot joint should and must be moved (arrow)!**

5.6.5 Changing offset cylinder

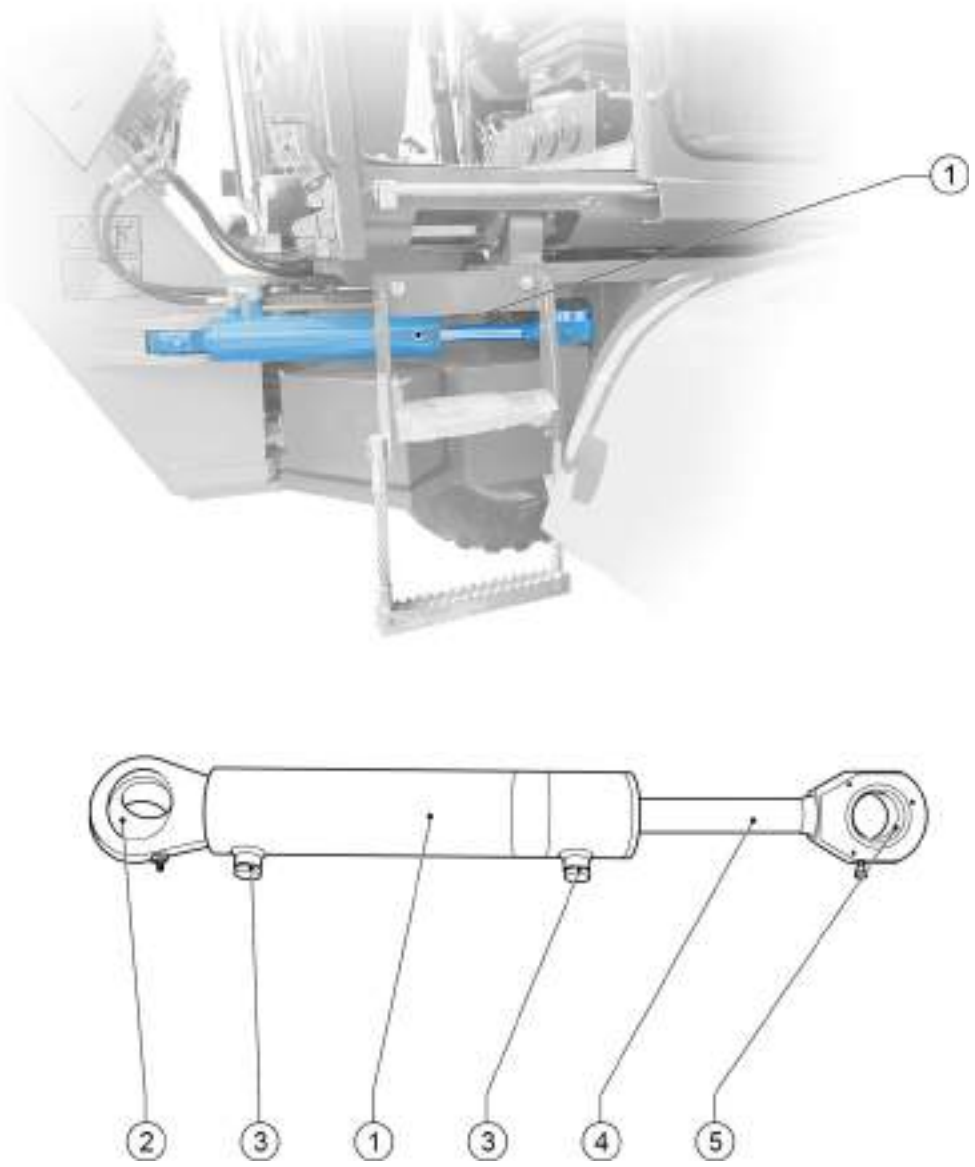


Fig. 179 Offset cylinder on the pivot steering left side

1 Cylinder
2 Cylinder base with hinged bearing
3 Hydraulic connection
4 Piston rod
5 Piston rod head with hinged bearing

An offset cylinder is mounted on each of the two sides of the pivot steering.

5.6.5.1 Dismounting center pivot steering

Step 1

The offset cylinder (2) is located directly behind the step (1).

Use a flat wrench to loosen the hex screws (3) on the step (1) and remove the step.

Tools:

open-end wrench

BG 110 size: 19
BG 130 size: 19
BG 160 size: 19
BG 190 size: 19
BG 240 size: 19

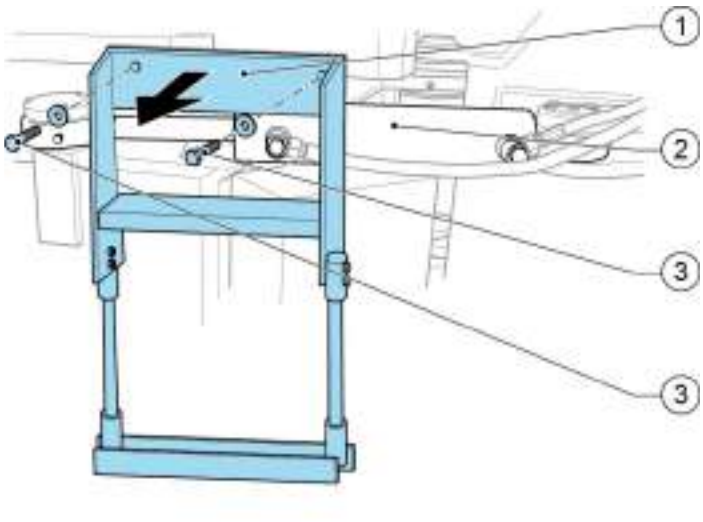


Fig. 180 Unscrew step

Step 2

Use a flat wrench to remove hydraulic hose lines (3) from the banjos (4) on the offset cylinder (1).

Tools:

open-end wrench

BG 110 size: 22
BG 130 size: 22
BG 160 size: 22
BG 190 size: 22
BG 240 size: 22

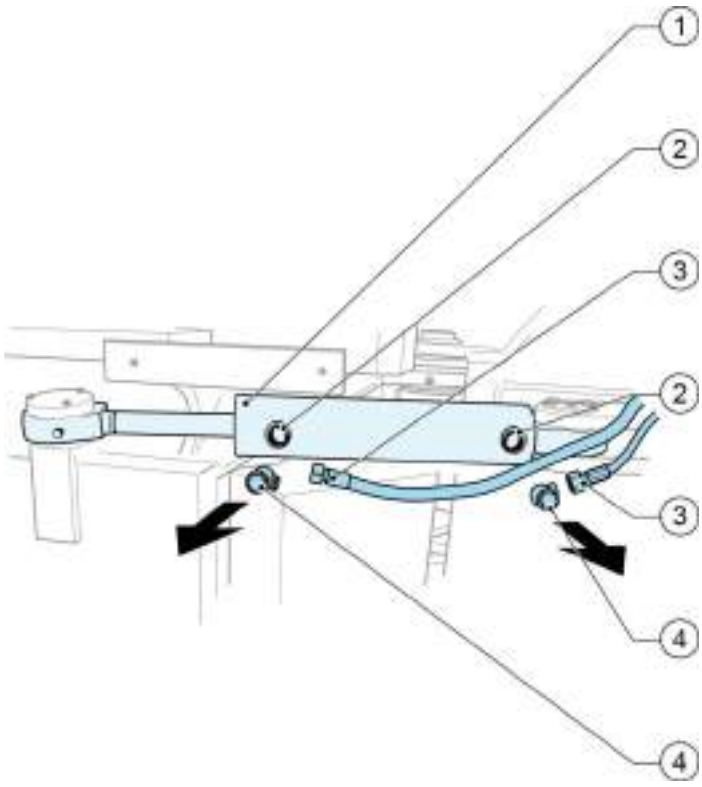


Fig. 181 Loosen hydraulic hoses

Step 3

Piston-shaft head:

Lock the banjos (2) on the offset cylinder (1) with closure material (3).

Tools:

open-end wrench

BG 110 size: 27
BG 130 size: 27
BG 160 size: 27
BG 190 size: 27
BG 240 size: 27

Closure material:

ROV 15-LA AN 932 1352
M 15-LA AN 560 605131
VK 15-La AN 560 335007

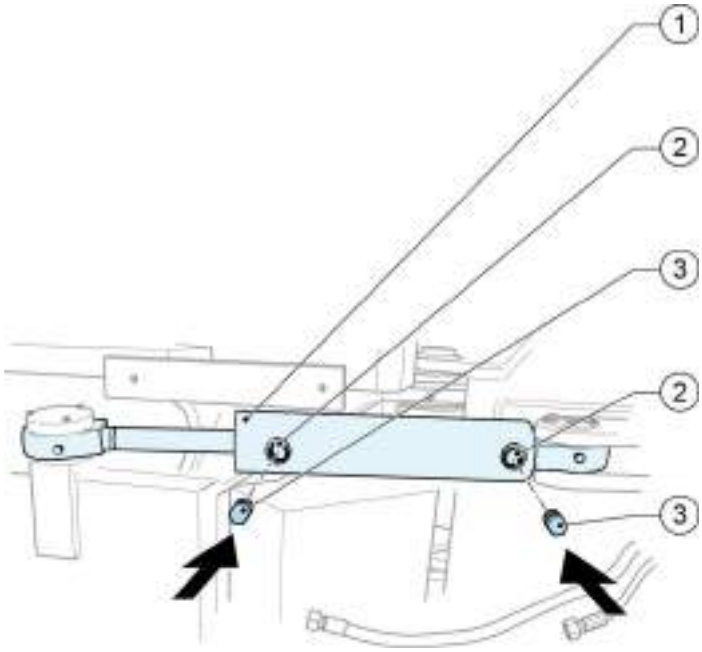


Fig. 182 Lock the threaded connections

Step 4

Piston-shaft head:

Use a flat wrench to loosen the hex screws (1) on the cover (2) of the piston rod head (3).

Remove the cover (2).

Tools:

open-end wrench

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 8
BG 240 size: 8

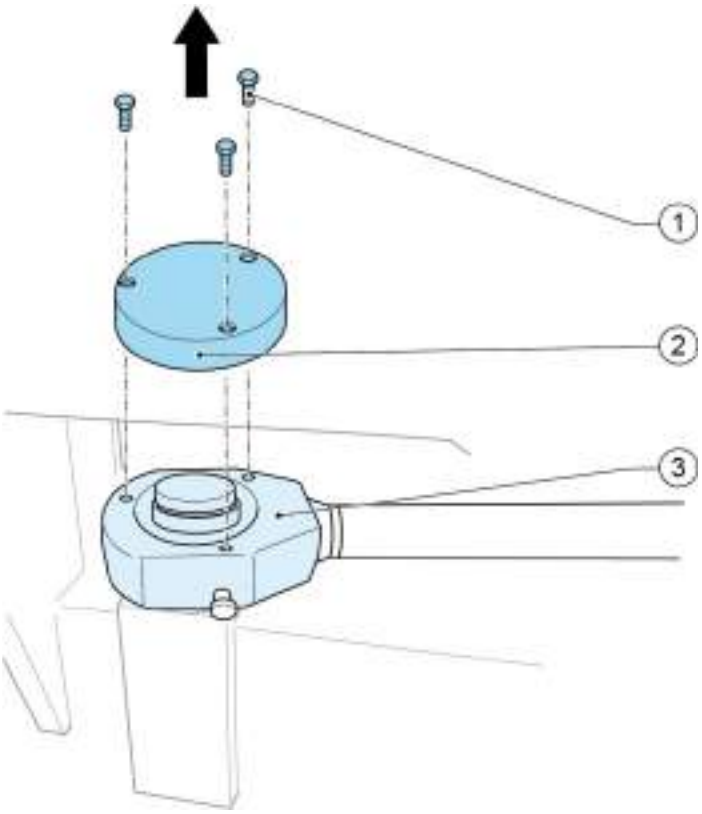


Fig. 183 Loosen cover from the piston rod head

Step 5

Piston-shaft head:

Use snapring pliers (1) to loosen the guard ring (3) from the journal pin (4) in the piston rod head (2).

Tools:

snapring pliers

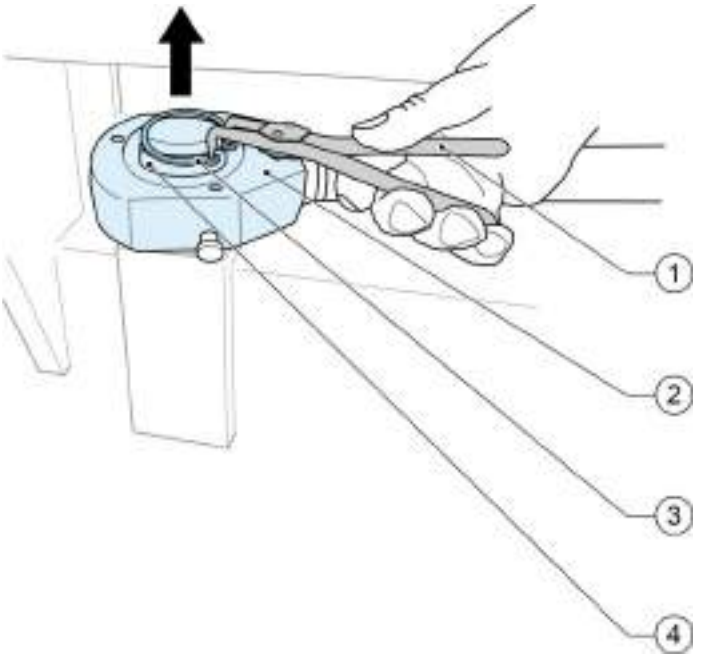


Fig. 184 Loosen guard ring from journal pin

Step 6

Piston-shaft head:

After removing the guard ring (1), take the spacer ring (2) from the journal pin (3).

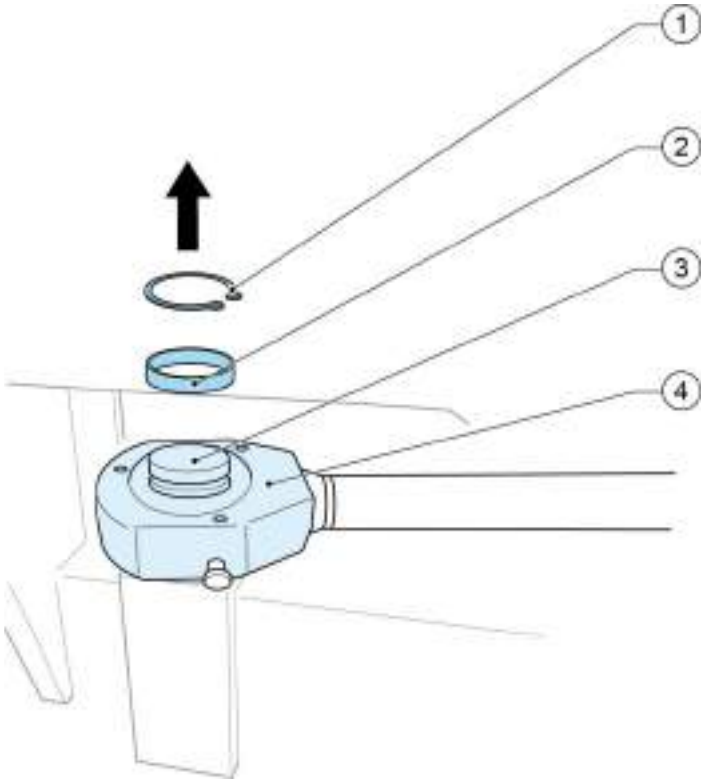


Fig. 185 Take spacer ring from the journal pin.

Step 7

Cylinder bottom:

Use a pneumatic wrench to loosen both hex screws (1) on the axle mounting (2) on the cylinder base receptacle (3).

Remove the mount plate (2).

Tools:

pneumatic wrench + attachment hexagon

BG 110 size: 17
BG 130 size: 17
BG 160 size: 17
BG 190 size: 17
BG 240 -size: 17

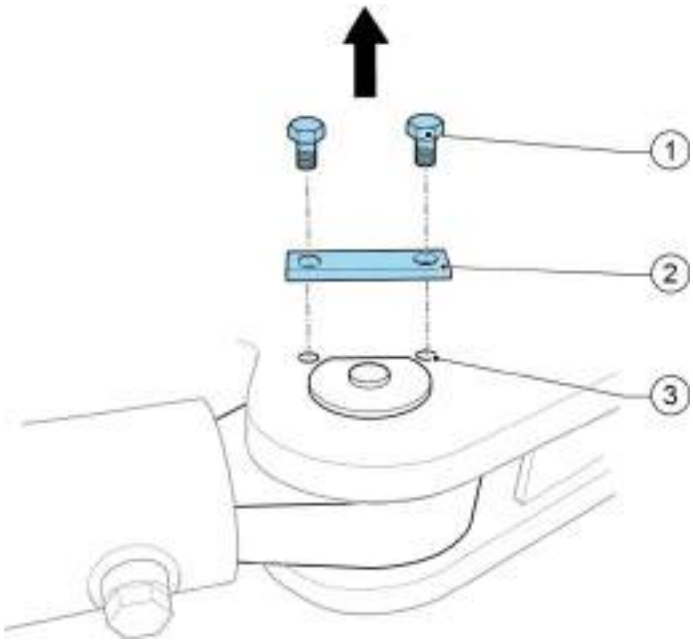


Fig. 186 Loosen hex screws on the cylinder base

Step 8

Cylinder bottom:

Use screwdriver (1) to remove the plastic cap (2) from the bolt (3) on the cylinder base receptacle (4).

Tools:

screwdriver

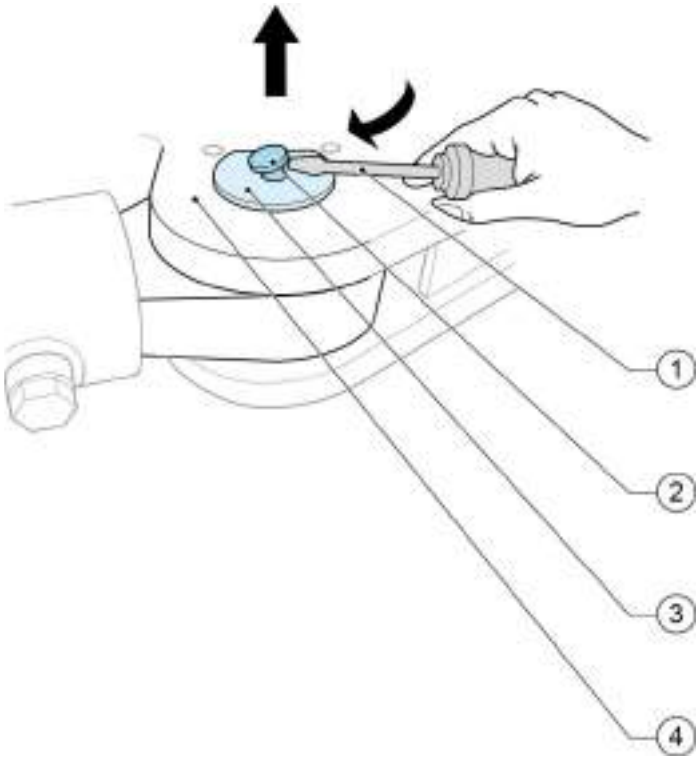


Fig. 187 Remove plastic cap from bolt on cylinder base

Step 9

Cylinder bottom:

Use hammer (4) and mandrel (3) to knock out the bolt (1) from the cylinder base bearing (2) half way and pull out.

Tools:

hammer,
mandrel

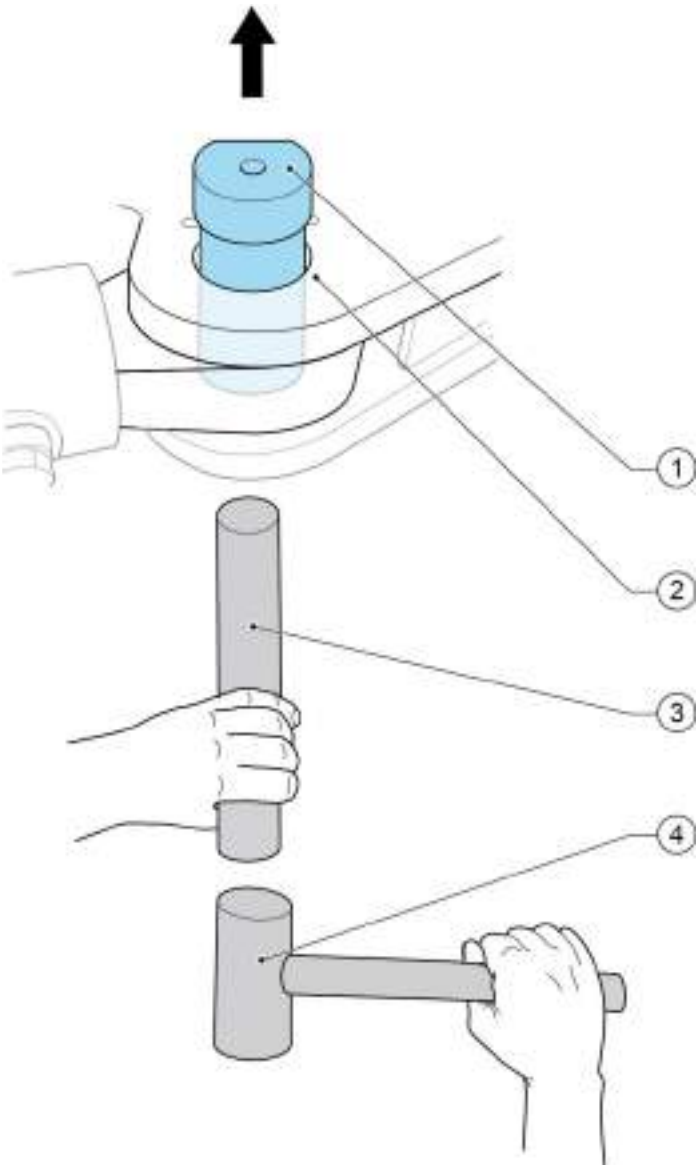


Fig. 188 Remove bolt on cylinder base

Step 10

Cylinder bottom:

Secure the offset cylinder (3) from slipping. Set hammer shaft (1) in the opening of the cylinder base receptacle (2).

Tools:

hammer

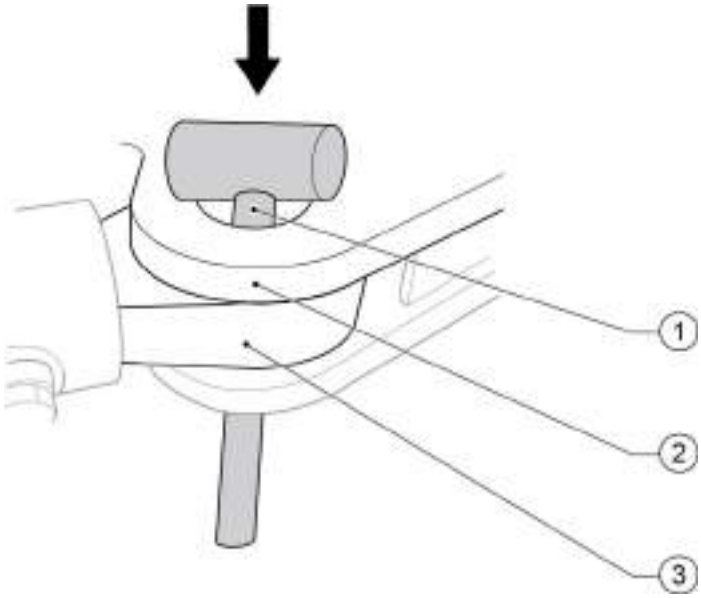


Fig. 189 Use hammer to secure offset cylinder on cylinder base

Step 11

Piston-shaft head:

Use crowbar (3) to push the piston rod head (2) upward from the journal pin (1).

Use hammer (4) as base.

Tools:

hammer,
crowbar

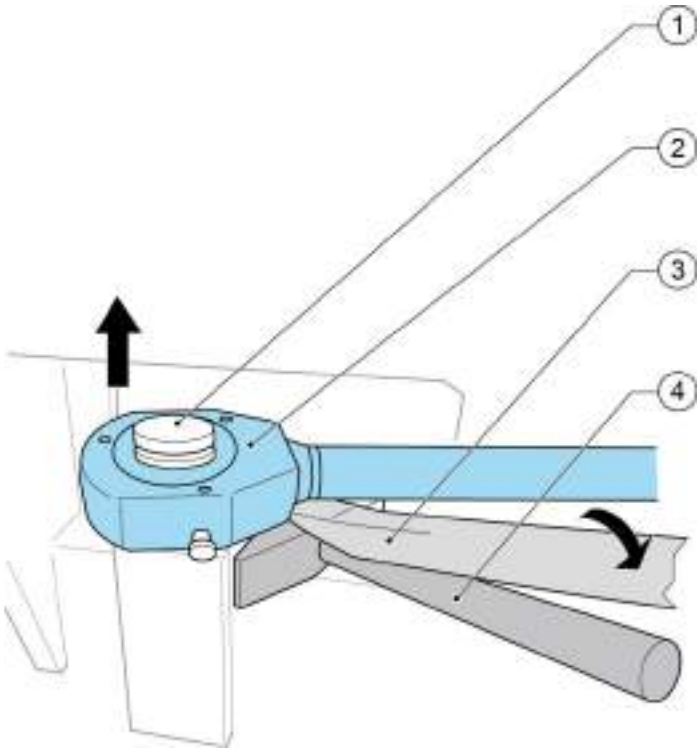


Fig. 190 Press piston rod head upward

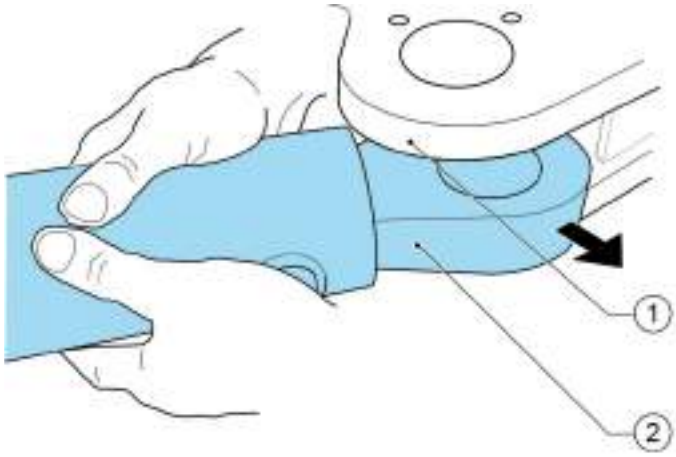
Step 12

Cylinder bottom:

Take the hammer out of the cylinder base receptacle (1) opening.

Use both hands to pull the offset cylinder (2) from the cylinder base receptacle (1).

Watch when pulling out the spacer ring (3).



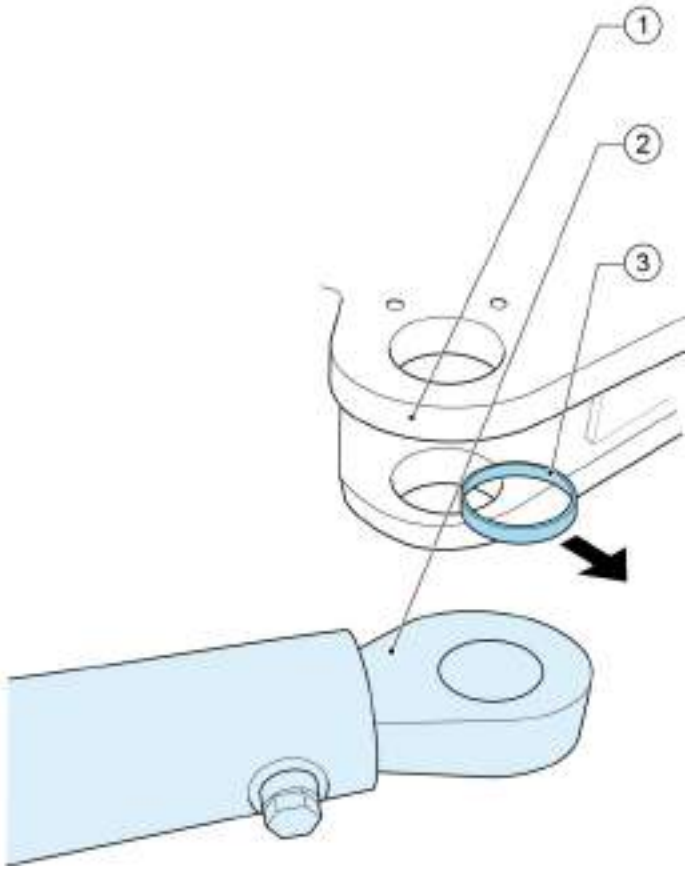


Fig. 191 Offset cylinder and spacer ring from cylinder base bearing

Step 13

Piston-shaft head:

Pull out the piston rod head (2) from the journal pin (3) with both hands and set down.

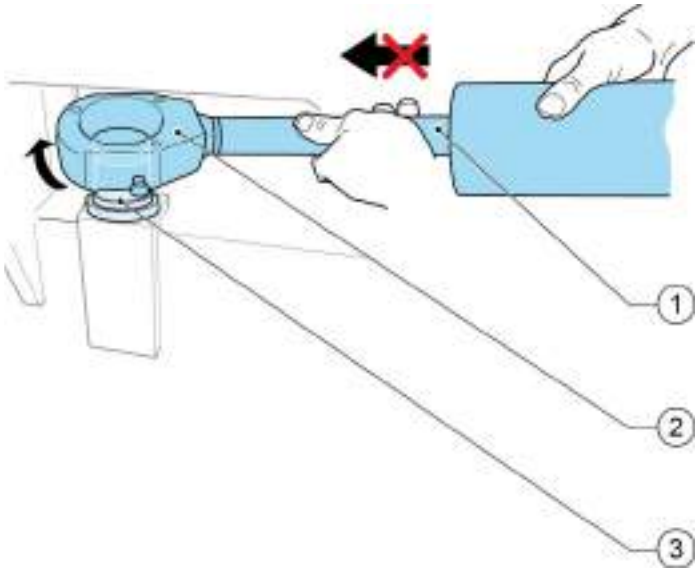


Fig. 192 Take piston rod head from the journal pin.

NOTE
Ensure that the piston rod (1) does not move out.

5.6.5.2 Mounting offset cylinder

Step 1

Measure (2) the travel length of the piston rod of the dismantled offset cylinder (1).

Use a hammer (4) to make the new offset cylinder (3) have the same travel length, if needed, pull out the piston rod.

Tools:

hammer,
scale

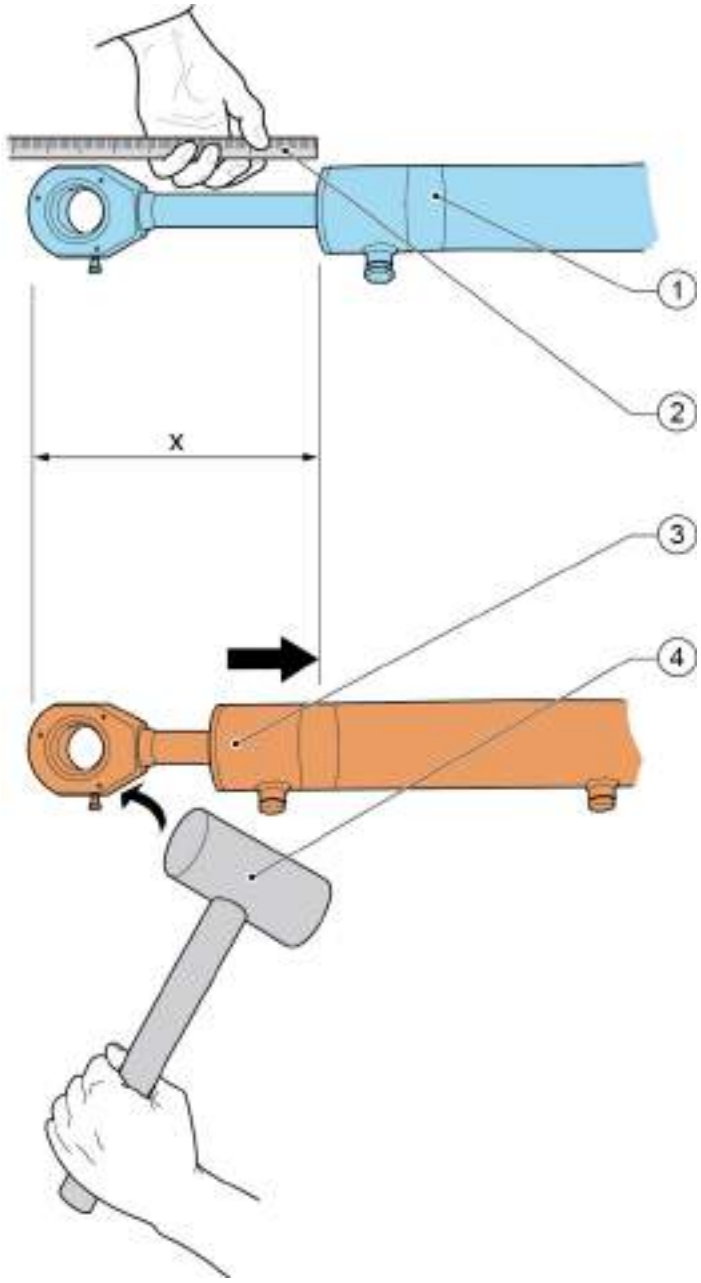


Fig. 193 Knock in the bearing on the frame rear part

Step 2

Use a hex wrench to remove the closure material (2) on the threaded connections (1).

Tools:

hex wrench

BG 110 size: 10
BG 130 size: 10
BG 160 size: 10
BG 190 size: 10
BG 240 size: 10

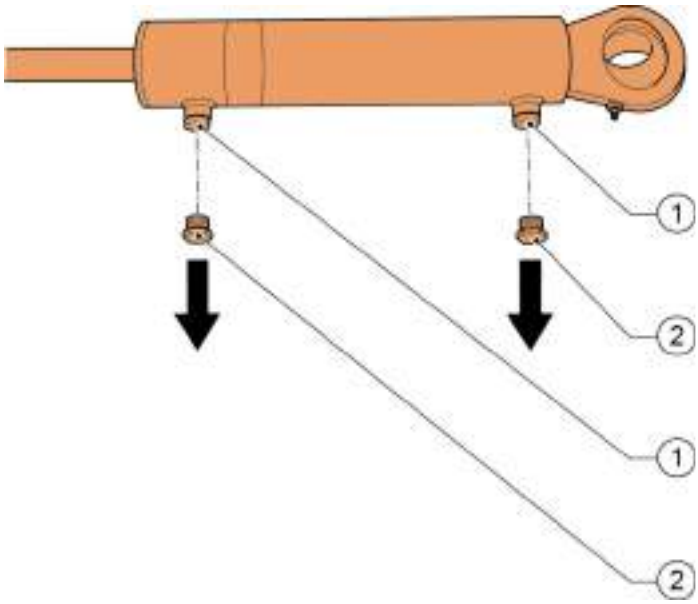


Fig. 194 Remove locking elements

Step 3

Piston-shaft head:

Use grease (2) to lubricate the journal pin (1) on the piston rod bearing.

Consumables:

lubricating grease

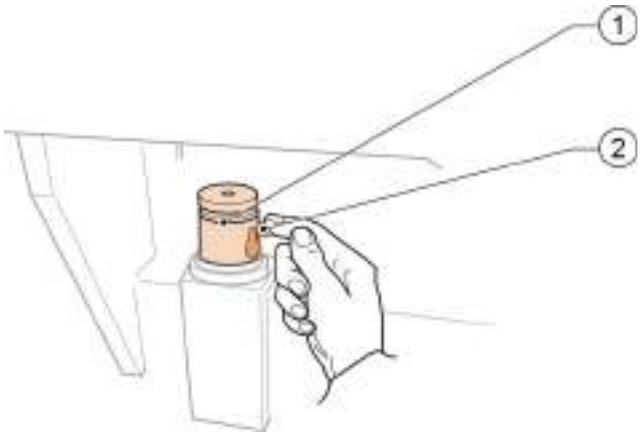


Fig. 195 Lubricate journal pin

Step 4

Piston-shaft head:

Use both hands to safely grab the offset cylinder (1).

Set the piston rod head (2) on the journal pin (3), but do not press into fitting position yet

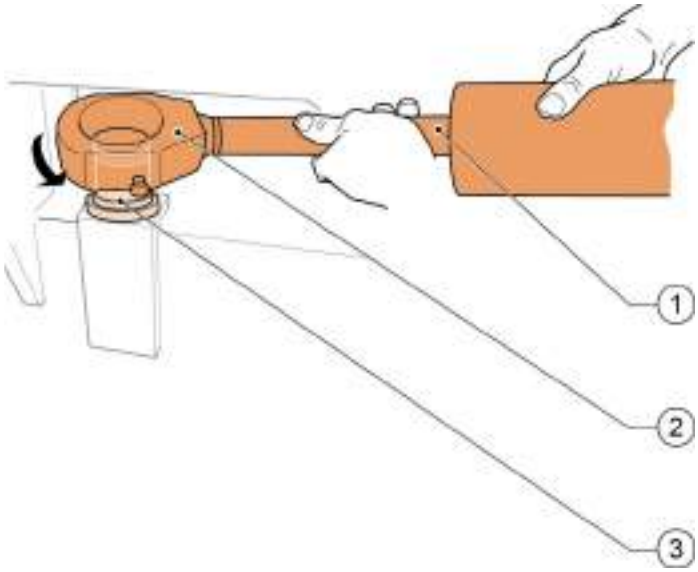


Fig. 196 Piston rod head on the journal pin

Step 5

Cylinder bottom:

Use both hands to push the cylinder base (2) in the cylinder base receptacle (1)

Secure the offset cylinder from slipping. Set hammer shaft (1) in the opening of the cylinder base receptacle (1).

Tools:

hammer

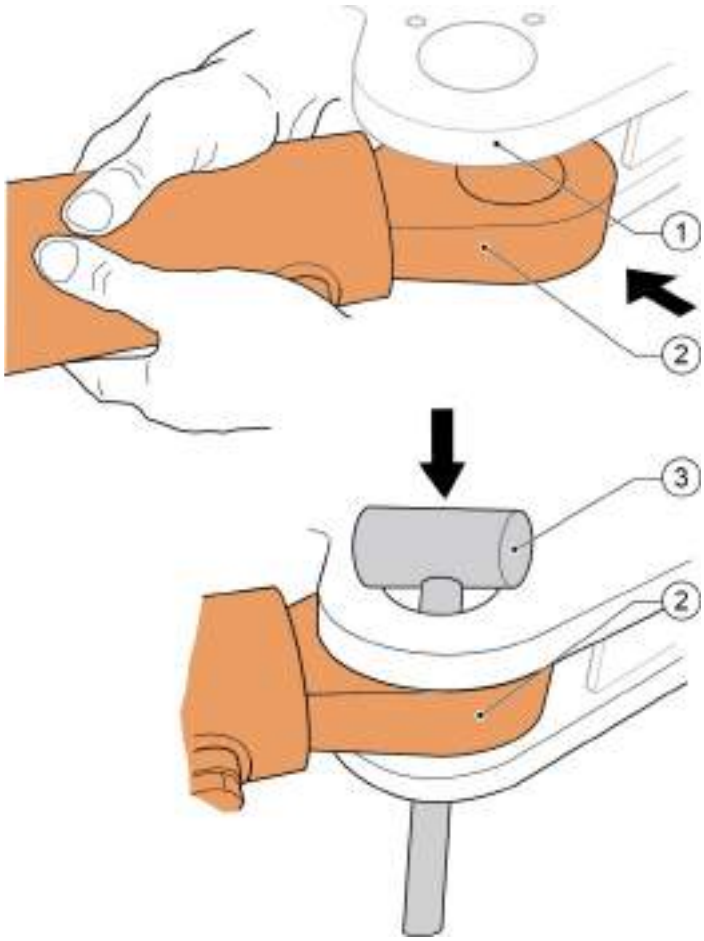


Fig. 197 Push and secure the offset cylinder in the cylinder base bearing

Step 6

Piston-shaft head:

Use crowbar (1) to press the piston rod head (2) on the journal pin (3).

Tools:

crowbar

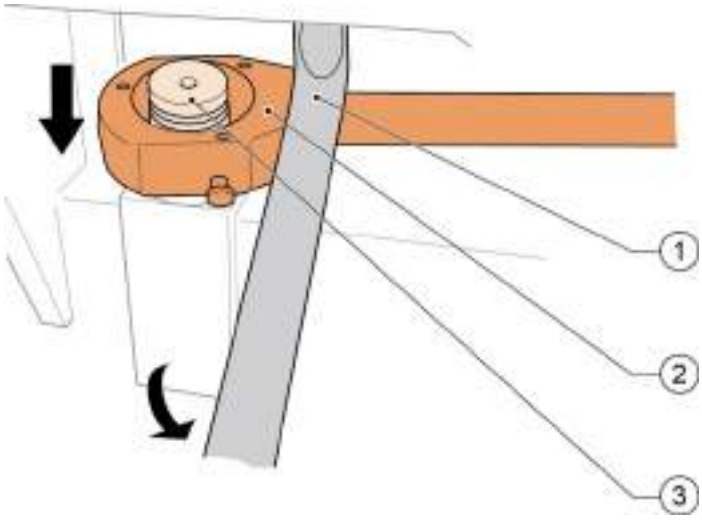


Fig. 198 Press piston rod head on journal pin

Step 7

Piston-shaft head:

Place the cover (3) loosely on the piston rod head (2).

Use crowbar (1) and pressure to press on the cover (3) of the piston rod bearing.

Tools:

crowbar

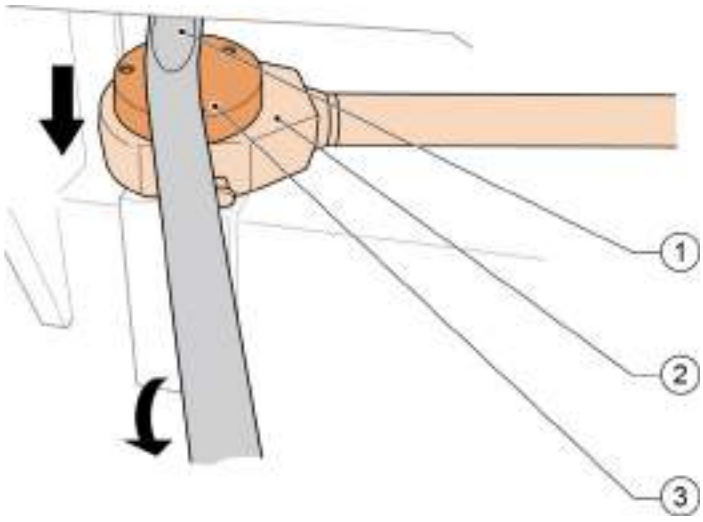


Fig. 199 Press piston rod head on journal pin

Step 8

Piston-shaft head:

Remove the cover (1) again from the piston rod head (4).

Set the spacer ring (2) on the journal pin (3) in the piston rod head (4).

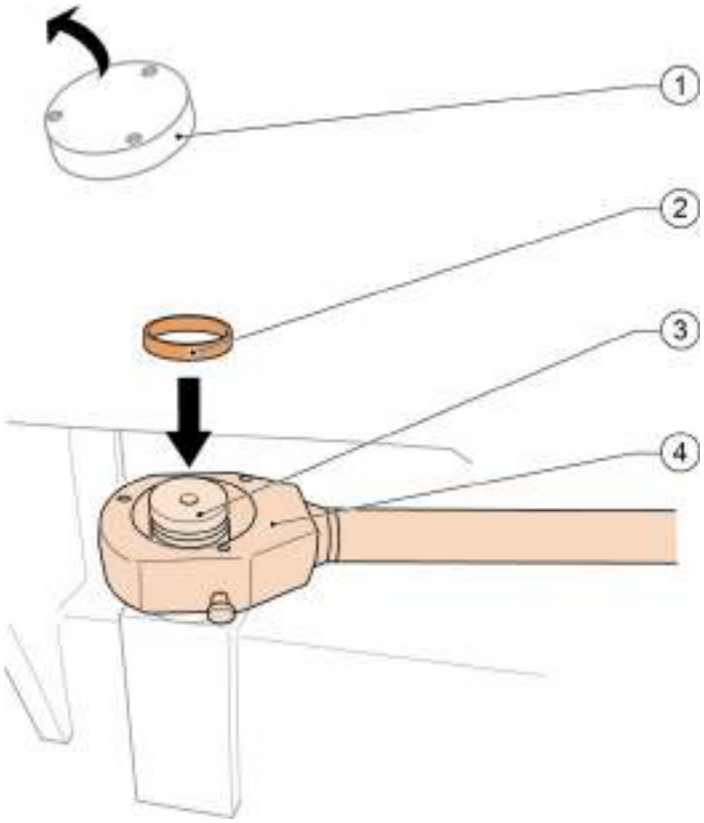


Fig. 200 Set spacer ring on journal pin

Step 9

Piston-shaft head:

Use snapring pliers (1) to set the guard ring (2) on the journal pin (4) in the piston rod head (3).

Tools:

snapring pliers

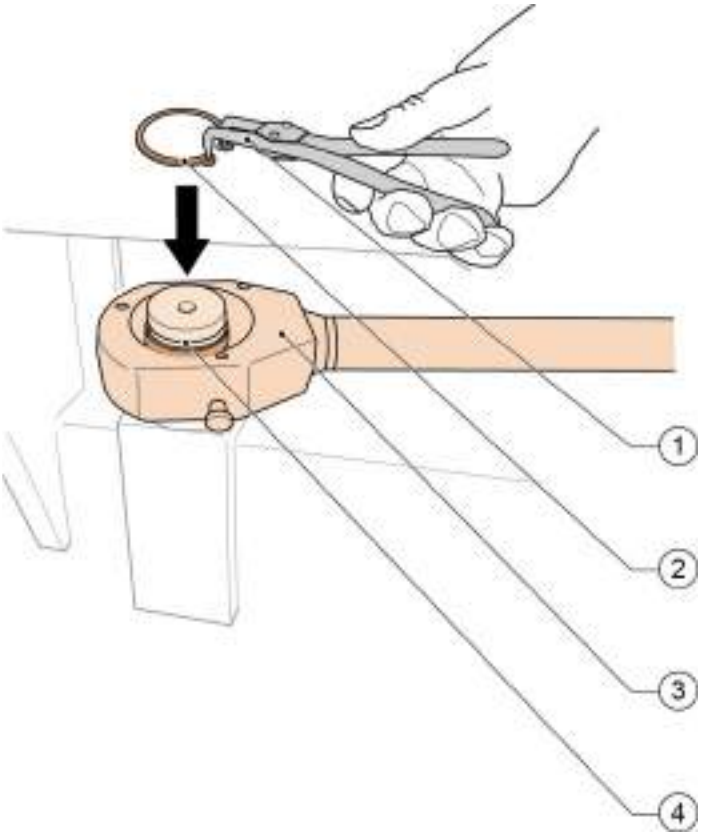


Fig. 201 Set spacer ring on journal pin

Step 10

Cylinder bottom:

Take the hammer (1) back out from the cylinder base receptacle (2).

Use mandrel (4) to align the cylinder base (3) and the cylinder base receptacle (2).

Tools:

mandrel

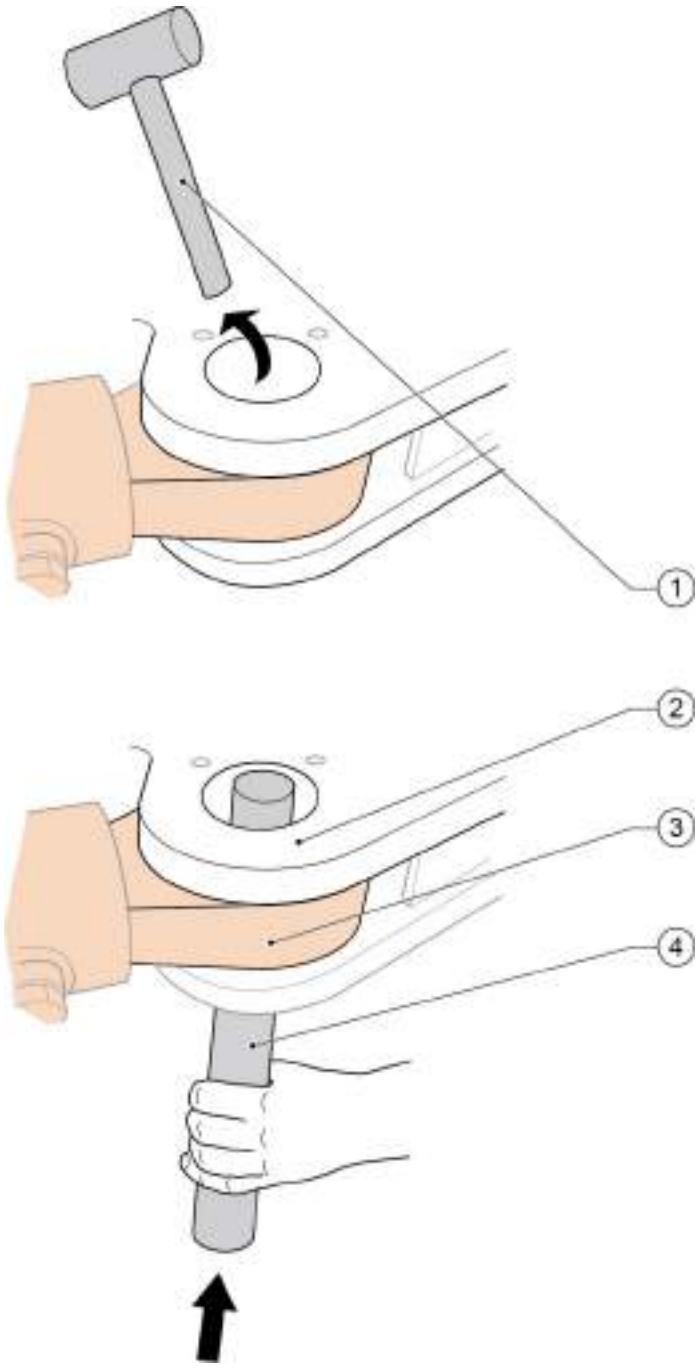


Fig. 202 Align cylinder base bearing

Step 11

Cylinder bottom:

Use grease to lubricate the bearing surfaces of the cylinder base receptacle (1) and of the cylinder base (3).

Consumables:

lubricating grease

Fig. 203 Lubricate cylinder base bearing

Step 12

Cylinder bottom:

Lift the offset cylinder (3) slightly upward and push the spacer ring (1) in the cylinder base bottom side (2).

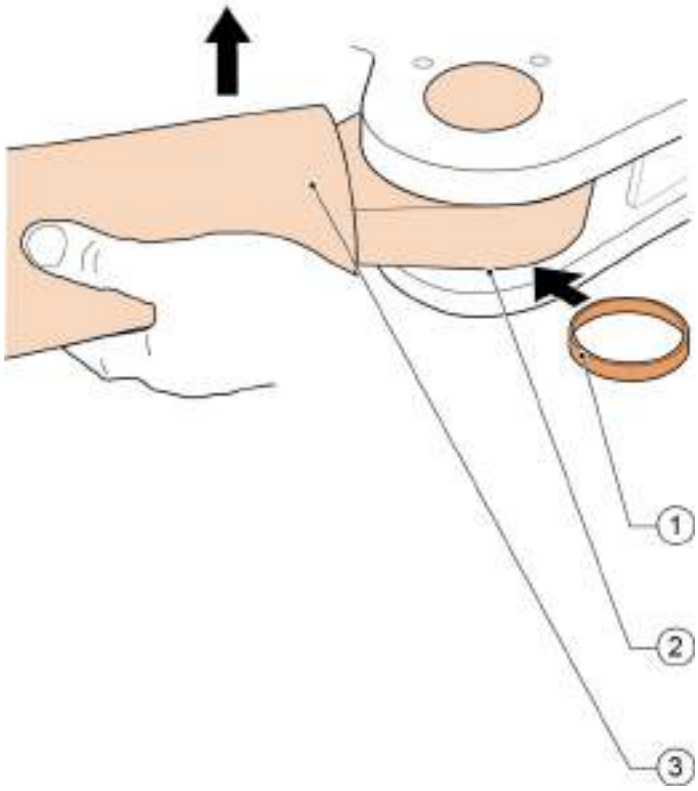


Fig. 204 Push spacer ring in the cylinder base bottom side

Step 13

Cylinder bottom:

Use grease (1) to lubricate the axle (2) for the cylinder base bearing (2).

Consumables:

lubricating grease

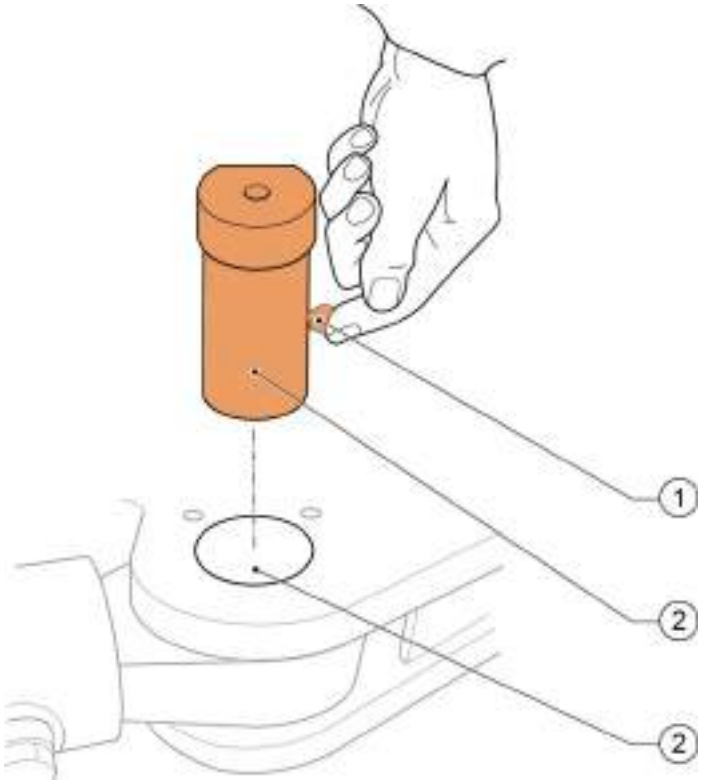


Fig. 205 Lubricate cylinder base bearing axle

Step 14

Cylinder bottom:

Insert the axle (2) in the cylinder base receptacle (3) such that the flat side faces the back.

Use hammer (1) to knock the axle (2) into the cylinder base receptacle (2).

Watch to ensure that the guard ring (3) does not slip below the cylinder base!

Tools:

hammer,
mandrel

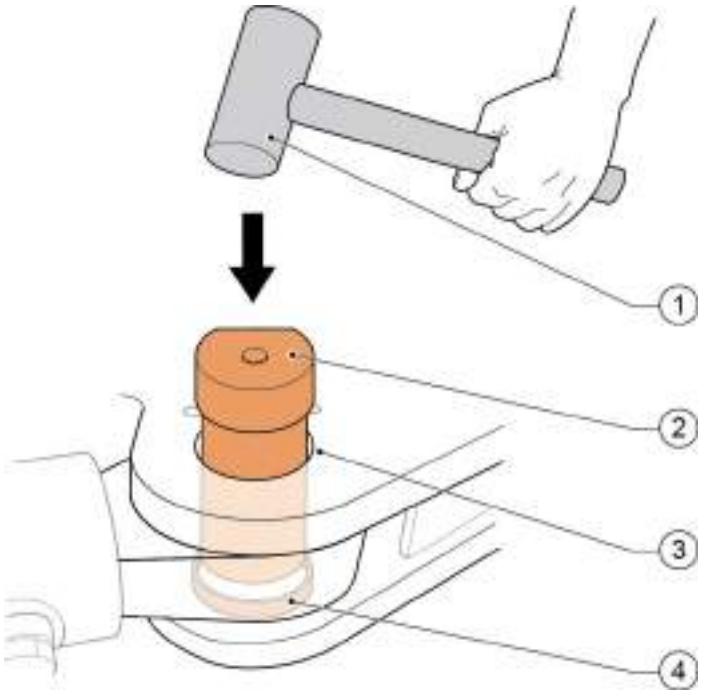


Fig. 206 Lightly knock the axle in the cylinder base bearing

Step 15

Cylinder bottom:

Use hex screws (3) to gently secure the axle mounting (4) in order to guide the axle better.

Use hammer (1) and mandrel (2) to knock the axle (5) up to the stop in the cylinder base receptacle (2).

Tools:

hammer,
mandrel

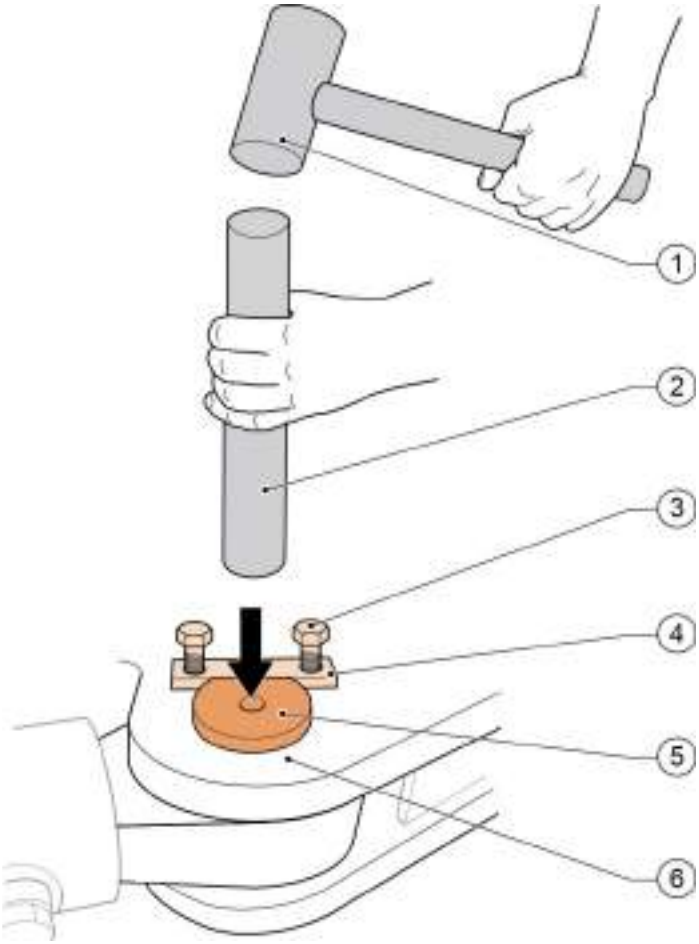


Fig. 207 Knock axle in cylinder base bearing until stop

Step 16

Cylinder bottom:

Reloosen the two securing hex screws (2).

Secure both hex screws (2) with Loctite (1) and use a pneumatic wrench to screw the axle mount (4) to secure the axle (5) to the cylinder base receptacle (3).

Use a torque wrench to retighten both hex screws (2) and check.

Tools:

pneumatic wrench + attachment)

BG 110 size: 17
BG 130 size: 17
BG 160 size: 17
BG 190 size: 17
BG 240 size: 17

torque wrench (2)

BG 110 size: 17
BG 130 size: 17
BG 160 size: 17
BG 190 size: 17
BG 190 size: 17

Standardized parts: (2)

BG 110: Screw M 10-8.8
BG 130: Screw M 10-8.8
BG 160: Screw M 10-8.8
BG 190: Screw M 10-8.8
BG 240: Screw M 10-8.8

Starting torques: (2)

BG 110: M_T=43 Nm
BG 130: M_T=43 Nm
BG 160: M_T=43 Nm
BG 190: M_T=43 Nm
BG 240: M_T=43 Nm

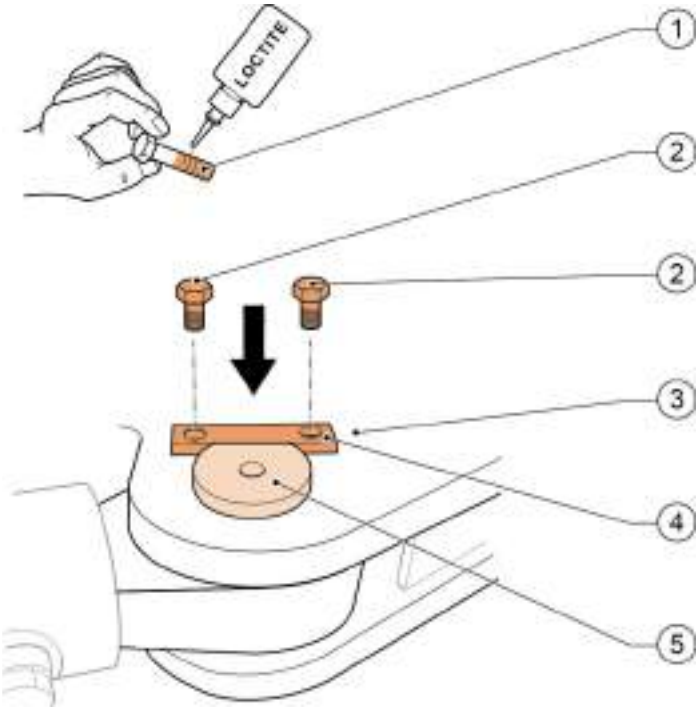


Fig. 208 Mounting the axle holders

Step 17

Cylinder bottom:

Use hammer to knock the fitting (2) into the axle (3) bore.

Tools:

hammer

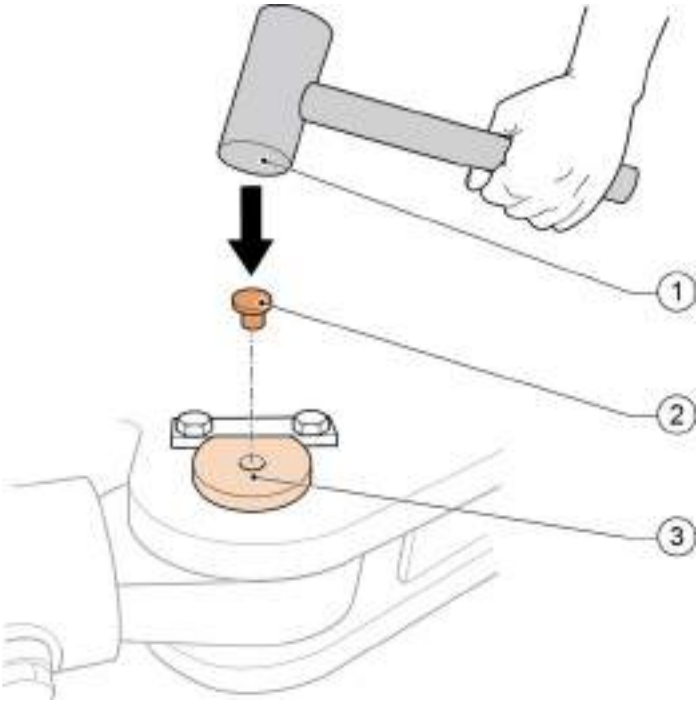


Fig. 209 Insert fitting in axle

Step 18

Piston-shaft head:

Secure three hex screws (2) with Loctite 243 (1).

Use flat wrench with hex screws (2) to tighten on the cover (3) on the piston rod head (3).

Tools:

open-end wrench

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 8
BG 240 size: 8

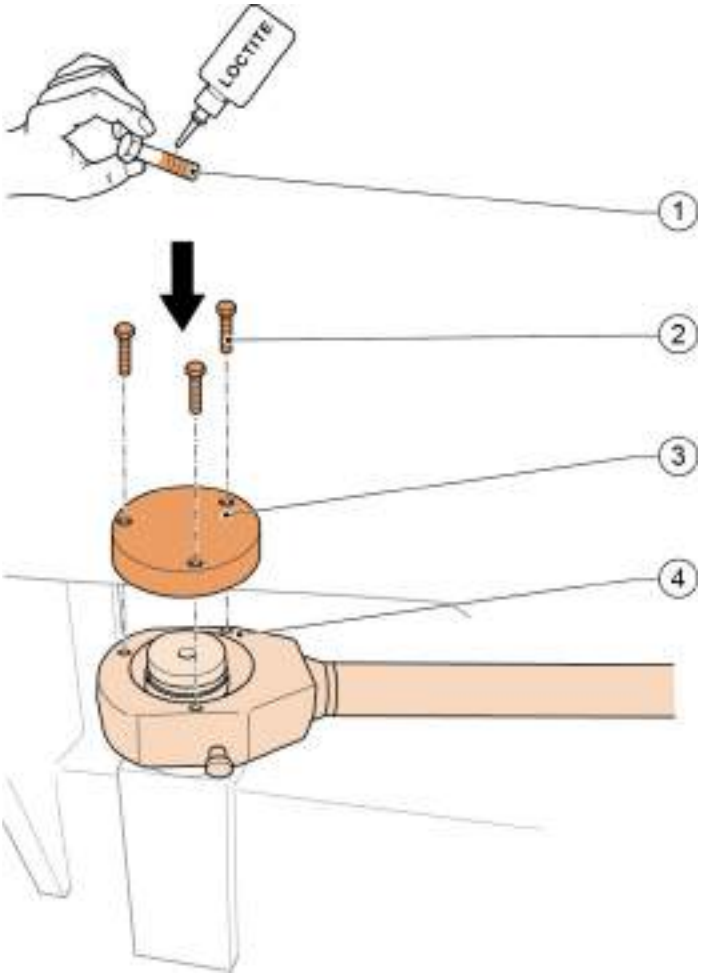


Fig. 210 Screw cover on piston rod head

Step 19

Use flat wrench to screw the banjo (3) on the threaded connections (2) on the offset cylinder (1).

Use flat wrench to screw the hydraulic hose lines (4) to the banjo (3)

Tools:

open-end wrench

BG 110 sizes: 24, 27
BG 130 sizes: 24, 27
BG 160 sizes: 24, 27
BG 190 sizes: 24, 27
BG 240 sizes: 24, 27

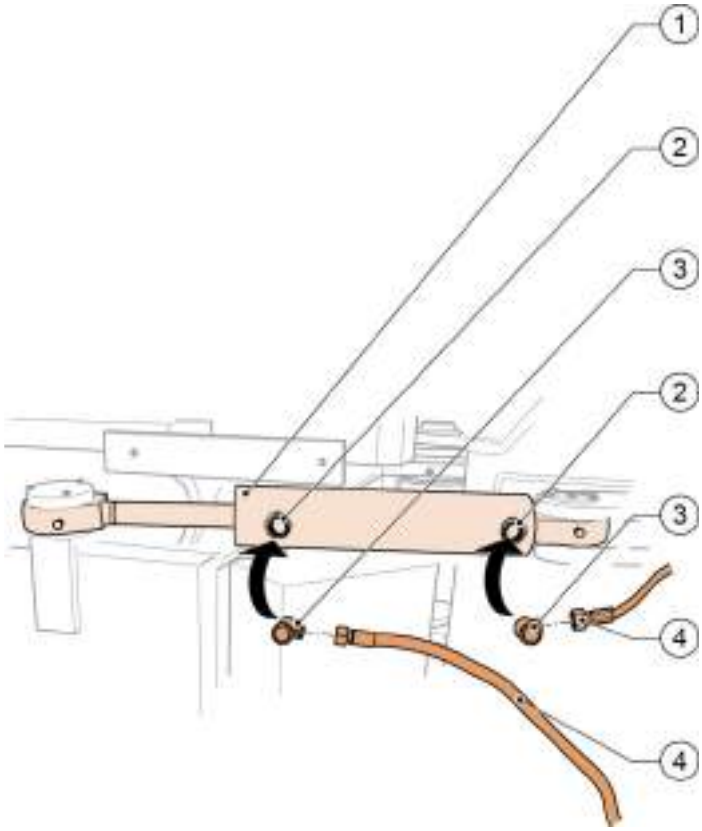


Fig. 211 Mount hydraulic connections to offset cylinder

Step 20

Use grease gun to lubricate at the grease fitting (2) on the piston rod head (1) and on the cylinder base (4).

Check if grease is leaking out.

Tools:

grease gun

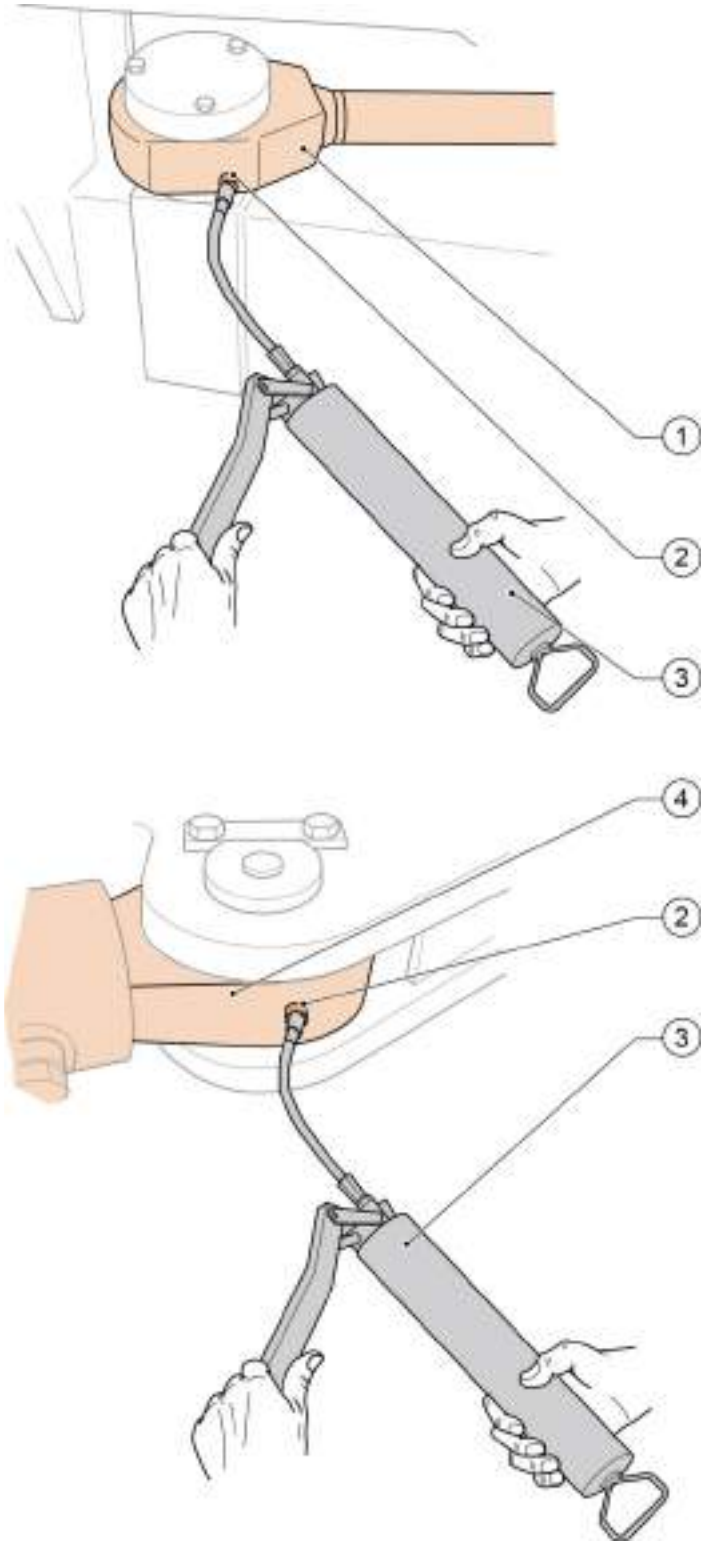


Fig. 212 Lubricate offset cylinder

NOTE
Perform functional trial on the offset cylinder!

5.7 Front axle assembly

5.7.1 Replacing front axle

5.7.1.1 Dismounting front axle

Step 1a	BG 110 / BG 130 / BG 160

Set the grader on a stable, level surface.

Use chocks to secure the grader from rolling away.

Lift up the rear mounted ripper.

Use wheel wrench to loosen 10x wheel nuts (3) on the left (2) and right front wheels (1).

Tools:

wheel wrench

BG 110 size: 27
BG 130 size: 30
BG 160 size: 30

Standardized parts: (3)

BG 110: nut M 20x1,5 B20 AN 9512217
BG 130: nut M 22x1,5 B22 AN 538201024
BG 160: nut M 22x1,5 B22 AN 538201024

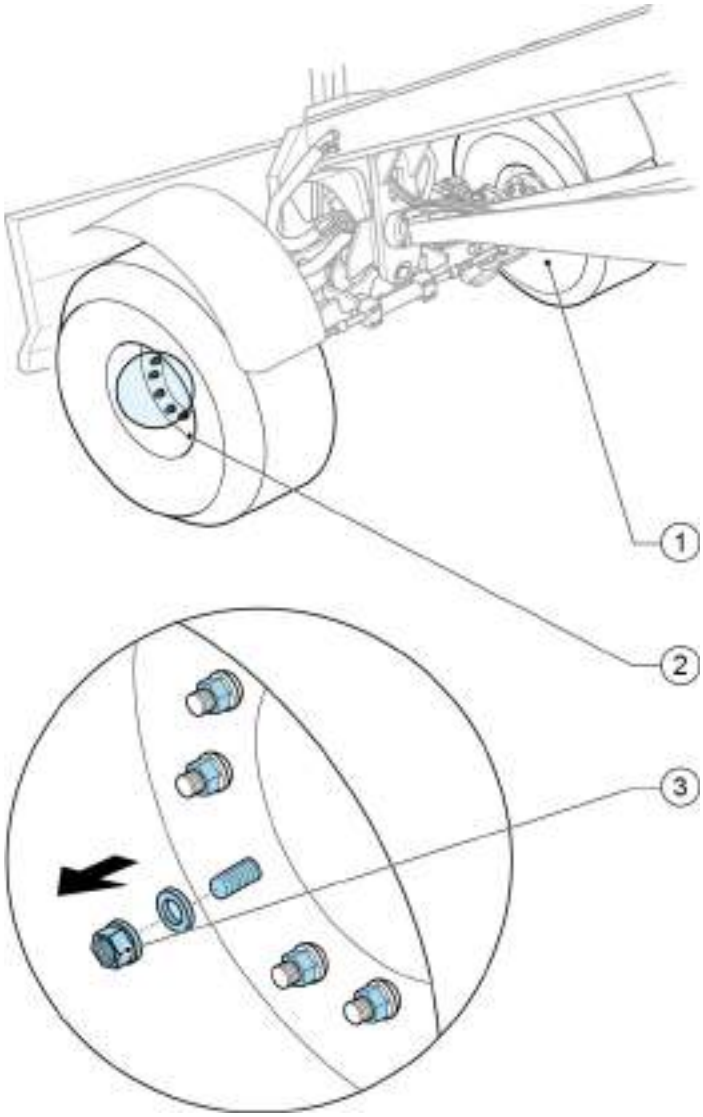


Fig. 213 Loosen wheel nuts on both from wheels

Step 1b **BG 190 / BG 240**

Set the grader on a stable, level surface.

Use chocks to secure the grader from rolling away.

Lift up the rear mounted ripper.

Use wheel wrench to loosen and remove 2 opposing wheel bolts (3) on the left (2) and right front wheels (1).

Use a screwdriver to mount one loading pin (4) each at the point of both wheel bolts.

Tools:

screwdriver,

wheel wrench

BG 190 size: 30
BG 240 size: 30

Standardized parts: (3)

BG 190: Screw M 22x1,5 B20 AN 9512217
BG 240: Screw M 22x1,5 B22 AN 538201024

Equipment:
guide mandrel: AN 4501569

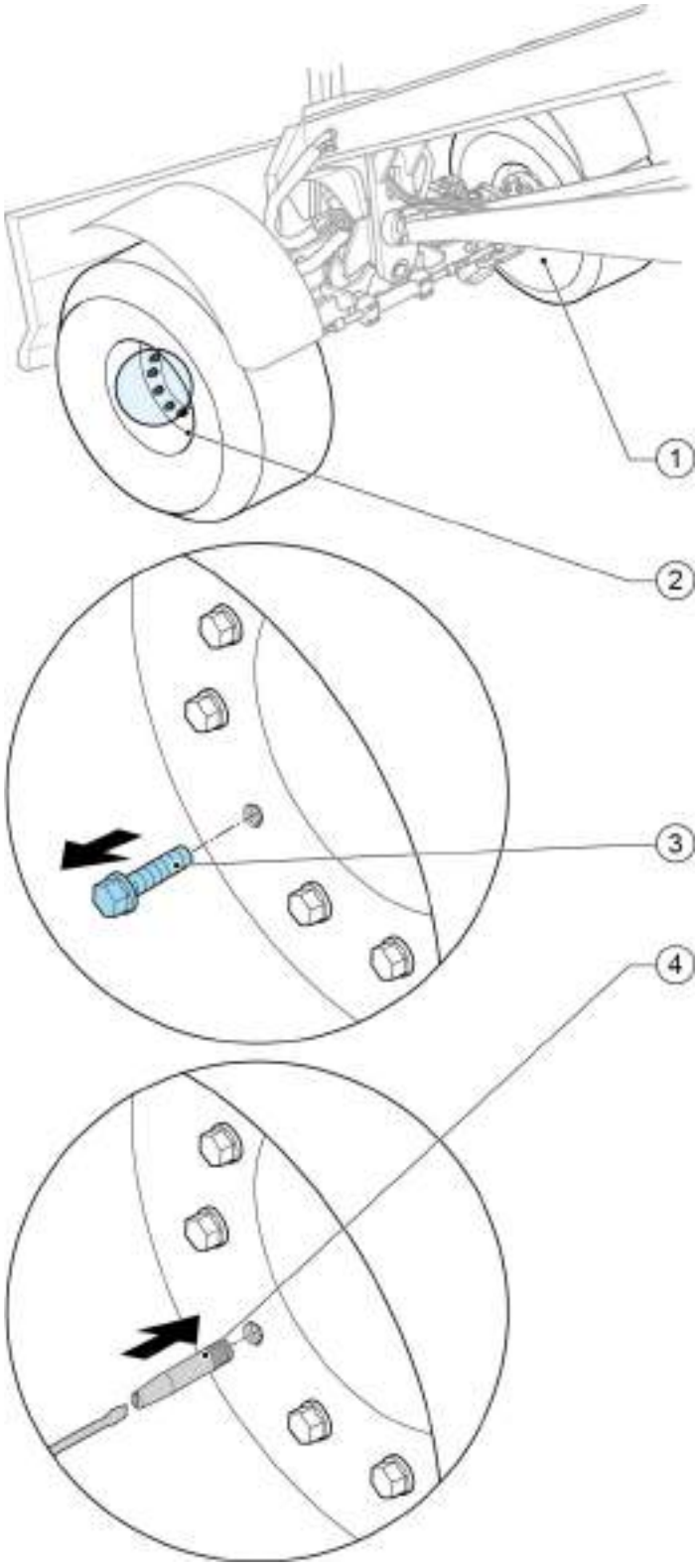


Fig. 214 Loosen wheel nuts on both from wheels

Step 2

Set the dozer blade (5) and the blade (4) crosswise to the direction of travel, lower and thus lift the grader (1) such that the wheels have space from the ground.

Place a metal support (3) on the front frame at the front receptacle of the front axle as well as under the pivot joint to secure the grader from dropping down.

Place a wood beam as damping between the metal parts!

Note additional assembly for access to the axle / bolts (2).

Equipment:
2 x metal supports

Material: (2)

BG 110 shaft AN 2722297
BG 130 shaft AN 2722297
BG 160 bolt AN 4229959
BG 190 bolt AN 4229959
BG 240 bolt AN 4229959

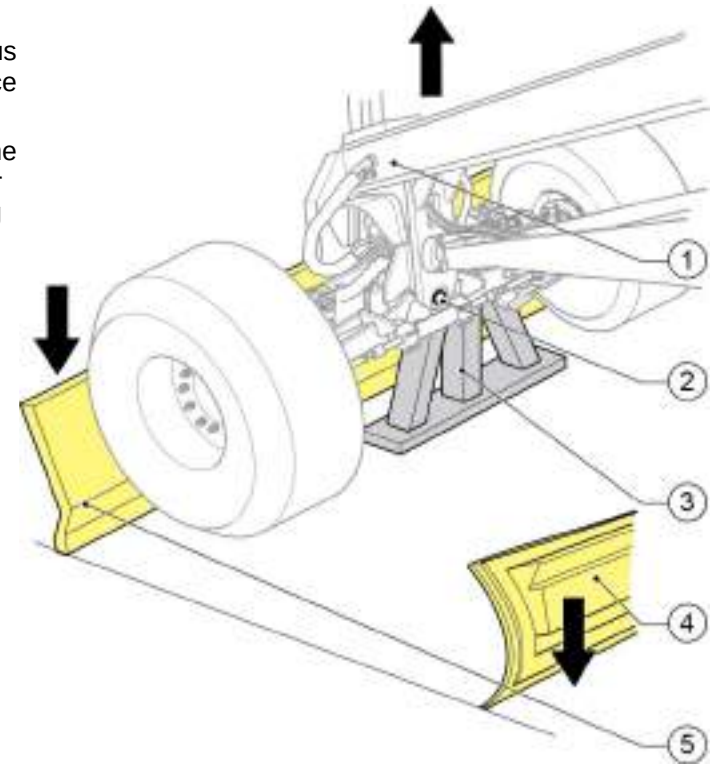


Fig. 215 Lift up and secure grader

DANGER

Risk from lowering of hydraulic assemblies!
Hydraulic assemblies, such as the cylinder, push blade, blade, etc. can lower unexpectedly. After lifting it up, the grader must immediately be secured with a metal support (3) under the pivot joint and the front frame!

Step 3

Secure suitable stopping means on the dozer blade.

Disconnect and close all hose lines from the dozer blade cylinder.

Use socket wrench to loosen all hex screws (3) on the dozer blade (2).

Use crane to remove dozer blade (2) with plate completely from frame front part (1).

Tools:

open-end wrench for hose lines,

socket wrench

BG 110 size: 30
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: Screw M 20
BG 130: Screw M 20
BG 160: Screw M 20
BG 190: Screw M 20
BG 240: Screw M 20

Equipment:

crane,
hitching gear

Weight

BG 110 764 kg
BG 130 995 kg
BG 160 764 kg
BG 190 948 kg
BG 240 1112 kg

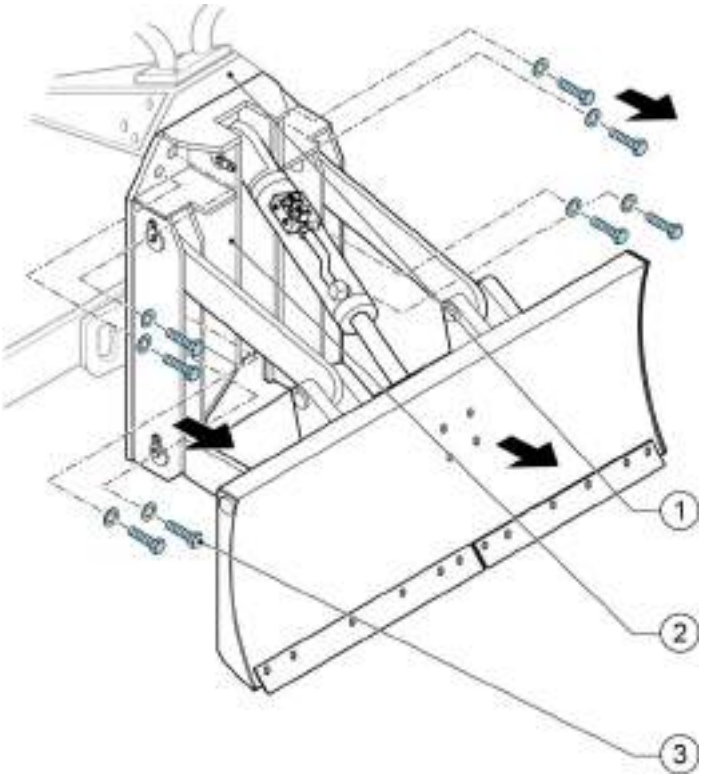


Fig. 216 Dismantle dozer blade

Step 4

Secure front axle with shipping pins:
Connect the axle carrier (4) and the coupling rod (3) with pins (1) and secure the hinged pin (2).

Material: (1)

BG 110 bolt AN 2722954
BG 130 bolt AN 2722954
BG 160 bolt AN 2722954
BG 190 bolt AN 2722954
BG 240 bolt AN 2722954

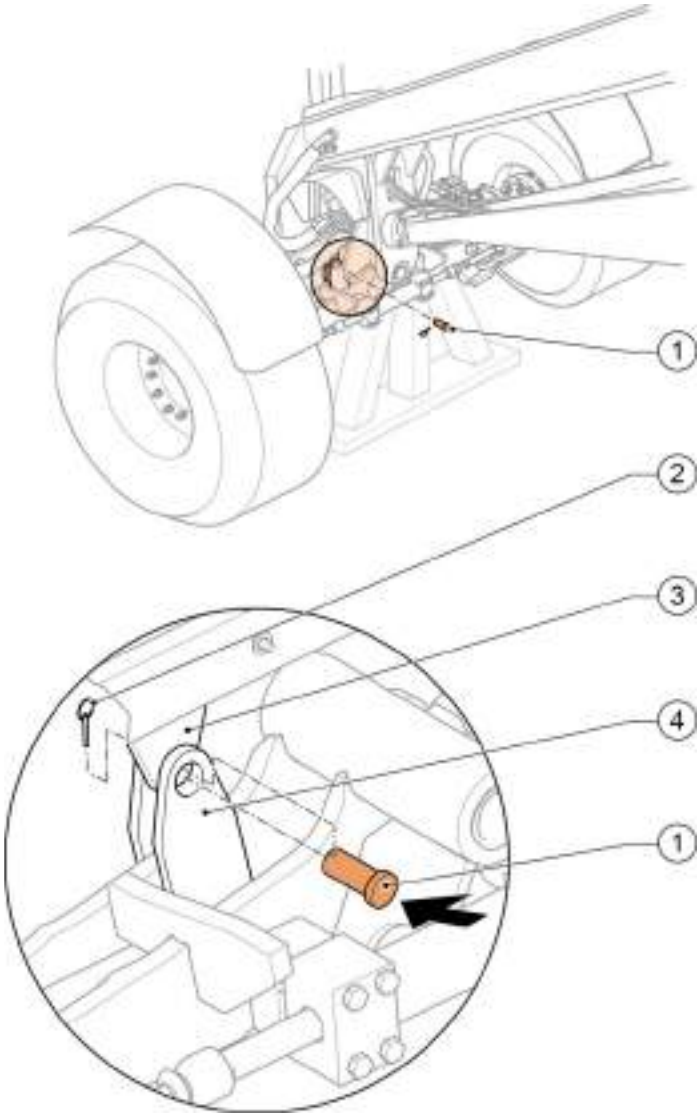


Fig. 217 Secure front axle with shipping pins

NOTE

The shipping pins and hinged pin are installed at the plant for delivery condition. Store is a suitable location, e.g., in the driver's cab.

Step 5a **BG 110 / BG 130 / BG160**

Use pneumatic wrench to unscrew 10x wheel nuts (6) each on the left (4) and right (1) wheels and set down with the lock washers (6).

Pull off right (1) and left (4) wheels from the intermediate rings (2+3) and use a crane and cable to set aside.

Tools:

pneumatic wrench + attachment

BG 110 size: 30
BG 130 size: 30
BG 160 size: 30

Weight

BG 110 110 kg
BG 130 150 kg
BG 160 150 kg

Equipment:

cable, crane

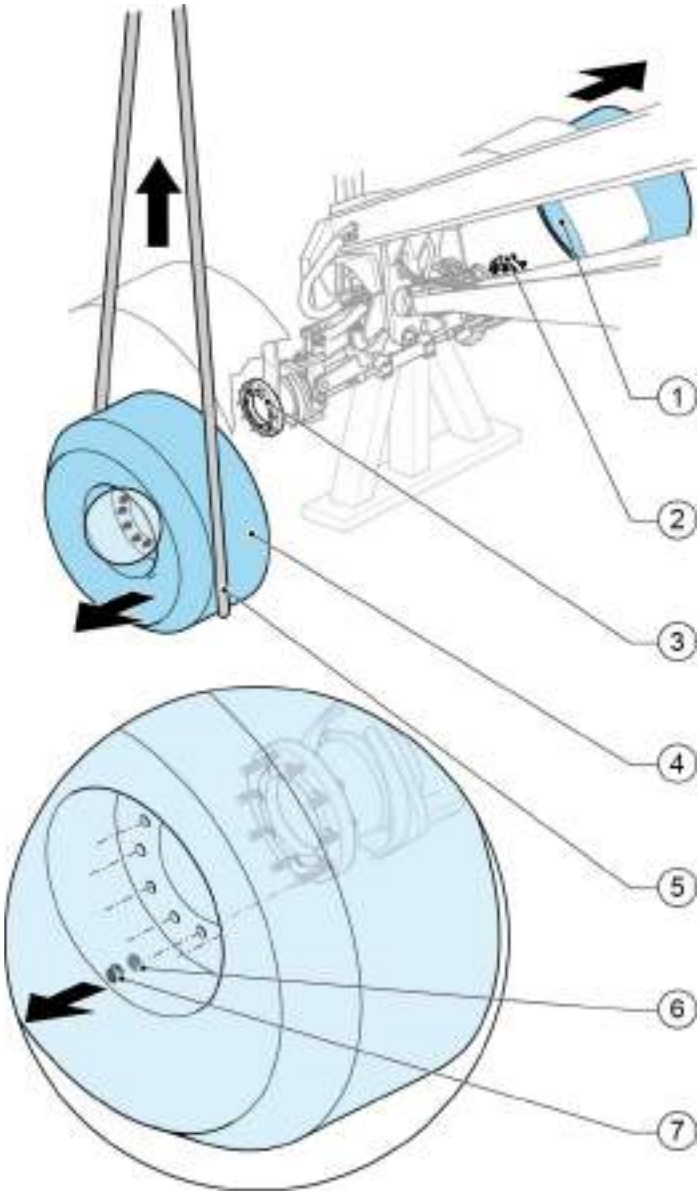


Fig. 218 Dismantle wheels BG 110, BG130, BG 160 on front axle

DANGER

Crush or impact risk!
When pulling the wheels off, they can fall or tip.
Lay underlayment (wood or similar) under the wheels. Dismantle wheels with a second person.

Step 5b	**BG 190 / BG 240**

Use a pneumatic wrench to unscrew and set down 8x wheel bolts (7) each on the left (4) and right (1) wheels.

Pull off right (1) and left (4) wheels using the loading pin (6) from the intermediate rings (2+3) and use a crane and cable to set aside.

Tools:

pneumatic wrench + attachment

BG 190 size: 30
BG 240 size: 30

Weight:

BG 190 210 kg
BG 240 340 kg

Equipment:

cable, crane
guide mandrel: AN 4501569

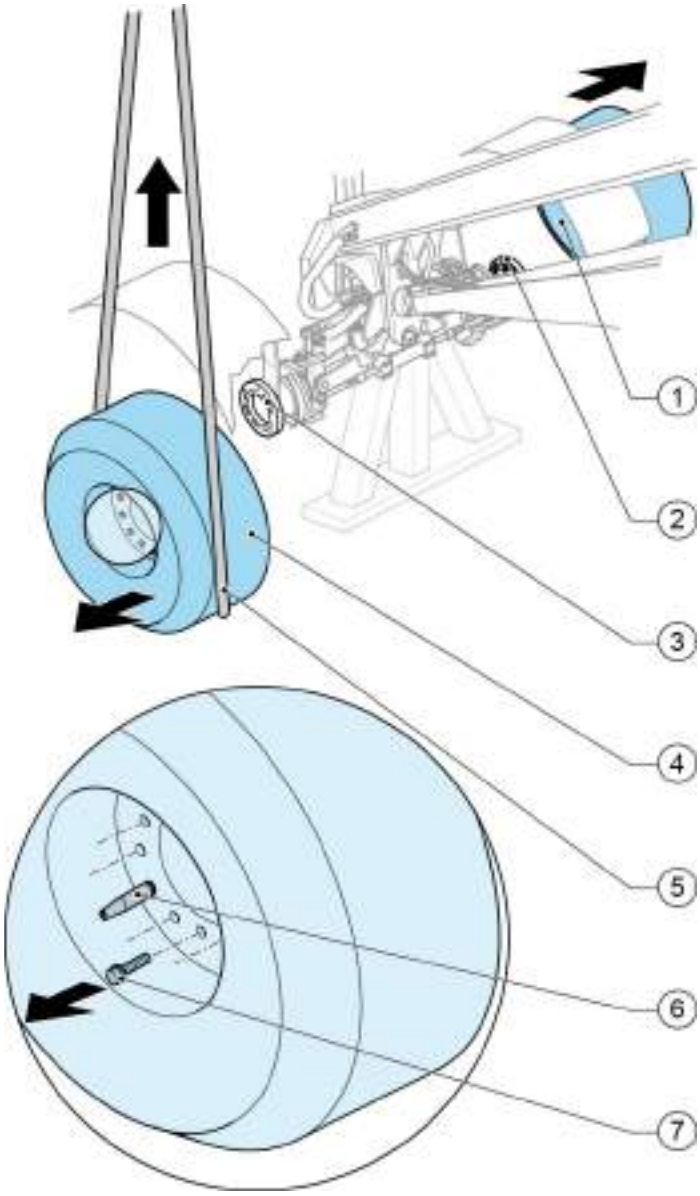


Fig. 219 Dismantle wheels BG 190, BG 240 on front axle

DANGER

Crush or impact risk!
When pulling the wheels off, they can fall or tip.
Lay underlayment (wood or similar) under the wheels. Dismantle wheels with a second person.

Step 6

Use socket wrench to loosen and unscrew the hex screws (3) on the supports (2) of both splash boards (1).

Remove and set aside splash boards (1).

Tools:

socket wrench

BG 110 size: 19
BG 130 size: 19
BG 160 size: 24
BG 190 size: 24
BG 240 size: 24

Standardized parts: (4)

BG 110: Screw M 12-10.9
BG 130: Screw M 12-10.9
BG 160: Screw M 16-10.9
BG 190: Screw M 16-10.9
BG 240: Screw M 16-10.9

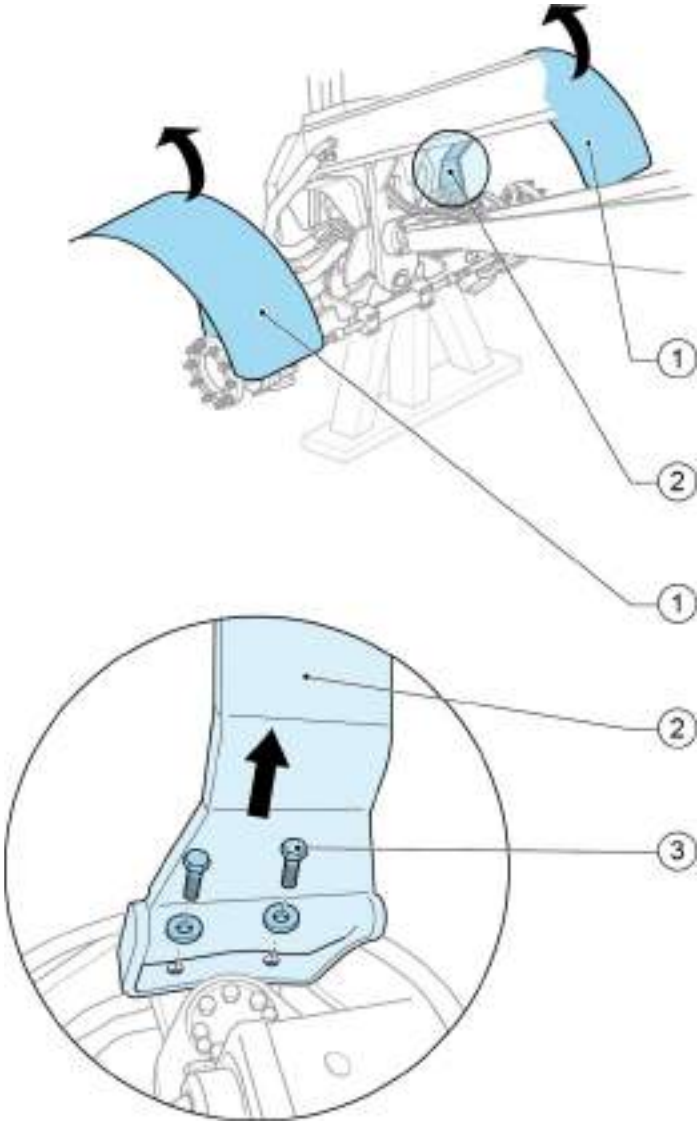


Fig. 220 Uninstall right and left splash boards

Step 7

Use flat wrench to loosen all hex screws (3) on the lamp holder (1).

Lift up and secure lamp holder (1).
Disconnect the line (2) plug x6.4 (4) from the connection and pull sideways from the front frame.
Disconnect plug x21 (5) from the connection.

Then take off the lamp holder (1) and set it aside.

Tools:

open-end wrench

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

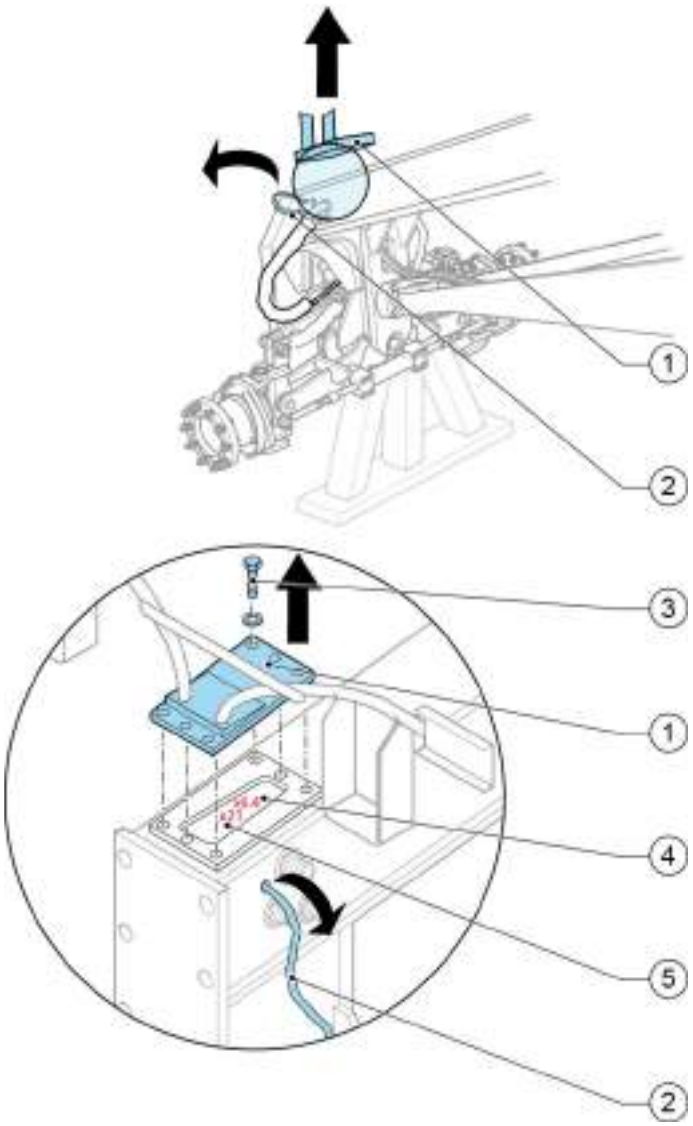


Fig. 221 Dismantle the lamp holder

Step 8

Use a flat wrench to remove all of the hose lines (2) from the control block (4) and the front frame (1) and close with closure material.

Use a flat wrench to remove all of the hose lines (2) from the camber cylinder (3) and the steering cylinder (5) and close both sides with closure material.

Tools:

open-end wrench

BG 110 size: 19, 22, 27, 30, 36, 41
BG 130 size: 19, 27, 36, 30, 36, 41
BG 160 size: 19, 27, 36, 30, 36, 41, 46
BG 190 size: 19, 27, 36, 30, 36, 41, 46
BG 240 size: 19, 27, 36, 30, 36, 41, 46

hexagon socket

BG 190 size: 8, 10

Closure material:

BG 110 NW: S08, S10, S16, S20
BG 130 NW: S08, S10, S16, S20
BG 160 NW: S08, S10, S16, S20
BG 190 NW: S08, S10, S16, S20
BG 240 NW: S08, S10, S16, S20

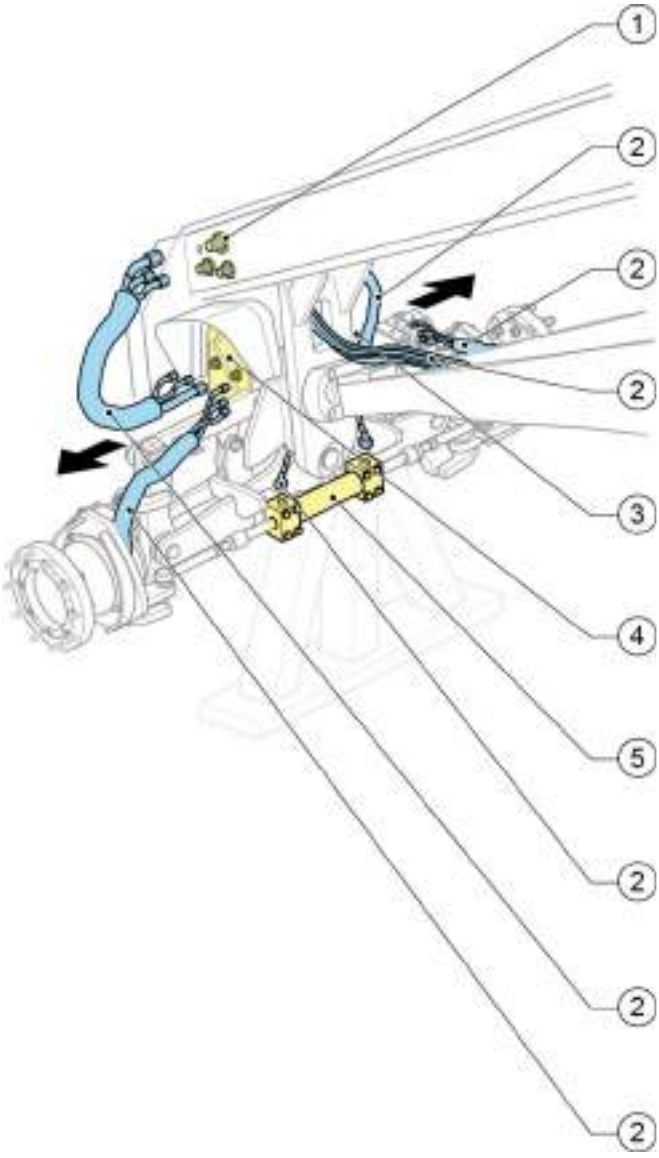


Fig. 222 Remove and close hose lines

Step 9

Secure suitable hitching gear (1) to the wheel hubs (2) and the axle arms.

Carefully use lift apparatus to lift up front axle.

Push palettes (3) under the front axle.

Use a lift apparatus to carefully set the front axle on the palettes (3).

Remove the sling (1) from the wheel hubs (2) again.

Equipment:

cable or chain,
crane,
pallets

Weight

BG 110 3250 kg
BG 130 4120 kg
BG 160 4920 kg
BG 190 5300 kg
BG 240 6850 kg

See table point 3.6.4.

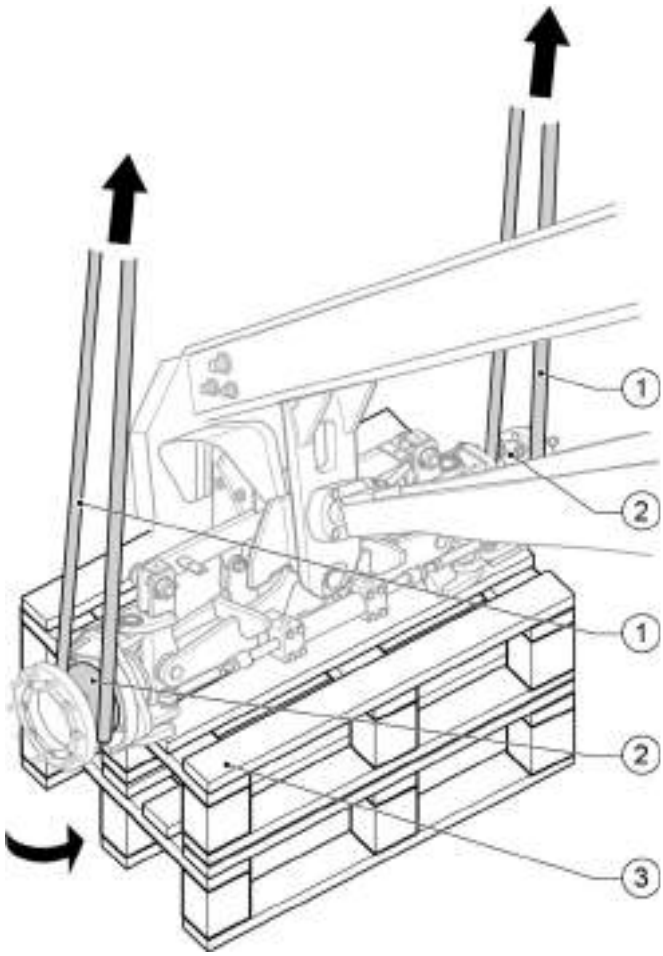


Fig. 223 Push palettes under front axle

Step 10

Use flat wrench to loosen and remove the hex nuts (1) on the axle / bolts (2).

Remove the washer (4), the round ring (3) and the grease fitting (5) from the axle (2).

BG 110 and BG 130
Hex nut in front direction of travel.

BG 160, BG 190 and BG 240
Hex nut in direction of travel behind.

Tools:

open-end wrench (1)

BG 110 size: 65
BG 130 size: 65
BG 160 size: 65
BG 190 size: 65
BG 240 size: 65

Material: (2)

BG 110 shaft
BG 130 shaft
BG 160 bolt
BG 190 bolt
BG 240 bolt

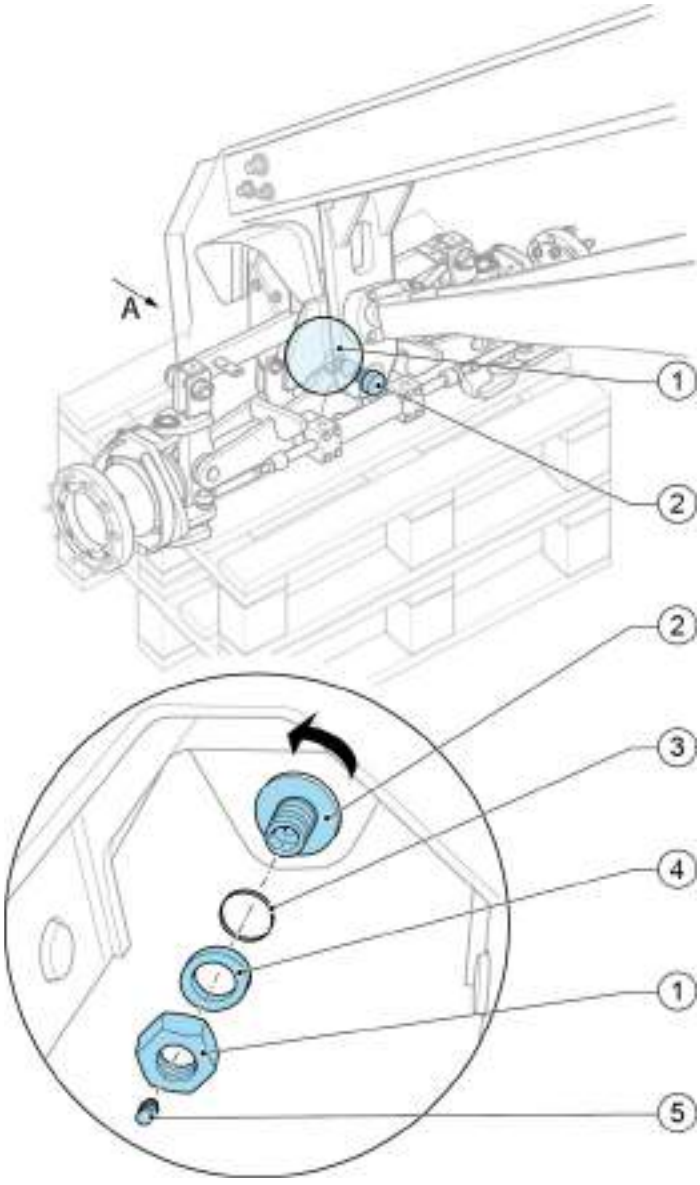


Fig. 224 Loosen hex nut from the axle
View A

Step 11

Place the sling (1) on the front frame (3) and lift up slightly until there is no load on the front axle (4).

Carefully use a mandrel (5) and hammer to knock the axle / bolts (2) out of the front axle (4). Be careful of the thread in the process!

BG 110 and BG 130
Hex nut in front direction of travel.

BG 160, BG 190 and BG 240
Hex nut in direction of travel behind.

Tools:

hammer,
mandrel,
dolley

Equipment:

lift apparatus,
cables, chains

Weight

BG 110 3250 kg
BG 130 4120 kg
BG 160 4920 kg
BG 190 5300 kg
BG 240 6850 kg

See table point 3.6.4.

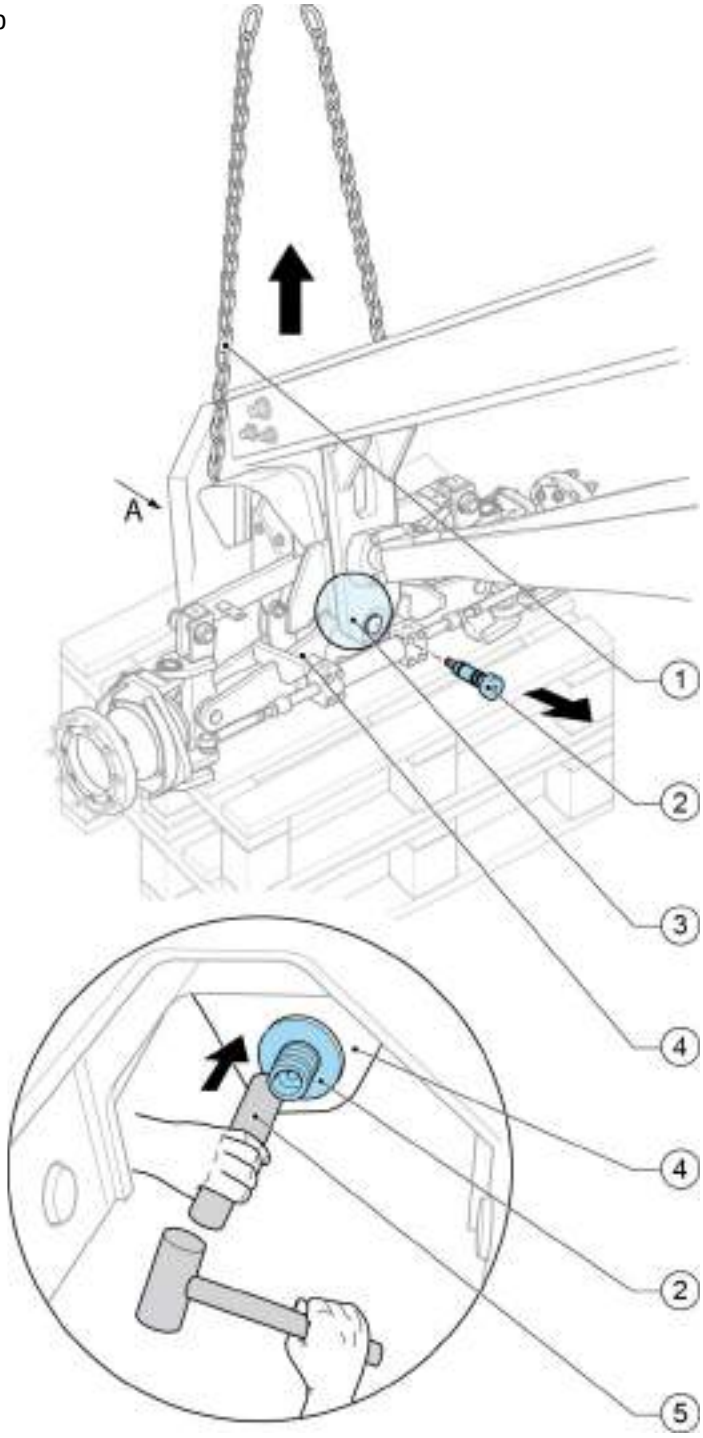


Fig. 225 Knock axle out of the front axle

⚠ CAUTION

Risk of damage to property.
Be careful of the thread when knocking out the axle!

Step 12

Line the front axle (3) with wood pieces and use tension belts (4) to secure from accidents.

Use forklift (5) or jack lift to lift the palettes slightly.

Lower forklift or jack lift and move front axle out of the receptacle.

Using a lift apparatus and slings (1), lift up the front frame (2) until the forklift (5) or jack lift can be moved under the front axle unhampered.

Equipment:

Palettes, wood pieces
lift apparatus,
forklift or low-lift platform truck
tension straps

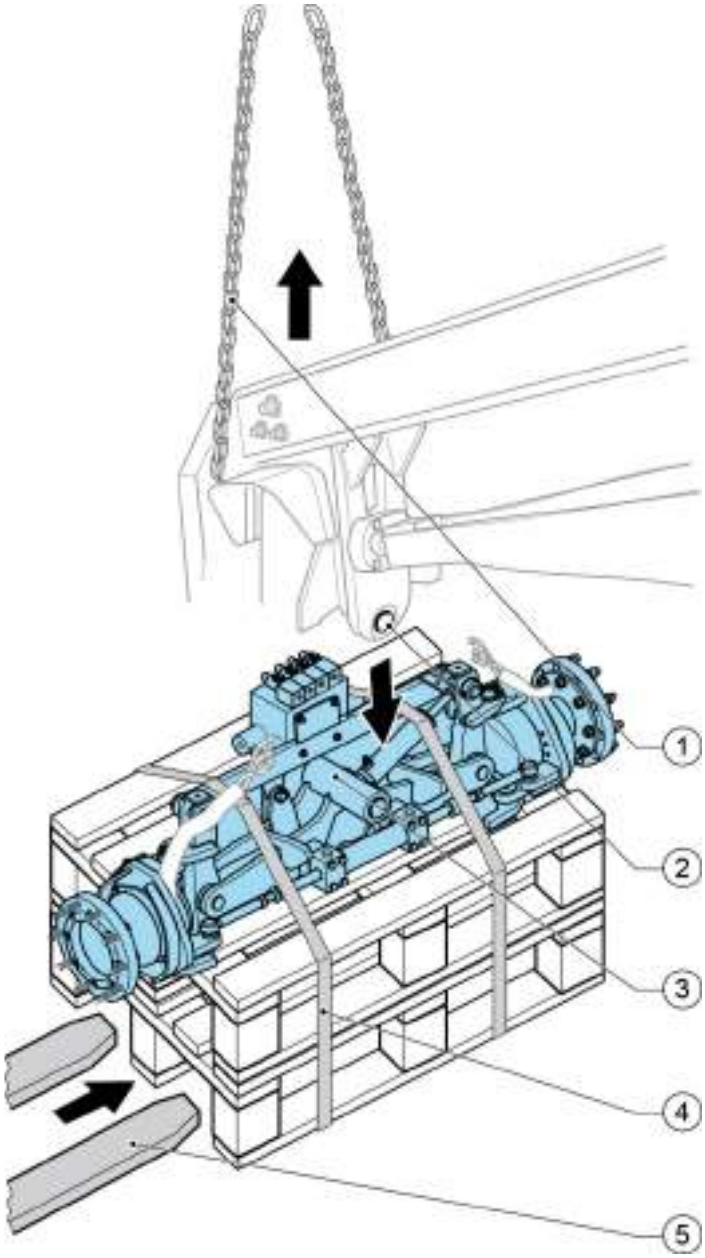


Fig. 226 Secure front axle on pallet

Step 13

Use forklift (3) or jack lift to move palette (2) with front axle (1) sideways from the grader and set down.

Equipment:

forklift truck,
Low-lift platform truck

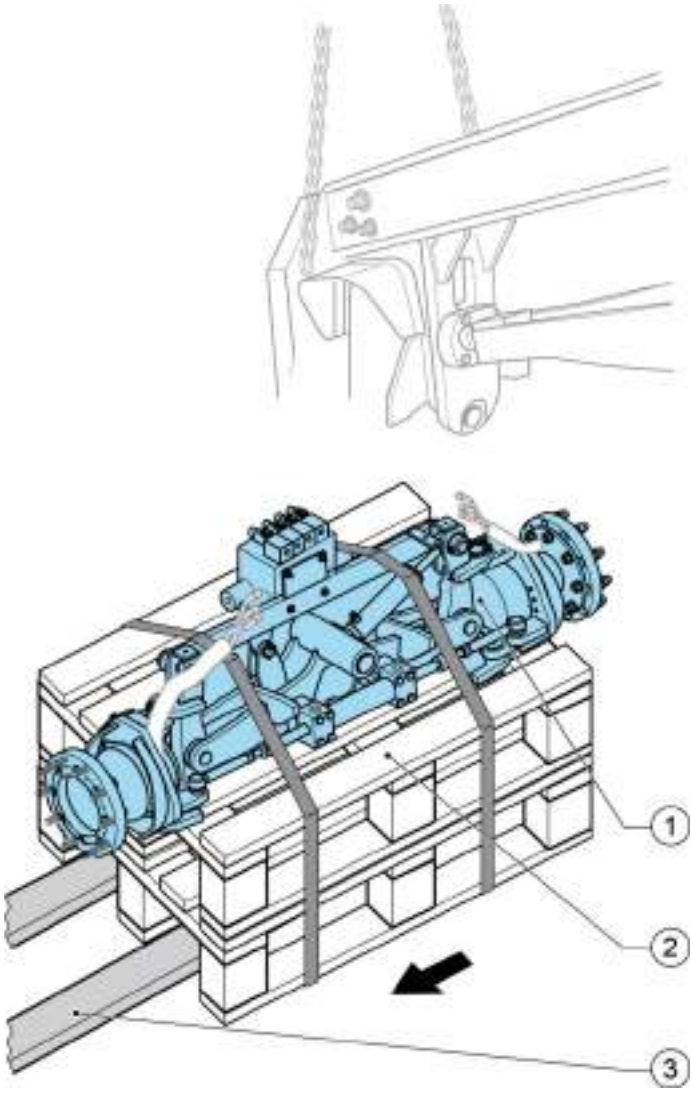


Fig. 227 Move palette with front axle from the grader

Step 14

Dismantle all attached parts, hose lines (1) from the front axle (2).

Tools:

open-end wrench

BG 110 size: 19, 22, 27, 30, 32
BG 130 size: 19, 22, 27, 30, 32
BG 160 size: 19, 22, 27, 30, 32
BG 190 size: 19, 22, 27, 30, 32
BG 240 size: 19, 22, 27, 30, 32

Allen wrench SAE flange

BG 110 size: 8, 10
BG 130 size: 8, 10
BG 160 size: 8, 10
BG 190 size: 8, 10
BG 240 size: 8, 10

Weight

BG 110 690 kg
BG 130 740 kg
BG 160 970 kg
BG 190 1000 kg
BG 240 1000 kg

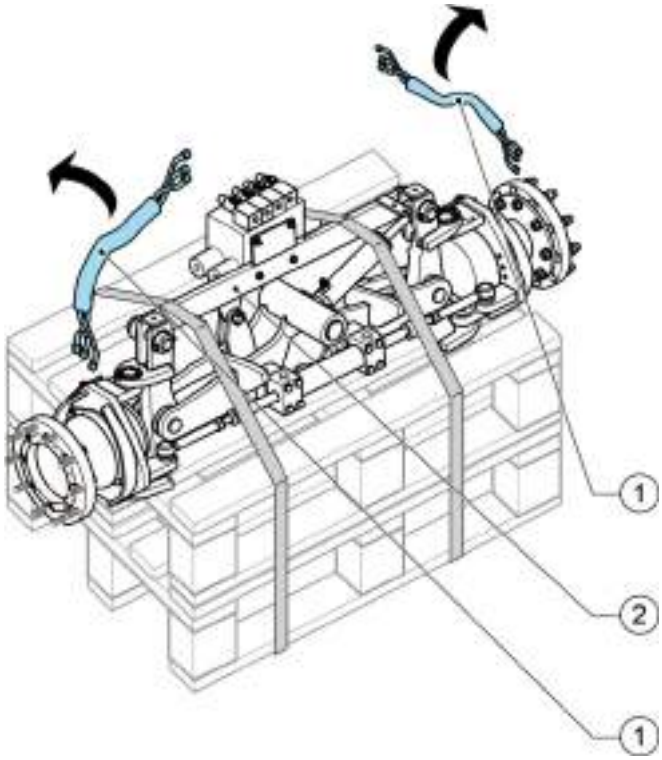


Fig. 228 Dismantle attached parts from the front axle

5.7.1.2 Mounting front axle

Step 1

Use lift apparatus to set new front axle (2) on palettes (3) and secure with tension belts (4) to prevent accidents.

Mount all attached parts, hose lines (1) to the new front axle.

Tools:

open-end wrench

BG 110 size: 19, 22, 27, 30, 32
BG 130 size: 19, 22, 27, 30, 32
BG 160 size: 19, 22, 27, 30, 32
BG 190 size: 19, 22, 27, 30, 32
BG 240 size: 19, 22, 27, 30, 32

hex wrench

BG 110 size: 8, 10
BG 130 size: 8, 10
BG 160 size: 8, 10
BG 190 size: 8, 10
BG 240 size: 8, 10

Weight

BG 110 690 kg
BG 130 740 kg
BG 160 970 kg
BG 190 1000 kg
BG 240 1000 kg

Equipment:

lift apparatus,
tension straps

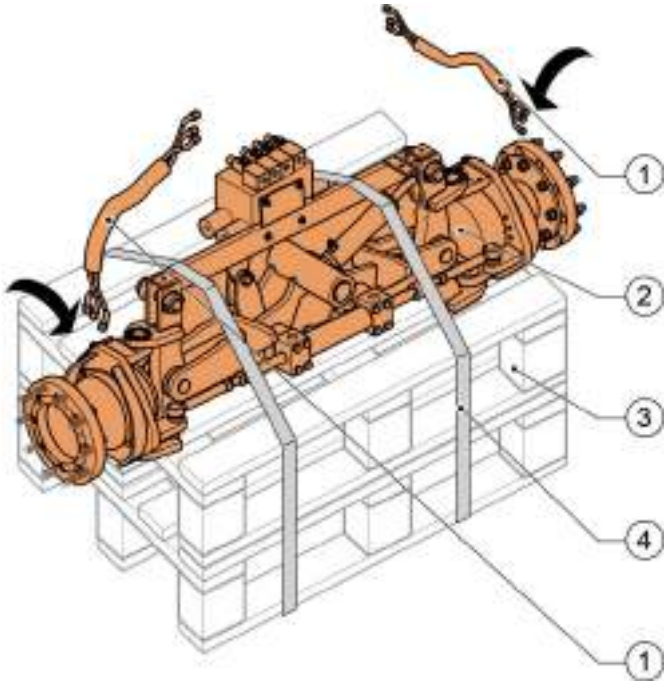


Fig. 229 Secure new front axle on palette

Step 2

Secure sling (1) to front frame and lift.

Use fork lift (4) or jack lift to move palettes (3) with the front axle (2) sideways in the grader.

Equipment:

crane,
cable, chains
forklift truck,
low-lift platform truck,

Weight

BG 110 3250 kg
BG 130 4120 kg
BG 160 4920 kg
BG 190 5300 kg
BG 240 6850 kg

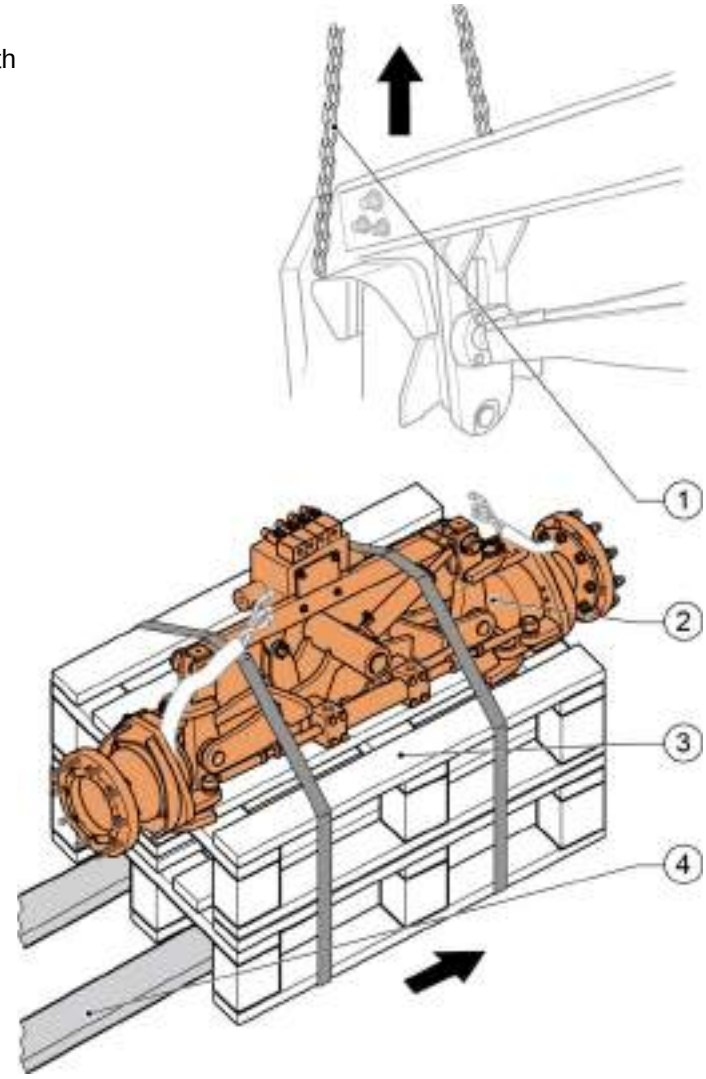


Fig. 230 Move palette with front axle in the grader

Step 3

Check the axle suspension (1) and the bushing and the front axle (2) bushing for damages and lubricate (3).

Push round rings (4) in the edge of the bushing (2) from both sides.

Equipment:

lubricating grease

Consumables:

round rings (4)

BG 110 75x5 NBR 90SHA
BG 130 75x5 NBR 90SHA
BG 160 80x5 NBR 90SHA
BG 190 80x5 NBR 90SHA
BG 240 80x5 NBR 90SHA

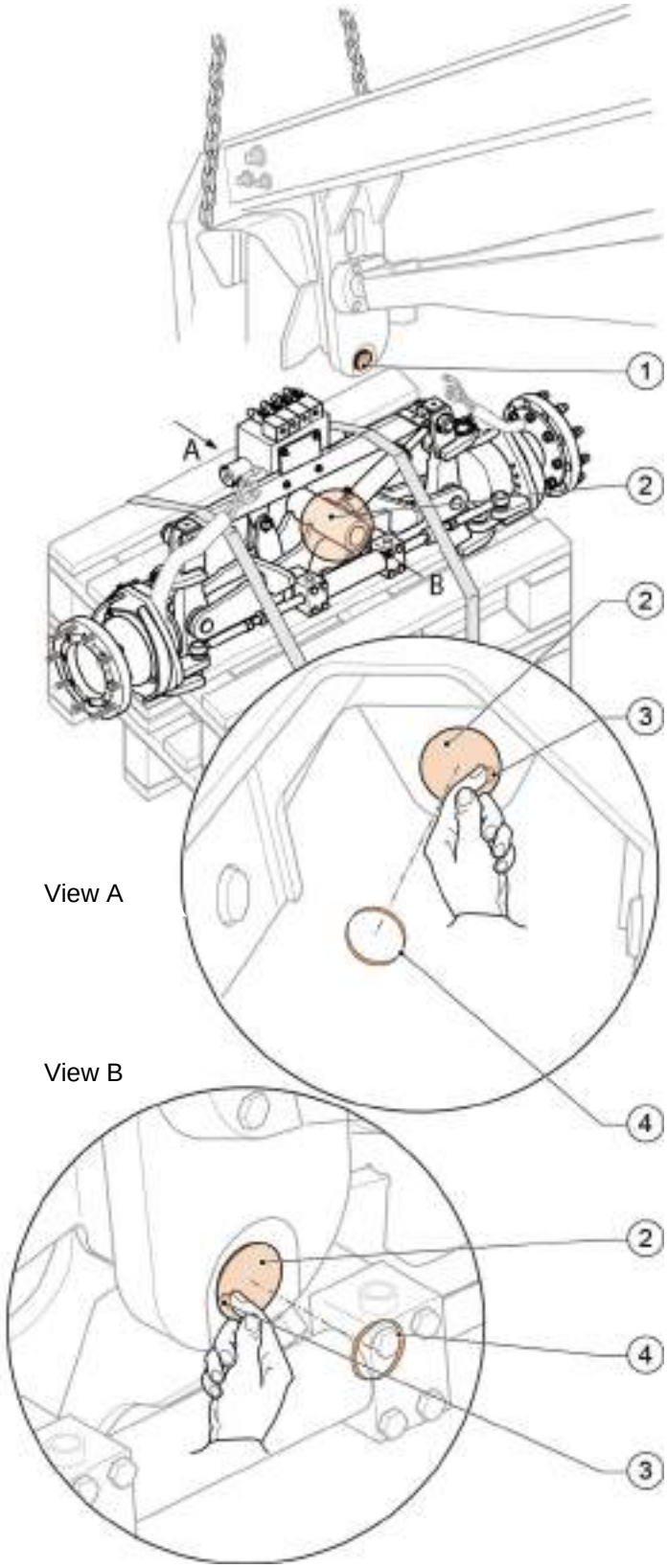


Fig. 231 Check and lubricate bushings

Step 4

Lower front frame (2) with sling and lift apparatus.

Secure suitable sling (1) to the wheel hubs and the axle arms

Align front axle (2) bushing to the front frame (2) bushing.

Remove tension belts and palettes (4).

Equipment:

lift apparatus
chains
cables

Weight

BG 110 3250 kg
BG 130 4120 kg
BG 160 4920 kg
BG 190 5300 kg
BG 240 6850 kg

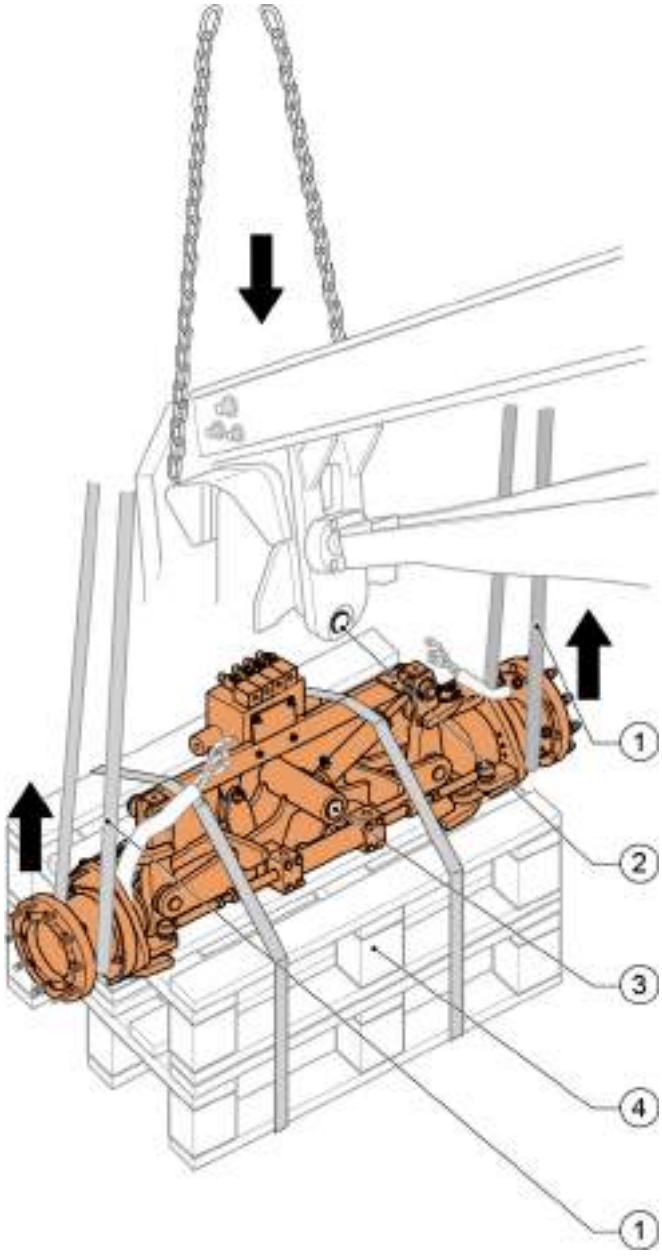


Fig. 232 Lift new front axle into receptacle

Step 5

At the front receptacle, place a metal support (2) under to secure the front axle on the front frame.

Lubricate (5) the axle (1).

Insert the axle (1) in the bushing of the receptacle and carefully knock in.

In doing this, ensure that the holes (3) on the axle / bolts (1) are on top and that both spanner flats (4) are vertical.

BG 110 and BG 130
Hex nut in front direction of travel.

BG 160, BG 190 and BG 240
Hex nut in direction of travel behind.

Tools:

hammer;
Brass mandrel

Axle or bolt, size 65 (4)

Equipment:

lubricating grease

Weight:

F_H shaft

BG 110 670 kg
BG 130 630 kg
BG 160 850 kg
BG 190 890 kg
BG 240 890 kg

F_{stroke}

BG 110 2700 kg
BG 130 3500 kg
BG 160 4100 kg
BG 190 4450 kg
BG 240 4450 kg

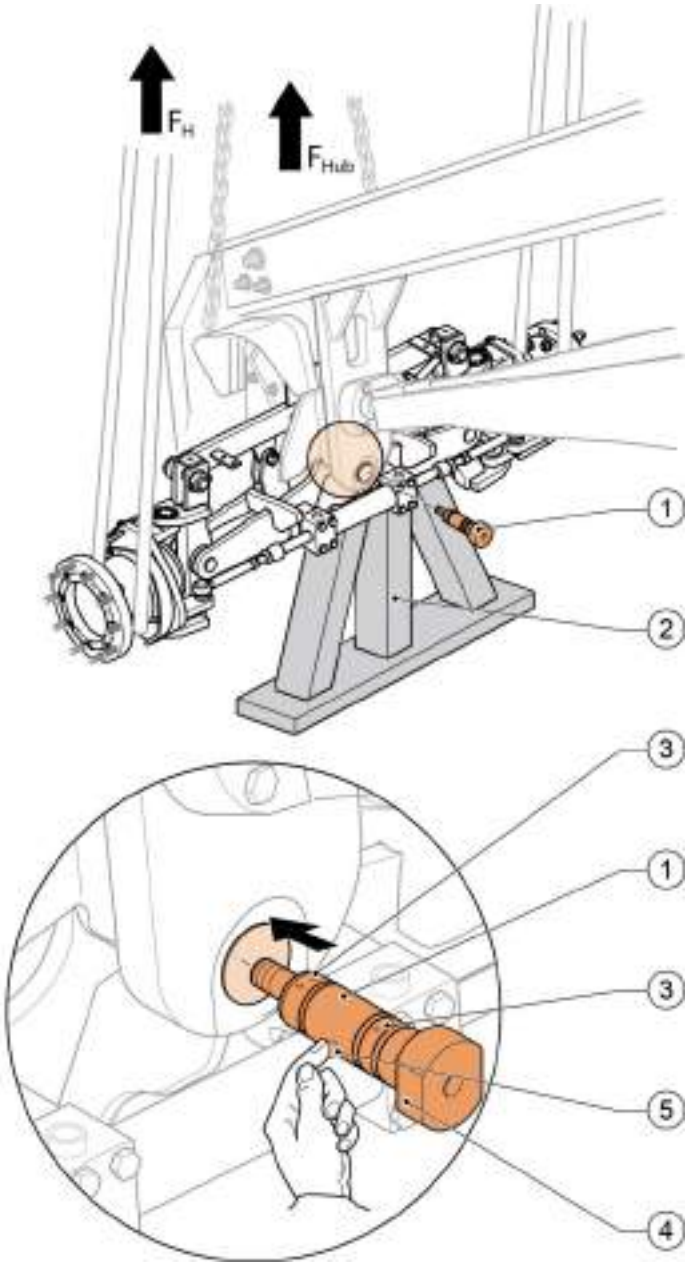


Fig. 233 Lubricate and insert axle

Step 6

Set the washer (3) on the axle (1).

Coat the hex nut (1) with Loctite 243 and screw onto the axle / bolts (2).
Use flat wrench to tighten.

Check to ensure that the axle can still oscillate.

Tools:

open-end wrench

BG 110 size: 65
BG 130 size: 65
BG 160 size: 65
BG 190 size: 65
BG 190 size: 65

Standardized parts: (1)

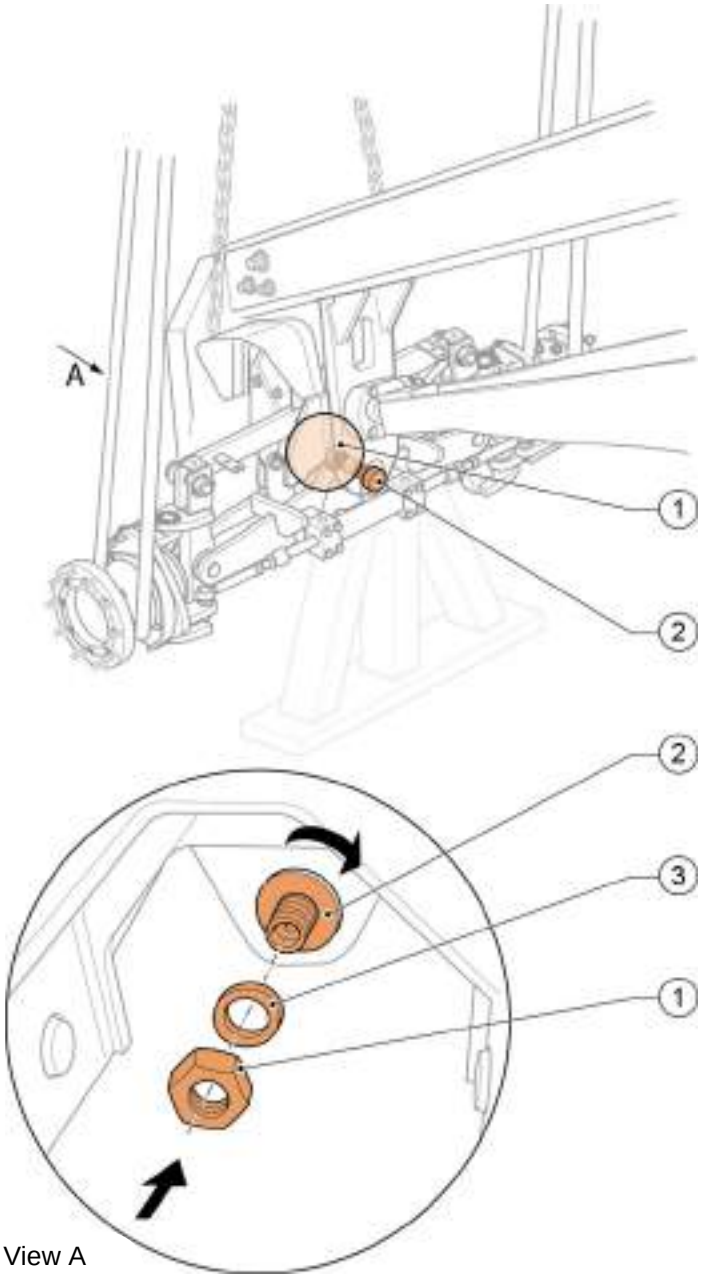
BG 110: nut M 42 X3-10 DIN 934
BG 130: nut M 42 X3-10 DIN 934
BG 160: nut M 42 X3-10 DIN 934
BG 190: nut M 42 X3-10 DIN 934
BG 240: nut M 42 X3-10 DIN 934

Starting torques: (1)

BG 110: M_T=100 Nm
BG 130: M_T=100 Nm
BG 160: M_T=100 Nm
BG 190: M_T=100 Nm
BG 240: M_T=100 Nm

Equipment:

Loctite 243



View A

Fig. 234 Screw nut to axle / bolts

NOTE

The bearing clearance (0.1 - 0.4 mm) results from the component tolerances.
Check oscillation after installation!

Step 7

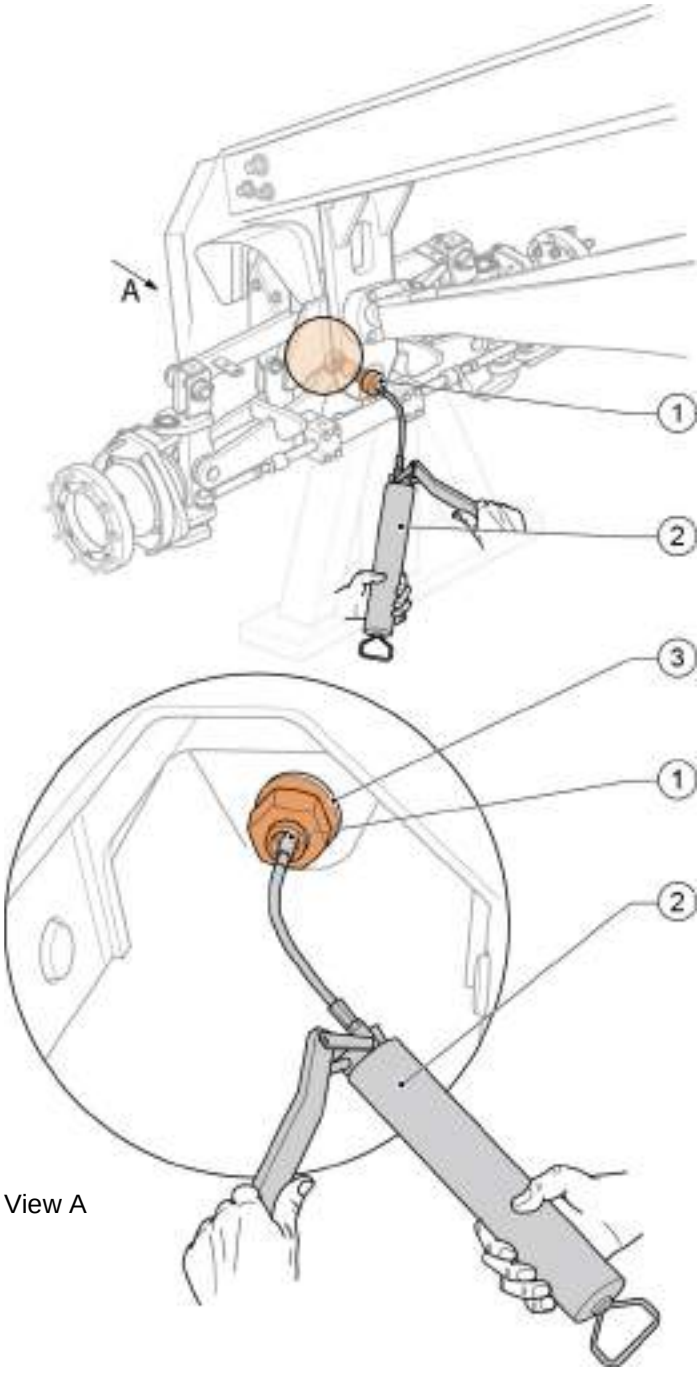
Push the round rings (3) over the gap between front frame and axle.

Use grease gun (2) on the grease fittings (1) and lubricate until grease leaks out at the round rings (3).

Remove the cable on the right and left wheel hubs.

Equipment:

grease gun,
lubricating grease



View A

Fig. 235 Position round rings - lubricate axle

Step 8

Use a flat wrench to remove the closure material on the hose connections.

Use flat wrench to mount all hose lines (2) to control block (3) and front frame (1).

Use flat wrench to mount all hose lines (2) to the steering cylinder (4) and camber cylinder.

Tools:

open-end wrench

BG 110 size: 19, 22, 24, 27, 30, 36
BG 130 size: 19, 22, 24, 27, 30, 36
BG 160 size: 19, 22, 24, 27, 30, 36
BG 190 size: 19, 22, 24, 27, 30, 36
BG 240 size: 19, 22, 24, 27, 30, 36

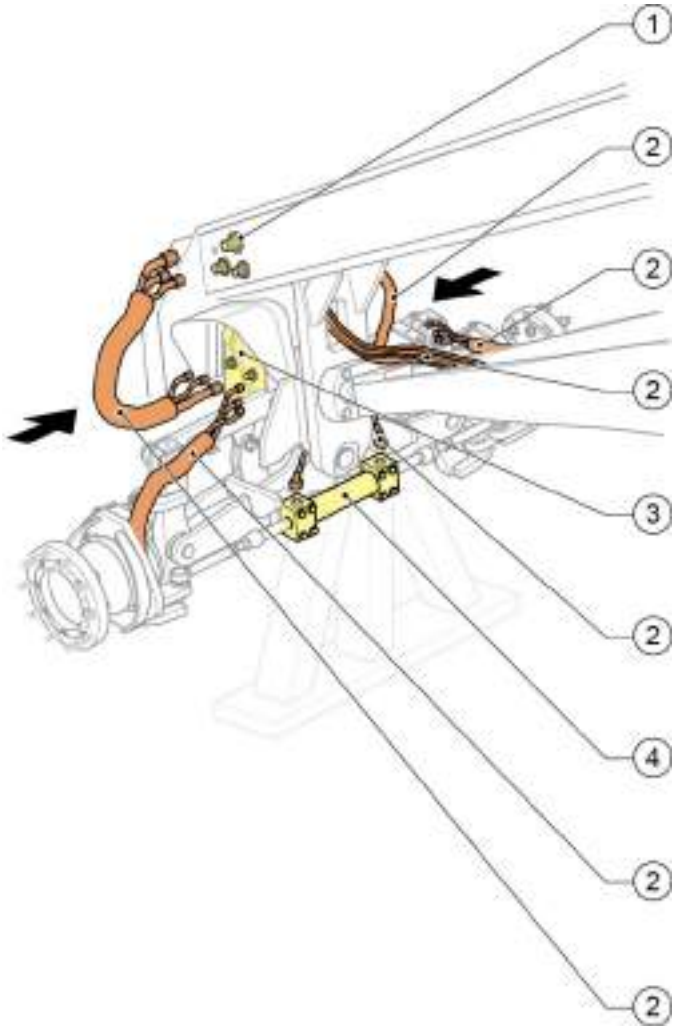


Fig. 236 Mount hose lines

Step 9

Place lamp carrier (1) on the front frame and hold.

Push line (2) plug x6.4 (4) through lateral hole in the front frame and plug into connection.

Insert plug x21 (5) from above to the connection.

Place lamp carrier (1) on plug opening in the front frame.

Use flat wrench to tighten all hex screws (3) on the lamp holder (1).

Tools:

open-end wrench

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

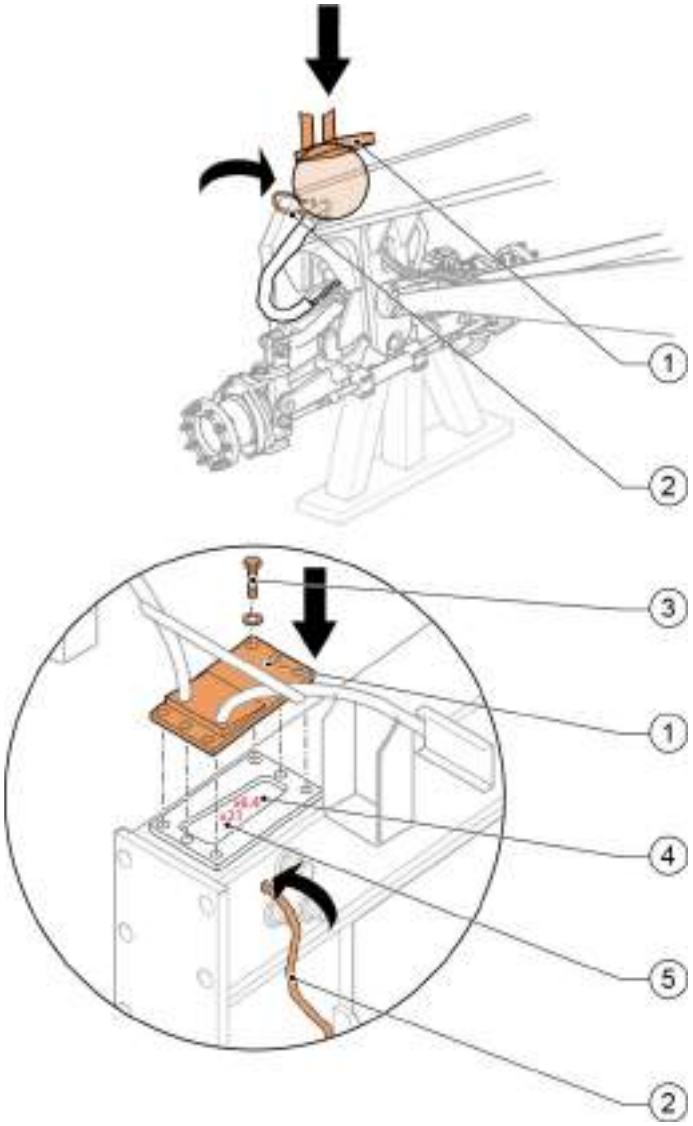


Fig. 237 Insert lamp carrier

Step 10

Secure suitable hitching gear on the dozer blade (2).

Set dozer blade (2) down on a horizontal surface using crane, place up against front frame (1) and align.

Fasten all hex screws (3) with nuts (4) on dozer blade (2) and front frame (1) with socket wrench.

Connect all hose lines to dozer blade with a flat wrench.

Tools:

open-end wrench

socket wrench

BG 110 size: 30
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: Screw M 20-10.8 (3)
BG 130: Screw M 20-10.8 (3)
BG 160: Screw M 20-10.8 (3)
BG 190: Screw M 20-10.8 (3))
BG 240: Screw M 20-10.8 (3)

BG 110: nut M 20 DIN 980 (4)
BG 130: nut M 20 DIN 980 (4)
BG 160: nut M 20 DIN 980 (4)
BG 190: nut M 20 DIN 980 (4)
BG 240: nut M 20 DIN 980 (4)

BG 110: tension disk 20 DIN 6796 (5)
BG 130: tension disk 20 DIN 6796 (5)
BG 160: tension disk 20 DIN 6796 (5)
BG 190: tension disk 20 DIN 6796 (5)
BG 240: tension disk 20 DIN 6796 (5)

BG 110: washer 21 DIN 6916 (6)
BG 130: washer 21 DIN 6916 (6)
BG 160: washer 21 DIN 6916 (6)
BG 190: washer 21 DIN 6916 (6)
BG 240: washer 21 DIN 6916 (6)

Starting torques: (3)

BG 110: M_T=580 Nm
BG 130: M_T=580 Nm
BG 160: M_T=580 Nm
BG 190: M_T=580 Nm
BG 240: M_T=580 Nm

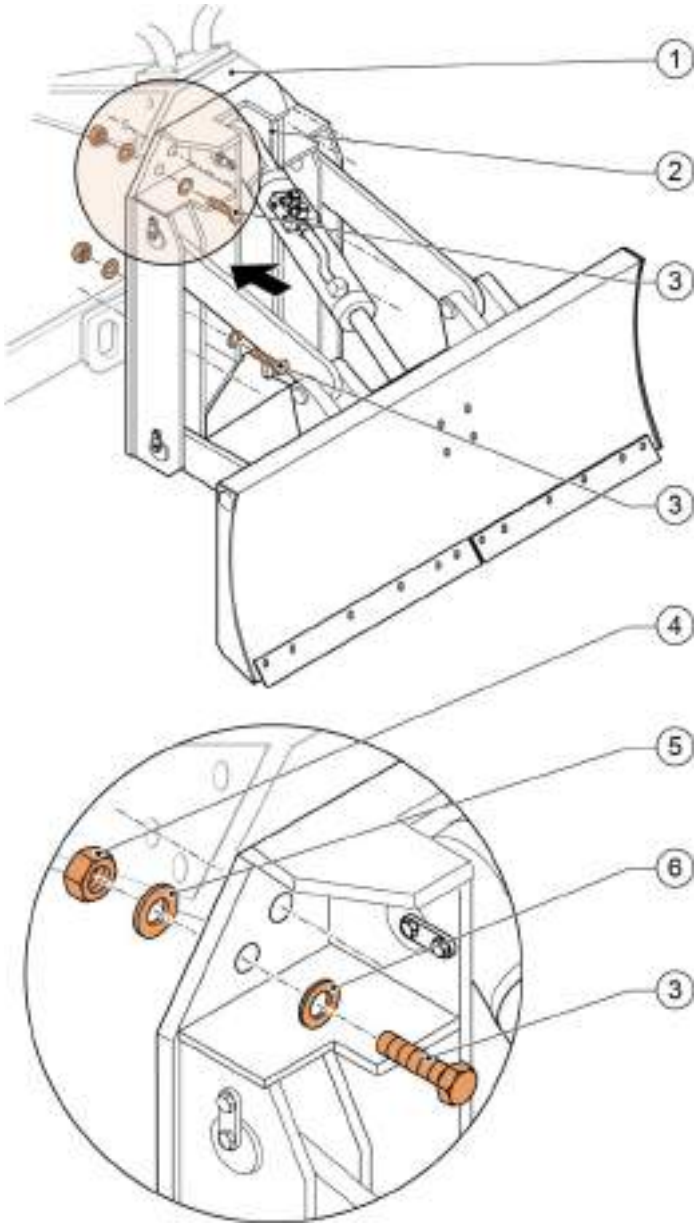


Fig. 238 Install dozer blade

Weight:

BG 110 764 kg
BG 130 995 kg
BG 160 764 kg
BG 190 948 kg
BG 240 1112 kg

Equipment:

crane, hitching gear

NOTE

Install washer (6) under the screw (3). The recess under the washer (6) must face towards the screw head (3).

Install spring washer (5) under the nut (4). The bulge of the washer (5) must face towards the nut (4).

NOTE

In BG 130 the dozer blade is installed on the plate. Mount plate and dozer blade together on the dozer blade.

DANGER

Old nuts and spring washers must not be reused!

Step 11

Secure the retainer (2) of both splash boards (1) with the hex screws (3) and the spring washer (4) on the front axle and screw tightly.

Tools:

open-end wrench

BG 110 size: 19
BG 130 size: 19
BG 160 size: 24
BG 190 size: 24
BG 240 size: 24

Standardized parts:

BG 110: Screw M 12-10.9 (3)
BG 130: Screw M 12-10.9 (3)
BG 160: Screw M 16-10.9 (3)
BG 190: Screw M 16-10.9 (3)
BG 240: Screw M 16-10.9 (3)

BG 110: tension disk 12 DIN 6796 (4)
BG 130: tension disk 12 DIN 6796 (4)
BG 160: tension disk 16 DIN 6796 (4)
BG 190: tension disk 16 DIN 6796 (4)
BG 240: tension disk 16 DIN 6796 (4)

Starting torques: (3)

BG 110: M_T=110 Nm
BG 130: M_T=110 Nm
BG 160: M_T=265 Nm
BG 190: M_T=265 Nm
BG 240: M_T=265 Nm

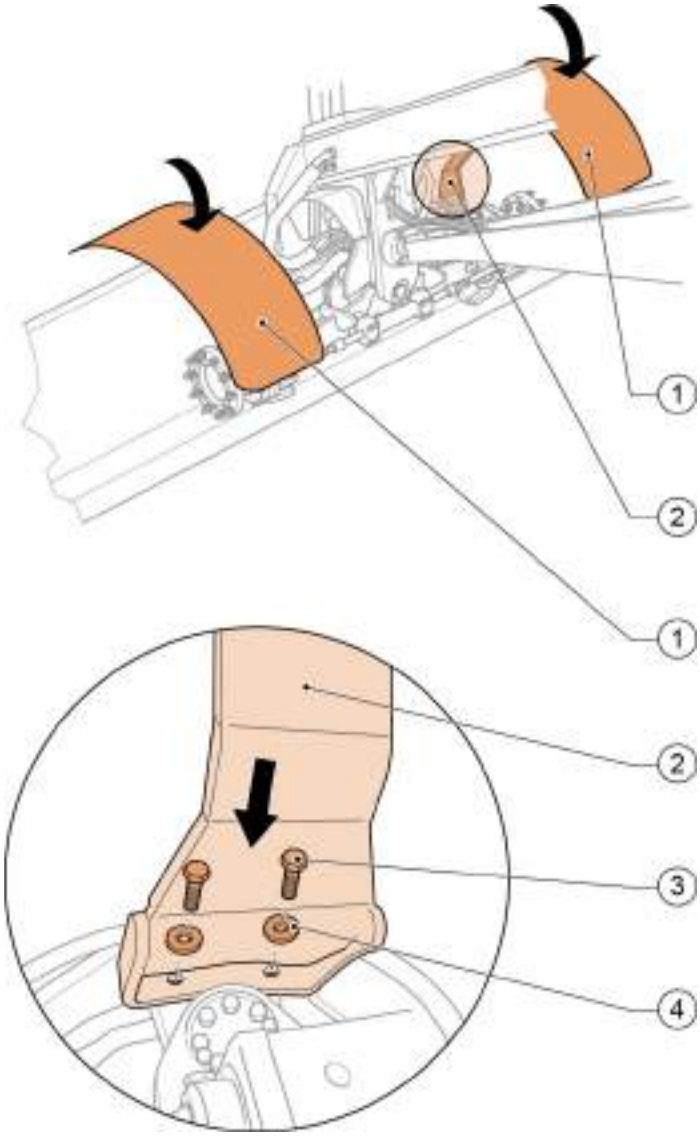


Fig. 239 Attach splash boards.

NOTE

Install washer (4) under the screw (3). The recess under the washer (4) must face towards the screw head (3).

With BG 190 splash boards, mount the adapter plate first.

⚠ DANGER

Old spring washers must not be reused!

Step 12a

Set the left (1) and right (2) front wheels on the wheel hubs.

For BG 190 and BG 240, screw 2x loading pin (4) opposing in the hub. Push front wheels on the loading pins.
Use pneumatic wrench to mount 8x wheel screws (8) each.

Remove loading pin and mount the remaining screws.

For BG 110, BG 130 and BG 160, place the front wheels on the wheel bolts (6).

Use pneumatic wrench to screw 10x wheel nuts (6) with lock washers (7) to the wheel bolts (6).

Tools:

pneumatic wrench + attachment

BG 110 size: 27
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: nut M 20x1,5 B20 AN 9512217 (5)
BG 130: nut M 22x1,5 B22 AN 538201024 (5)
BG 160: nut M 22x1,5 B22 AN 538201024 (5)

BG 190: screw M 22x1,5 B22 AN 9701500 (7)
BG 240: screw M 22x1,5 B22 AN 9701500(7)

Equipment:

cable, crane
guide mandrel: AN 4501569

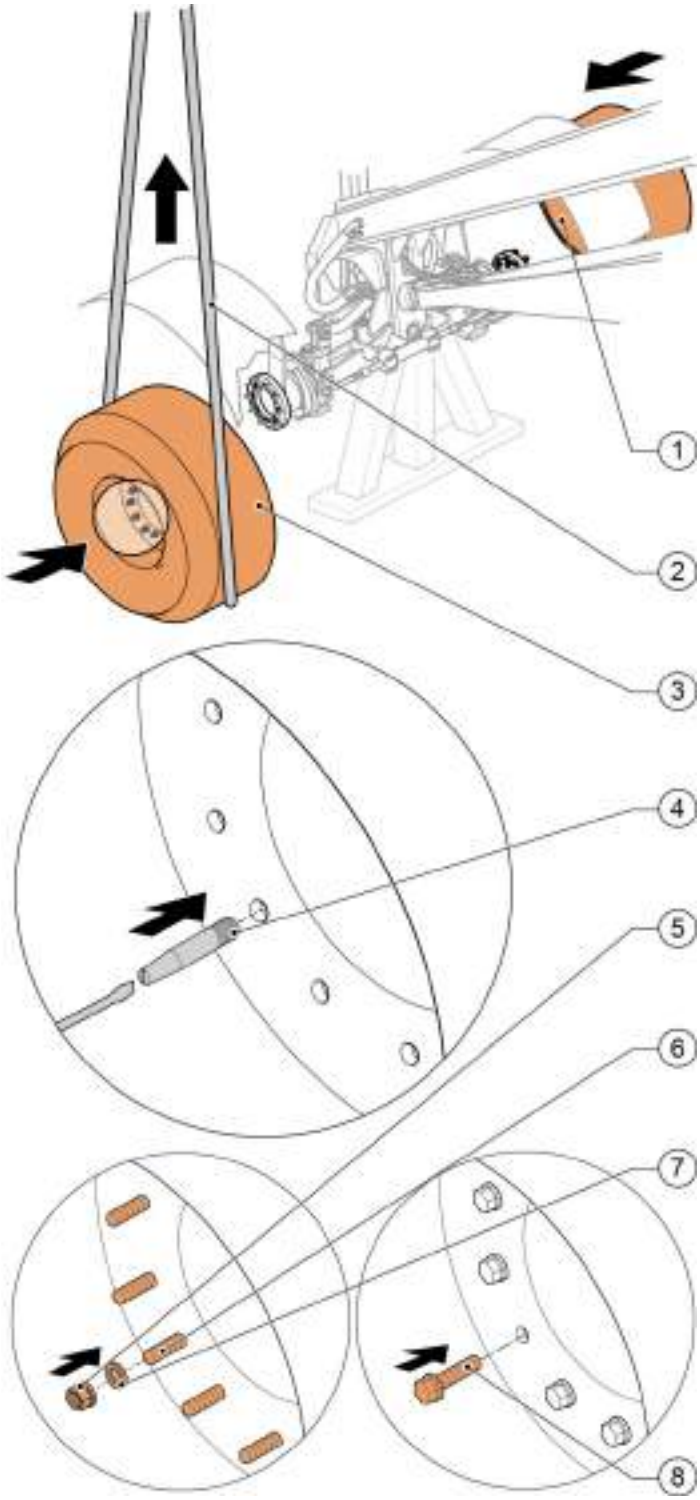


Fig. 240 Attach front wheels

DANGER

Old lock washers (7) must not be reused!

Step 13

Lift up the push blade and the blade. Lower the grader (1).

Use a torque wrench to retighten the wheel nuts / wheel bolts (4) of the right and left front wheels.

Perform a functional test.

Tools:

torque wrench

BG 110 size: 27
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Starting torques: (4)

BG 110: M_T=500 Nm
BG 130: M_T=550 Nm
BG 160: M_T=550 Nm
BG 190: M_T=550 Nm
BG 240: M_T=600 Nm

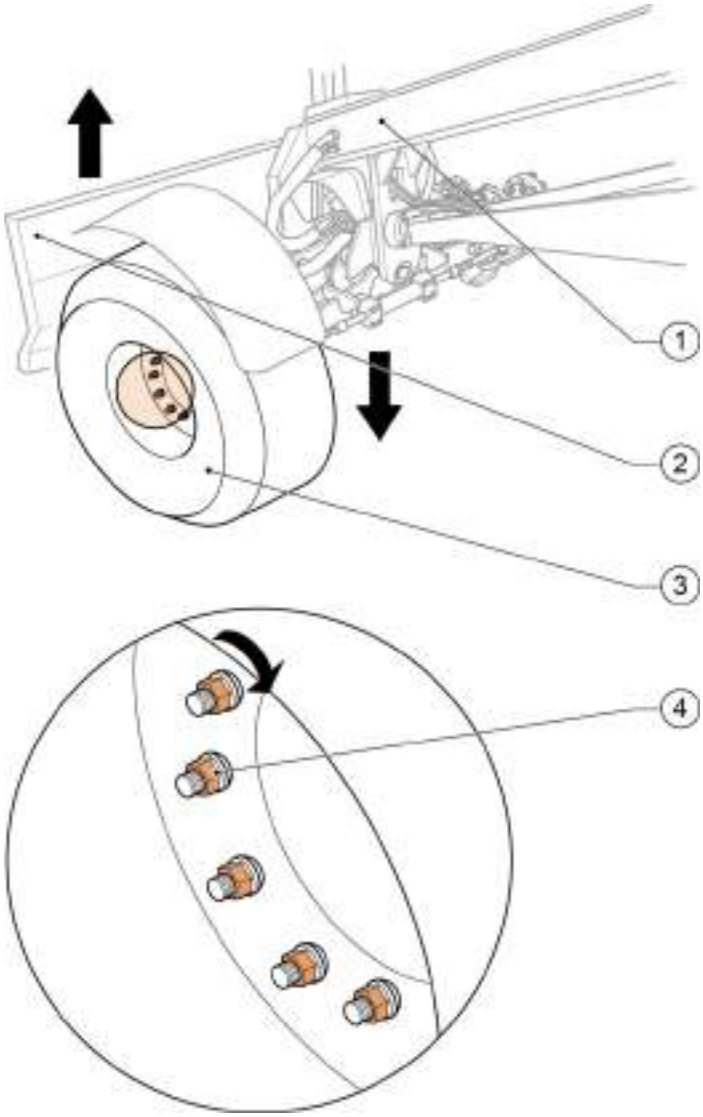


Fig. 241 Tighten wheel nuts of the front wheels

Step 14

Remove front axle shipping bolts
Remove the hinged pin (2) and pull out the pins (1) between the axle carrier (4) and the piston rod (3).

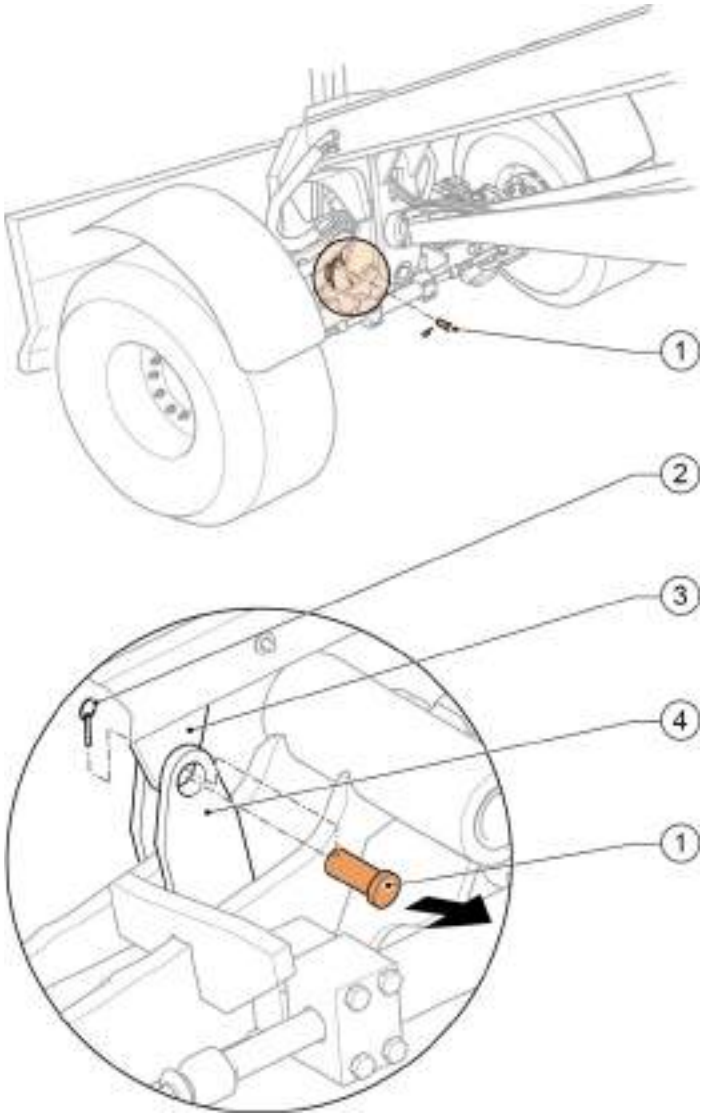


Fig. 242 Remove shipping bolts

NOTE
Put the shipping bolts and hinged pin back in the driver's cab.

5.8 Tandem axle assembly

5.8.1 Replacing planetary gear

5.8.1.1 Dismantle the tandem axle

Step 1

Set the grader on a stable surface.

Secure the grader with shipping clips.
On the **front axle**, connect the axle carrier (3) and the coupling rod (4) with pins (1) and secure the hinged pin (2).

On the **pivot joint**, connect the frame back part (9) and frame front part (8) with clip (7), pins (6) and hinged pin (10).

Move the rear mounted ripper upward to its end position.
Close the 2-way tap if the retention function is realized by the 2-way tap.

Prepare underlayment (wood beams) for the blade.

Lower the blade to the ground in order to prevent the grader from tipping sideways.

Equipment:

wooden beam

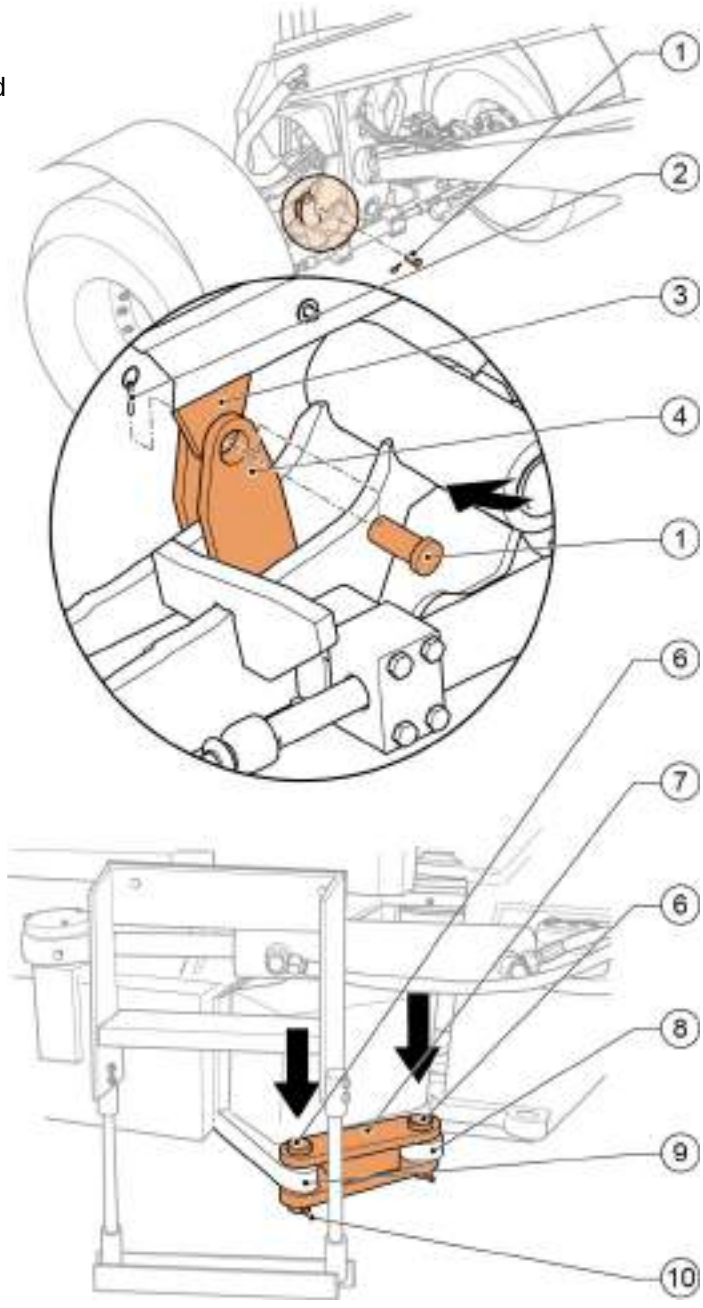


Fig. 243 Dismantle splash boards rear

NOTE
The shipping clips are installed by the plant for delivery condition. Store is a suitable location, e.g., in the driver's cab.

Step 2

Use a box wrench or open-ended wrench to loosen the hex screws (4) on the supports (2) of both splash boards (2) on the tandem axle.

Remove and set aside both splash boards (2).

Tools:

Box wrench or open-ended wrench

BG 110 size: 19
BG 130 size: 19
BG 160 size: 19
BG 190 size: 19
BG 240 size: 19

Standardized parts: (4)

BG 110: Screw M 12
BG 130: Screw M 12
BG 160: Screw M 12
BG 190: Screw M 12
BG 240: Screw M 12

Weight

BG 110: approx. 56 kg
BG 130: approx. 85 kg
BG 160: approx. 96 kg
BG 190: approx. 96 kg
BG 240: approx. 96 kg

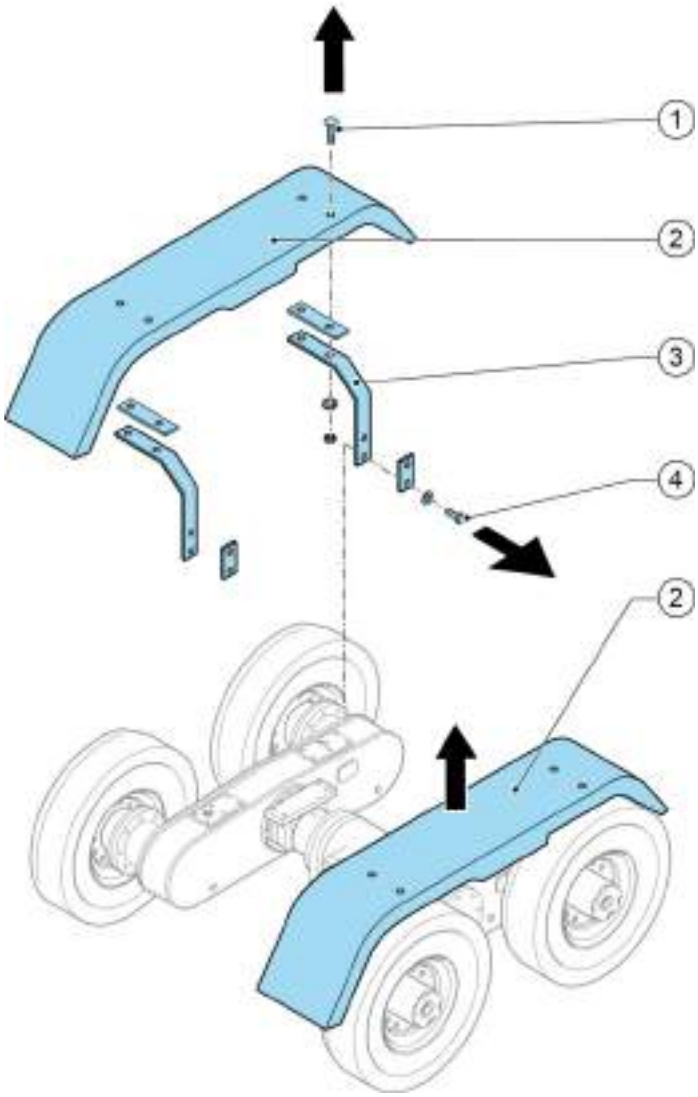


Fig. 244 Dismantle splash boards rear

Step 3

Use flat wrench to remove all brake hose lines (2) on the frame (1) on both sides and close the connections with closure material.

Tools:

open-end wrench

BG 110 size: 22
BG 130 size: 22
BG 160 size: 22
BG 190 size: 22
BG 240 size: 22

Closure material:

4x ROV 12 LX
4x VkA 12
4x M12 Lx

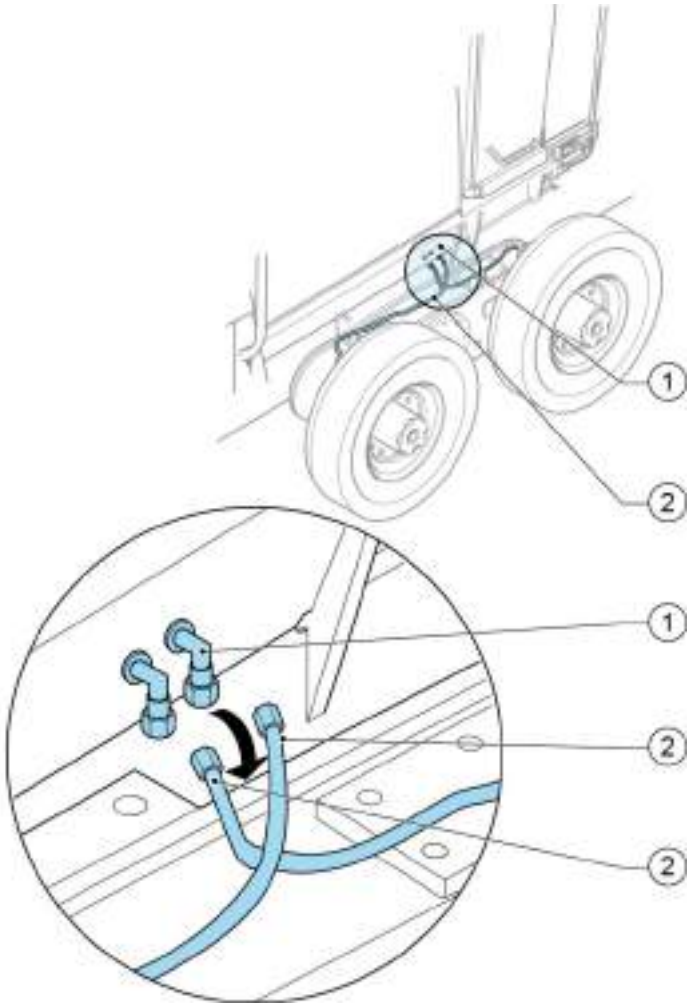


Fig. 245 Remove brake hose lines

Step 4

Use an Allen wrench to loosen the hex screws (3) for securing the drive shaft (2) on the differential (1).

Remove the drive shaft (2) from the differential gear (1) and secure against falling out. Secure with wire or cable binders on the oil hose.

Tools:

Hex wrench with extension and tensile force increase

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 8
BG 240 size: 8

Standardized parts: (3)

BG 110: Screw 3/8“-24 UNFx44-10.9
BG 130: Screw 3/8“-24 UNFx44-10.9
BG 160: Screw 3/8“-24 UNFx44-10.9
BG 190: Screw 3/8“-24 UNFx44-10.9
BG 240: Screw 1/2“-20 UNFx44-10.9

Starting torques: (3)

BG 110: M_T=65 Nm
BG 130: M_T=65 Nm
BG 160: M_T=62 Nm
BG 190: M_T=62 Nm
BG 240: M_T=135 Nm

Equipment:

wire, cable binder

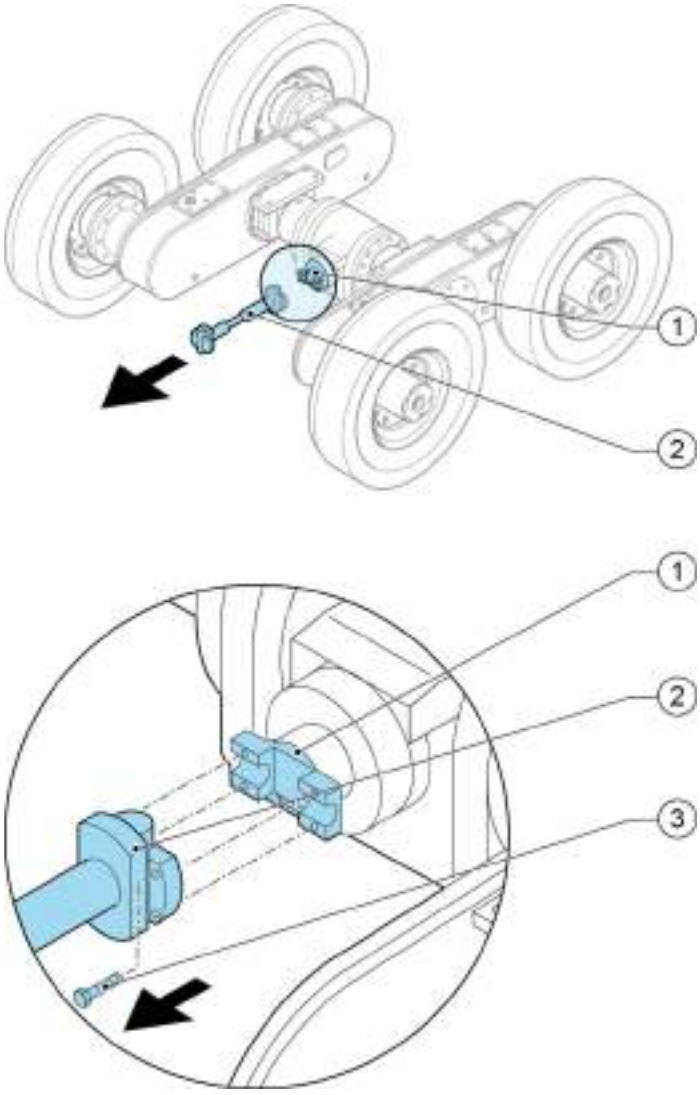


Fig. 246 Remove drive shaft from differential gear

Step 5

Underside of grader:
Use a wrench to loosen the hex screws (2) on the axle carrier (1) to the underside of the grader and remove with washer.

Tools:

Box wrench / bolt / impact wrench
or bolt / extension

BG 110 size: 30
BG 130 size: 36
BG 160 size: 36
BG 190 size: 36
BG 240 size: 36

Standardized parts: (2)

BG 110: Screw M20 ISO 4014
BG 130: Screw M24 ISO 4014
BG 160: Screw M24 ISO 4014
BG 190: Screw M24 ISO 4014
BG 240: Screw M24 DIN 933

Starting torques: (2)

BG 110: M_T=520 Nm
BG 130: M_T=1020 Nm
BG 160: M_T=1020 Nm
BG 190: M_T=1020 Nm
BG 240: M_T=950 Nm

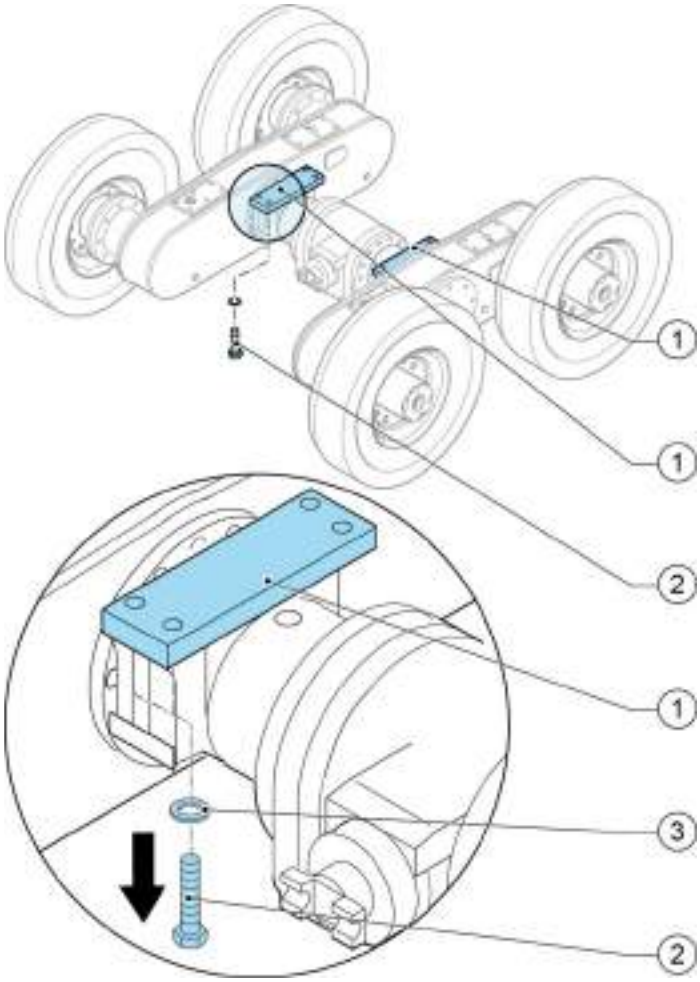


Fig. 247 Unscrew tandem axle from the grader

Step 6

Slightly lift up the grader on the back of the frame using a crane or sling.

Use flat wrench to loosen the connections (3) of the oil fill tube (1) on the tandem axle (2) and then pull out the oil fill tube (1).

Close the connections using closure material.

Tools:

open-end wrench

BG 110 size: 32, 36
BG 130 size: 32, 36
BG 160 size: 32, 36
BG 190 size: 32, 36
BG 240 size: 32, 36

BG 110 2 x pipe
BG 130 1 x pipe
BG 160 1 x pipe
BG 190 1 x pipe
BG 240 1 x pipe

Closure material

Plastic cap size 26x1.5
nut M18 LX
VkA 18 L

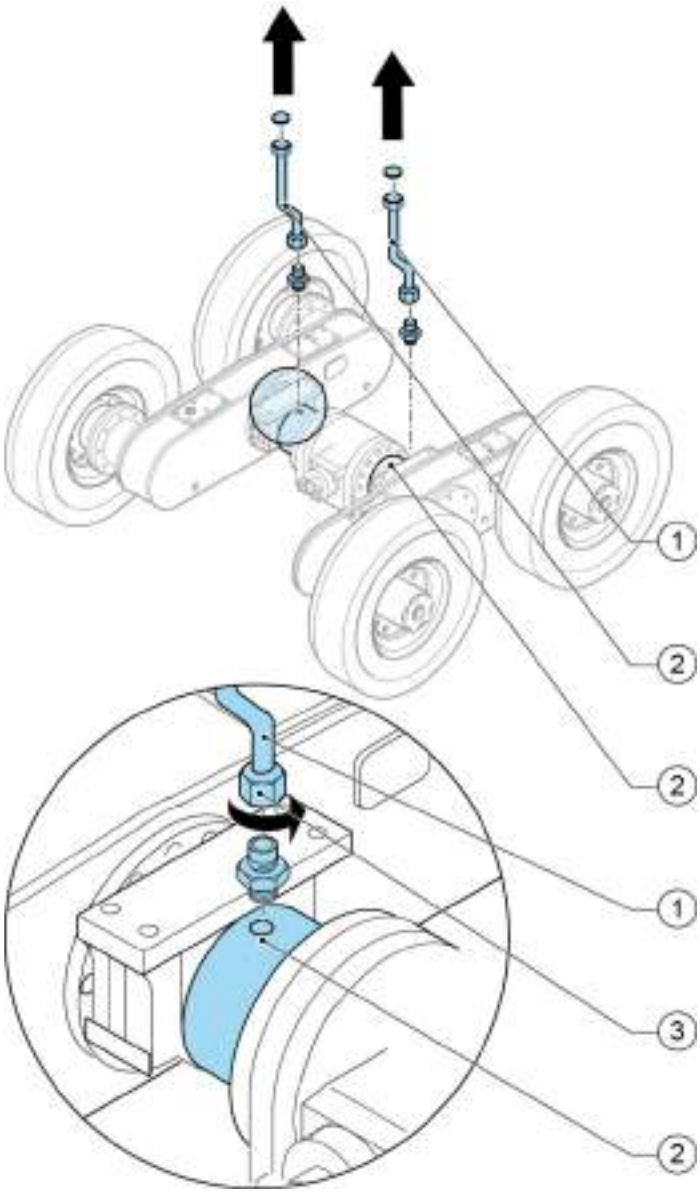


Fig. 248 Remove oil fill tube

Step 7

Use flat wrench to loosen the screwed connection (2) of the oil fill hose (1) on the tandem axle (3) and remove oil fill hose (1).

Close the connections using closure material.

Tools:

open-end wrench

BG 110 size: 36
BG 130 size: 36
BG 160 size: 36
BG 190 size: 36
BG 240 size: 36

Closure material

Plastic cap size 26x1.5, 30x1.5
nut M18 LX , M 22 LX
VkA 18 L, VkA 22 L

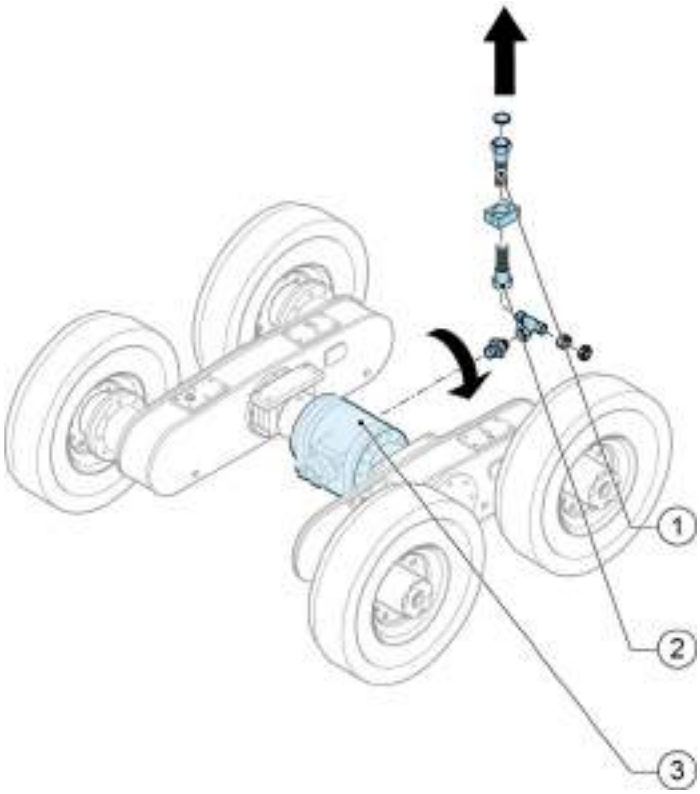


Fig. 249 Remove the oil fill hose

Step 8

Variation tandem axle toward back out:

Mount suitable sling (1) on the grader. Lift up the grader with lift apparatus until the tandem axle (3) moves freely.

Advance the tandem axle forward toward back under the grader.

Set the grader on metal supports (2) and wood beams.

Weight

BG 110: approx. 5100 kg
BG 130: approx. 6600 kg
BG 160: approx. 7600 kg
BG 190: approx. 9900 kg
BG 240: approx. 11000 kg

See weight point 3.6.4.

Equipment:

crane,
hitching gear,
metal supports
wooden beam

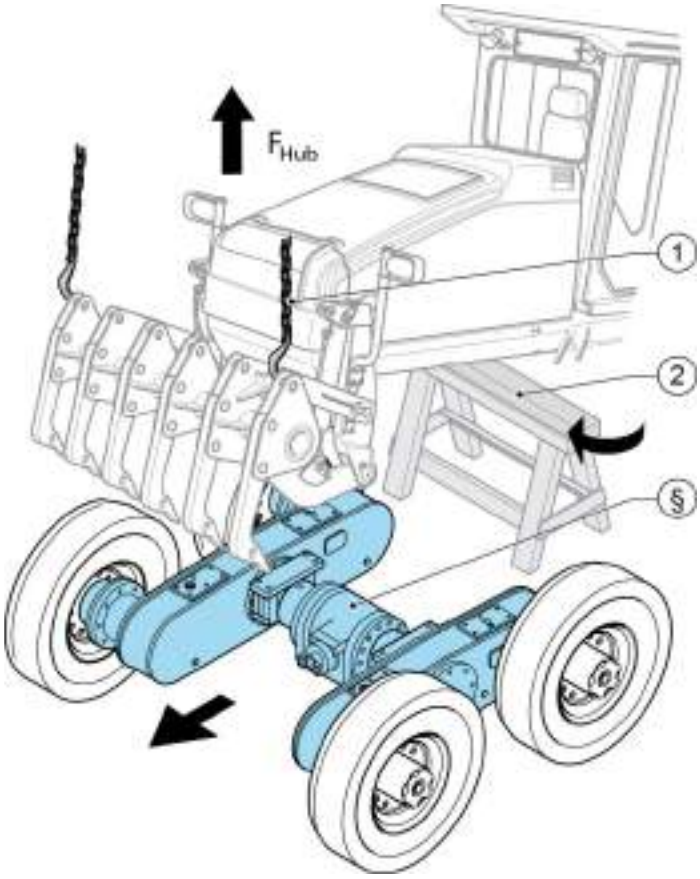


Fig. 250 Move tandem axle out downward

Step 9

Variant tandem axle out sideways:

Push metal supports (4) and wood beams under the grader to secure.

Dismantle all rear wheels before step 5.
Dismantle the rear wheels, see step 11.

Put sling (1) on the wheel heads on the tandem axle (2).

Set down tandem axle (2) on jack lift (3) or forklift.

Move tandem axle (2) sideways out of the grader.

Weight

BG 110: approx. 1400 kg
BG 130: approx. 2220 kg
BG 160: approx. 2240 kg
BG 190: approx. 2250 kg
BG 240: approx. 2300 kg

Equipment:

crane,
cables,
jack lift or forklift
metal supports,
wooden beam

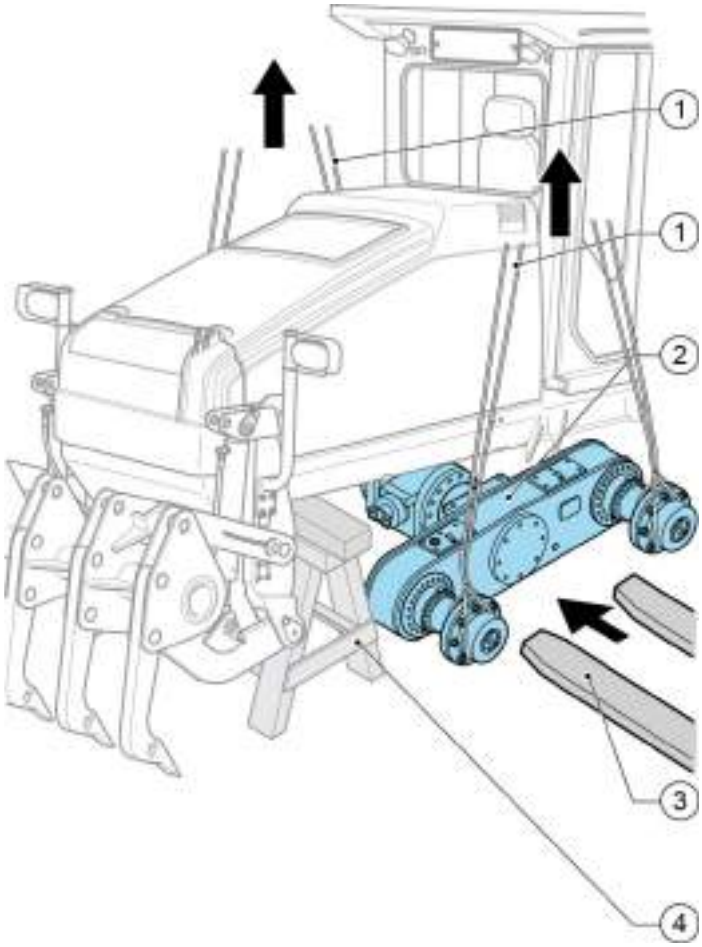


Fig. 251 Move tandem axle sideways out of the grader.

Step 10

On the right and left (1) axle carrier of the differential gear, screw on 2 ring bolts (2) each in the holes using a washer and a hex nut

or

Suspend 4x hook chains (3) in the front holes.

Weight without filling:

BG 110: approx. 1350 kg
BG 130: approx. 2220 kg
BG 160: approx. 2240 kg
BG 190: approx. 2250 kg
BG 240: approx. 2300 kg

Equipment:

4x ring bolts with nut from M16 (2)

4 hook chains

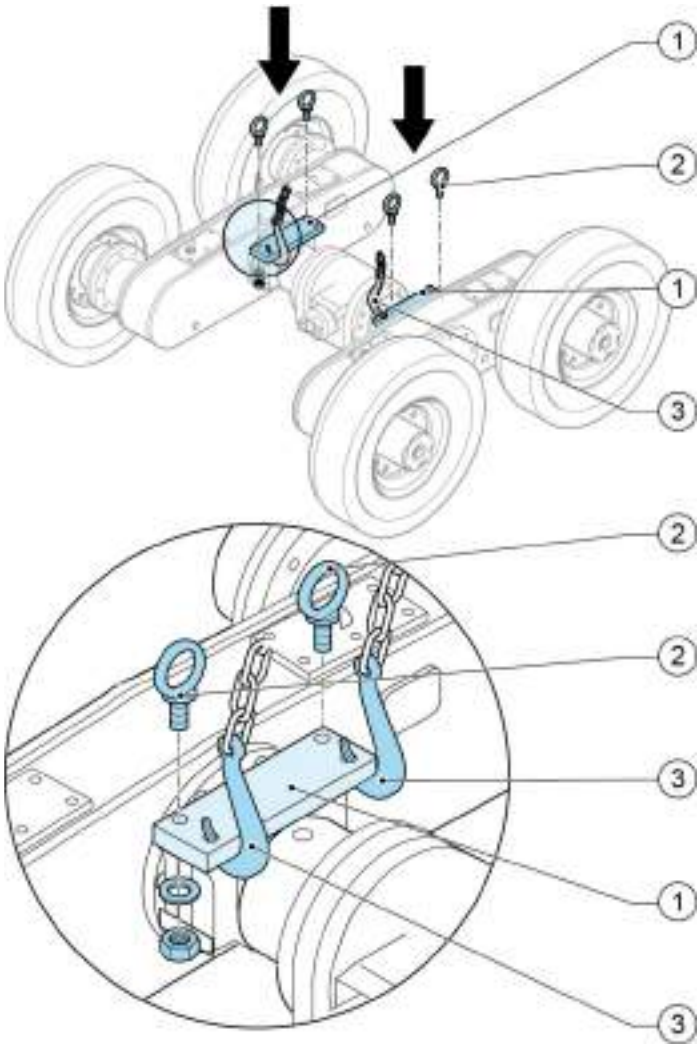


Fig. 252 Eye bolts on the differential gear

Step 11

Suspend suitable hitching gear (1) from ring bolts.

For the BG 190 and BG 240, loosen two opposing wheel screws (3) and mount loading pin (4) at the point of both wheel bolts.

Use a pneumatic wrench to unloosen, but not remove, the remaining wheel screws (3) to all rear wheels (2).

For BG 110, BG 130 and BG 160, use a pneumatic wrench to unloosen, but not yet remove, all wheel nuts (6) on the wheel bolts (5).

Tools:

pneumatic wrench + attachment

BG 110 size: 27
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Weight with wheels:

BG 110: approx. 1820 kg
BG 130: approx. 2800 kg
BG 160: approx. 2820 kg
BG 190: approx. 3090 kg
BG 240: approx. 4290 kg

Equipment:

crane,
hitching gear

guide mandrel: AN 4501569

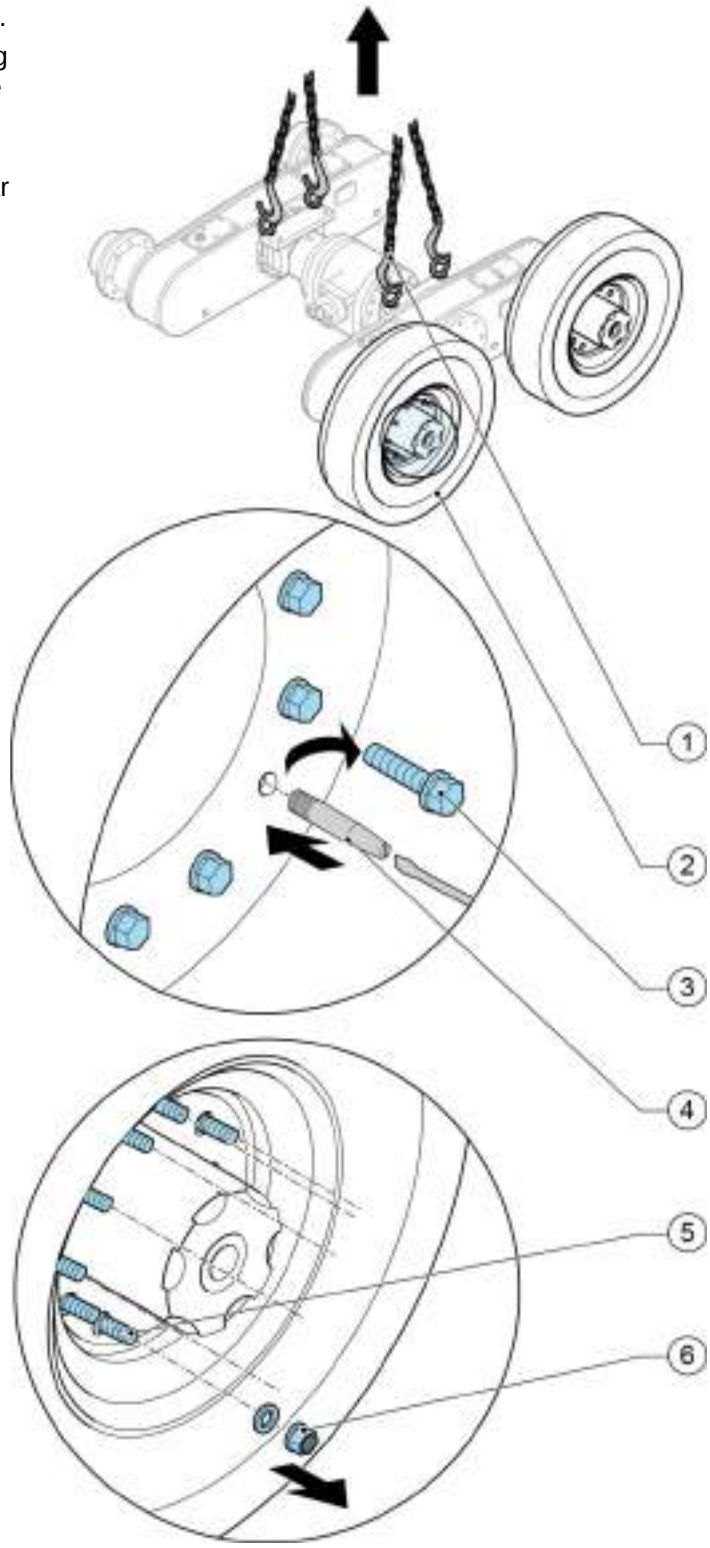


Fig. 253 Loosen wheel nuts / wheel bolts on rear wheels

Step 12

Slightly lift tandem axle (1) with crane.
Push metal supports (2) under the tandem axle (1). Place wood beams (5) on the metal supports (2) and set tandem axle (1) on them.

Sling cables (3) around each rear wheel (4).

For BG 190 and BG 240, dismantle all wheel screws and pull off the rear wheels (4) from the planetary gears over the loading pins and use a crane to set aside.

For BG 110, BG 130 and BG 160, dismantle all wheel nuts and washers and use a crane to set the rear wheels aside.

Weight

BG 110: approx. 1820 kg
BG 130: approx. 2800 kg
BG 160: approx. 2820 kg
BG 190: approx. 3090 kg
BG 240: approx. 4290 kg

Equipment:

metal supports,
wooden beam,
hitching gear,
crane

guide mandrel: AN 4501569

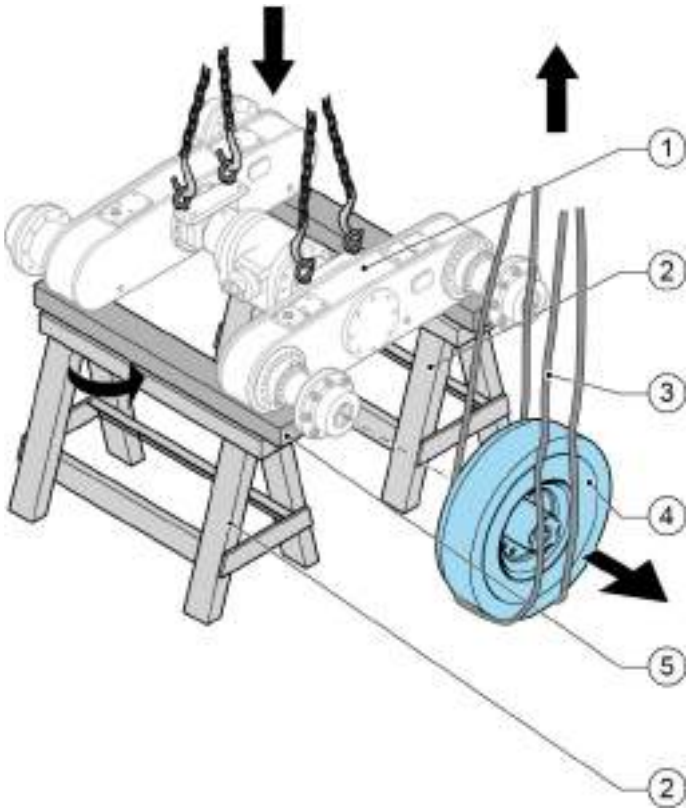


Fig. 254 Dismantle rear wheels

5.8.1.2 Dismounting the wheel heads

Step 1

Set oil pan (3) under the tandem axle as the runout points.

Use hex wrench to open all lock screws (1) on the tandem axle (4) and drain oil.

Do **NOT** open the lock screws on the planetary gear (2)!

Tools:

hex wrench

BG 110 size: 12
BG 130 size: 12
BG 160 size: 12
BG 190 size: 12
BG 240 size: 12

Standardized parts: (1)

BG 110: Screw M 24x1,5 DIN 908
BG 130: Screw M 24x1,5 DIN 908
BG 160: Screw M 24x1,5 DIN 908
BG 190: Screw M 24x1,5 DIN 908
BG 240: Screw M 24x1,5 DIN 908

Equipment:

oil pan

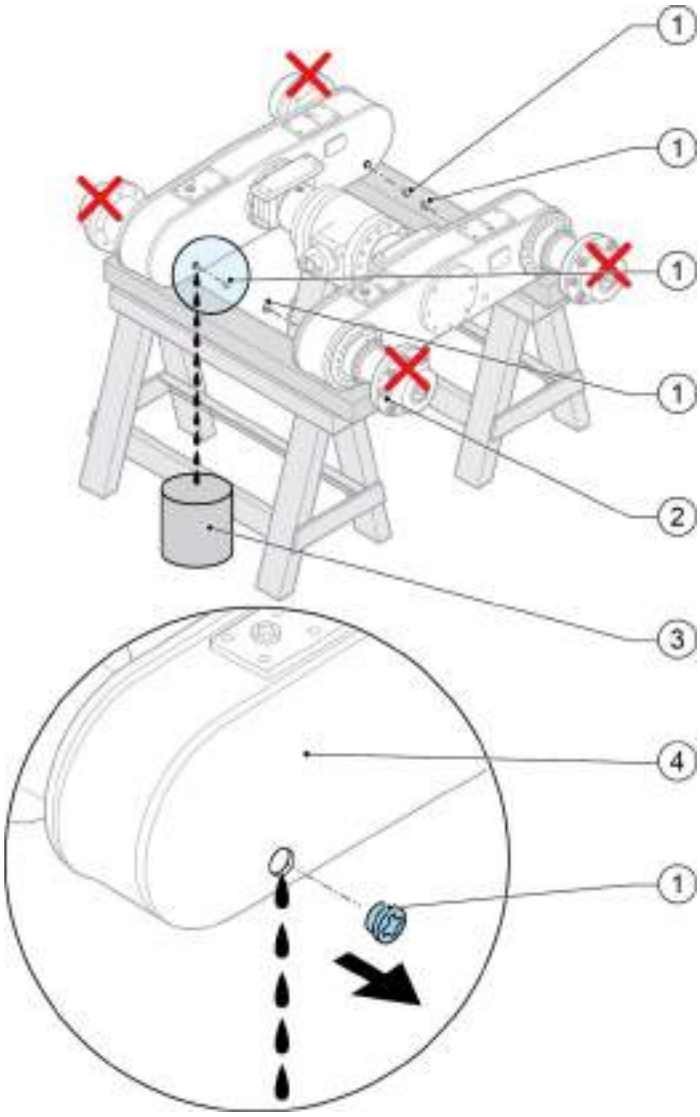


Fig. 255 Drain oil from tandem axle

Step 2

Use box wrench to loosen all hex screws (1).

Remove all covers (2) from the tandem axle (3).

The contact surface is sealed with Atmosit compact.

Tools:

box spanner

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Standardized parts: (1)

BG 110: Screw M8-10.9 DIN 933
BG 130: Screw M8-8.8 DIN 933
BG 160: Screw M8-8.8 DIN 933
BG 190: Screw M8-8.8 DIN 933
BG 240: Screw M8-8.8 DIN 933

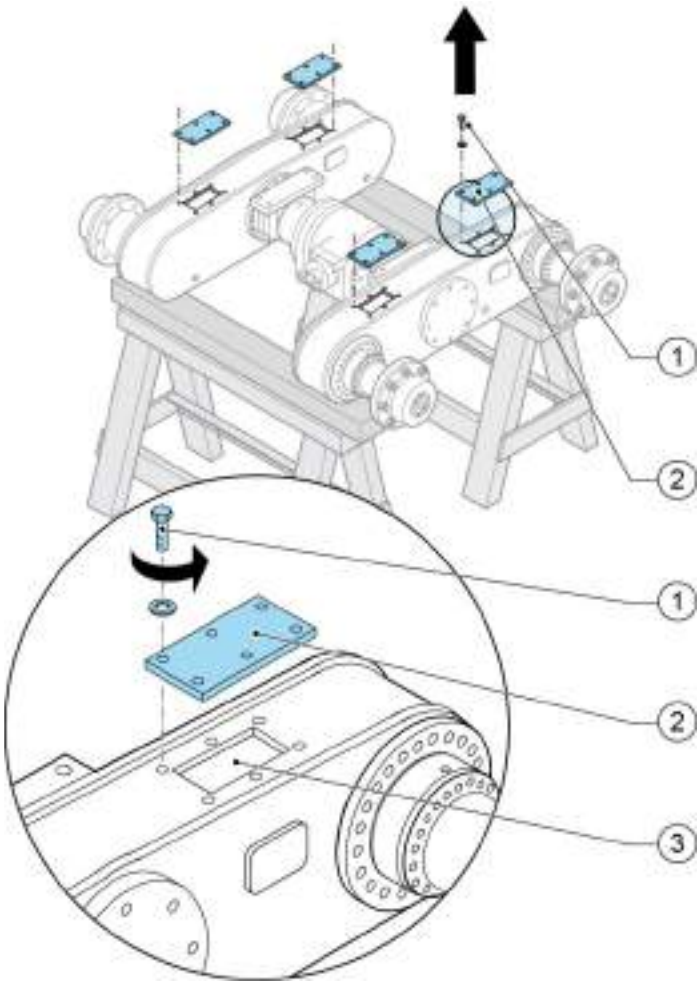


Fig. 256 Loosen cover nut from the tandem axle.

Step 3

Use hex wrench to loosen all hexagon screws (4).

Remove protective plates (1) over the brake line (2) connections on the planetary gear.

Tools:

Hex wrench + ratchet

BG 110 size: 19
BG 130 size: 24, 26
BG 160 size: 24, 26
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: Screw M 12-10.9 DIN 933 (4)
BG 130: Screw M 16-10.9 DIN 933 (4)
BG 160: Screw M 16-10.9 DIN 933 (4)
BG 190: Screw M 20-10.9 DIN 933 (4)
BG 240: Screw M 20-10.9 DIN 933 (4)

BG 110: spacer washer (3)
BG 130: spacer washer (3)
BG 160: spacer washer (3)
BG 190: spacer washer (3)
BG 240: spacer washer (3)

BG 190: tension disk (5)

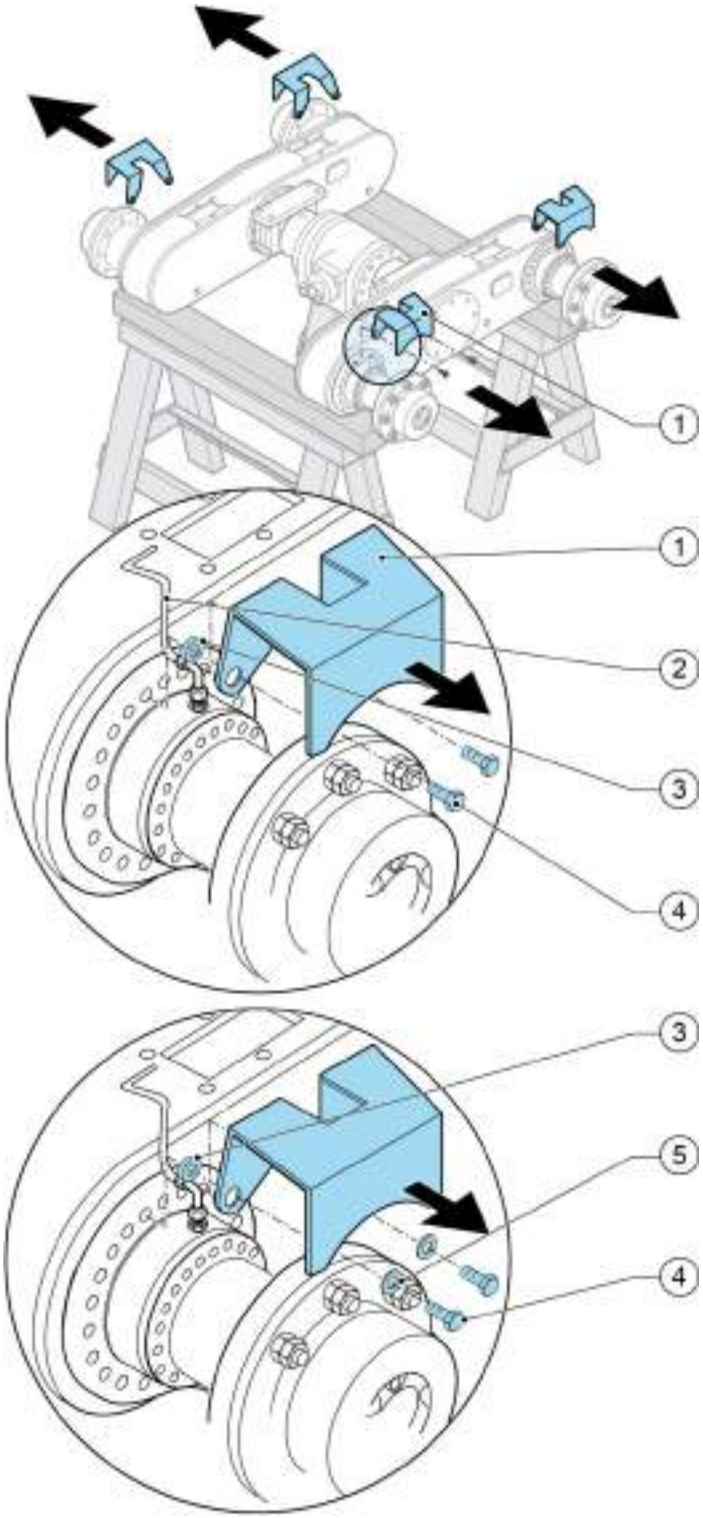


Fig. 257 Dismantle protective plates on the planetary gear

Step 4

Use a marking pen (3) to note the position of the brake lines (1) on the tandem housing for the assembly.

Use flat wrench to remove all brake lines (1) on the planetary gears (2) and close the connections with closure material.

Tools:

open-end wrench

BG 110 size: 17
BG 130 size: 19
BG 160 size: 19
BG 190 size: 19
BG 240 size: 19

Closure material:

4x ROV 12 LX
4x VkA 12
4x M12 Lx

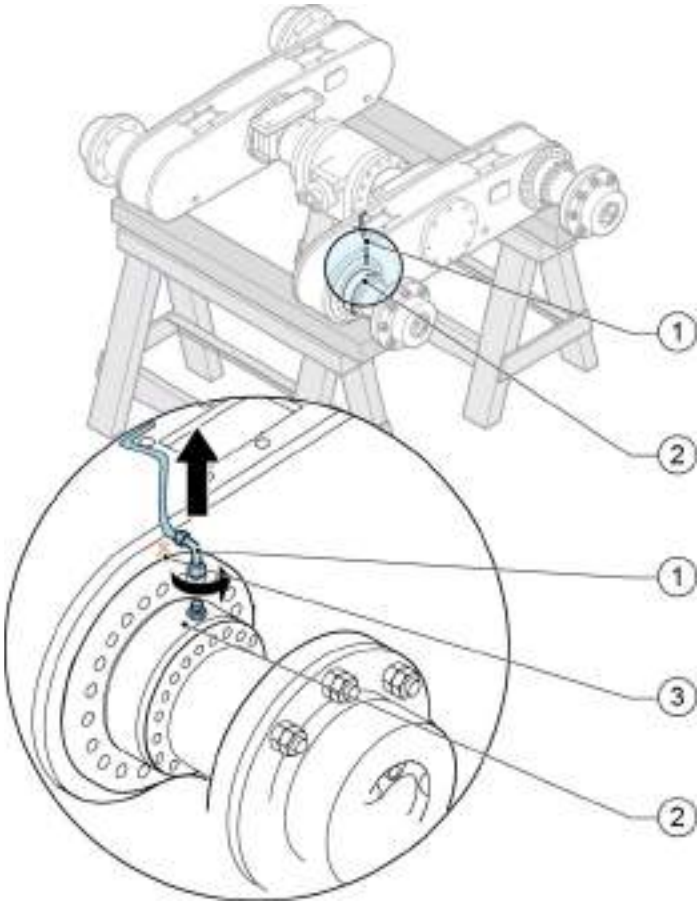


Fig. 258 Remove the brake line hose on the planetary gear

NOTE

Mark the position of the connections of the brake line (1) on the tandem housing.

Step 5

Secure chain wheels (3) in the tandem housing from slipping out. Clamp above suitable crowbar (1) or wood between chain and opening (2).

Equipment:

crowbar,
wood

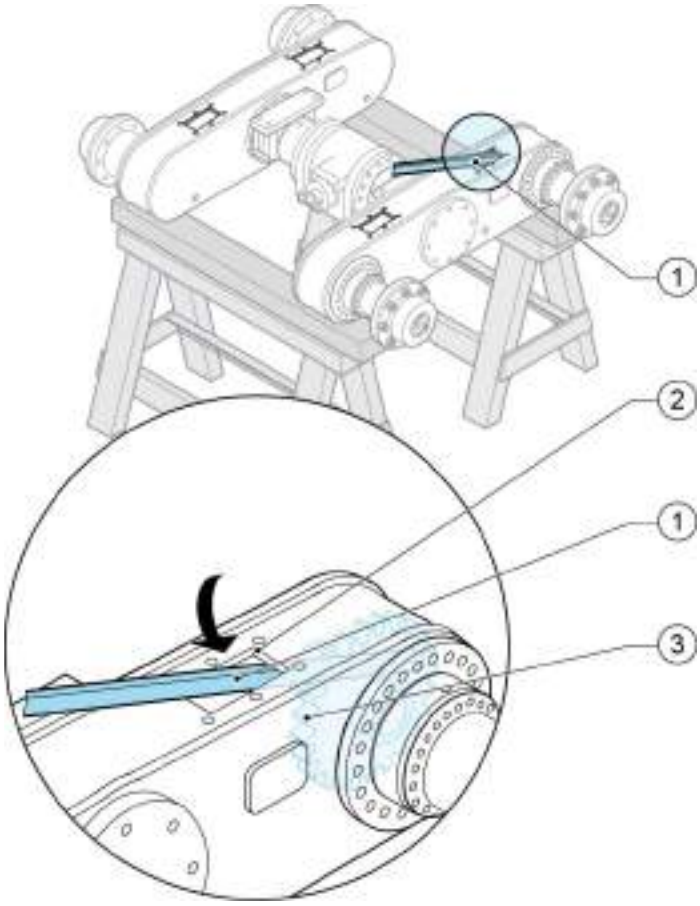


Fig. 259 Secure chain wheels from slipping out

Step 6

Place a cable (1) loop around the wheel heads (3) and secure.
Use the crane to slightly tighten the cable (1).

Use a box wrench to loosen all of the hex screws (2) on the flange (4) for the tandem housing.

Tools:

box wrench + ratchet,
crescent wrench.
socket wrench
torque wrench

BG 110 size: 19
BG 130 sizes: 24, 26
BG 160 sizes: 24, 26
BG 190 size: 30
BG 190 size: 30

Standardized parts:

BG 110: Screw M 12-10.9 DIN 933 (6)
BG 130: Screw M 16-10.9 DIN 933 (6)
BG 160: Screw M 16-10.9 DIN 933 (6)
BG 190: Screw M 20-10.9 DIN 933 (6)
BG 240: Screw M 20-10.9 DIN 933 (6)

Weight

BG 110: approx. 146 kg
BG 130: approx. 215 kg
BG 160: approx. 215 kg
BG 190: approx. 260 kg
BG 240: approx. 260 kg

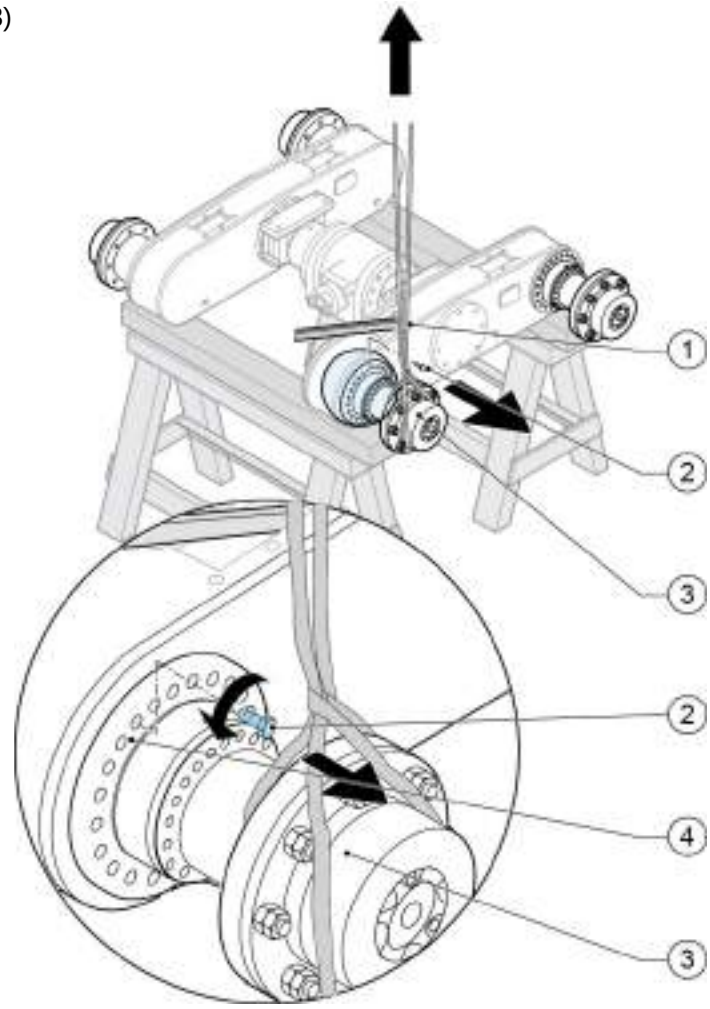


Fig. 260 Loosen hex screws on the flange

Step 7

Evenly screw in 3x hex screws (1) in the flange (3) and thus push the wheel head (2) from the tandem housing (4).

Pull the wheel head (2) from the gearing. In the process, ensure that the chain wheel is not pulled out of the tandem housing in the process!

Use the crane to set the wheel heads (1) aside.

Tools:

Hex wrench + ratchet

BG 110 size: 19
BG 130 sizes: 24, 26
BG 160 sizes: 24, 26
BG 190 size: 30
BG 240 size: 30

Standardized parts: (1)

BG 110: Screw M 12
BG 130: Screw M 16
BG 160: Screw M 16
BG 190: Screw M 20
BG 240: Screw M 20

Equipment:

crane,
hitching gear,
crowbar

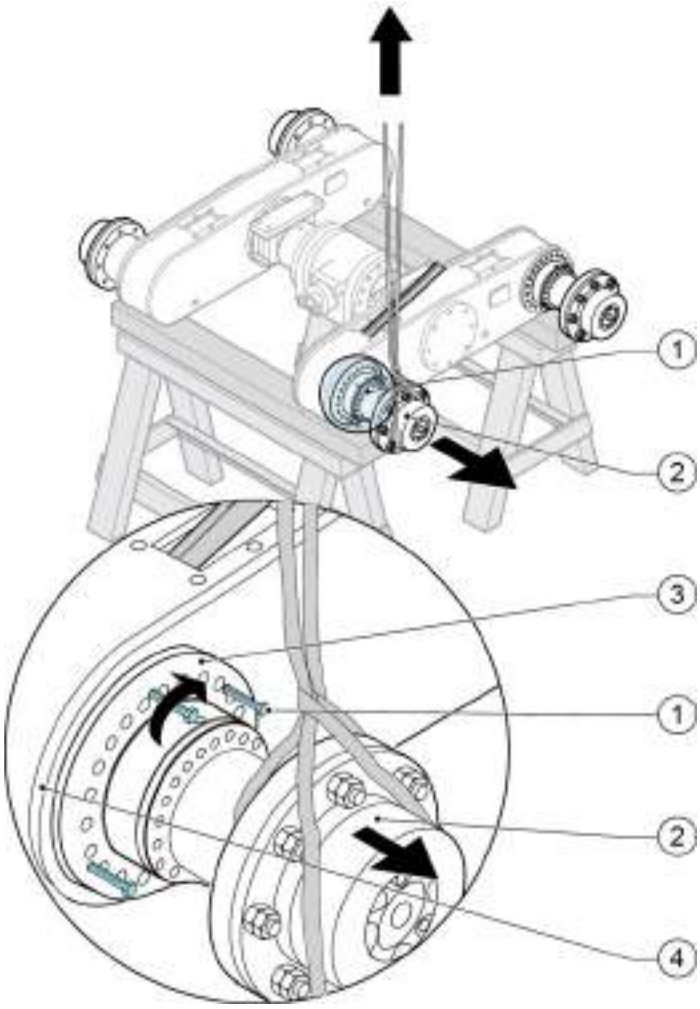


Fig. 261 Loosen wheel heads with screws from the tandem housing

5.8.1.3 Dismounting planetary gear from the flange

Step 1

Use a torque wrench to loosen all of the hex screws (3) on the intermediate flange (2) to the planetary gear.

Use crowbar (4) to lift apart intermediate flange (2) and the planetary gear (1).

Tools:

box wrench, crescent wrench. socket wrench
crowbar,
screwdriver

BG 110 sizes: 24, 26
BG 130 sizes: 24, 26
BG 160 sizes: 24, 26
BG 190 size: 30
BG 240 size: 30

Standardized parts: (1)

BG 110: Screw M 16-10.09
BG 130: Screw M 16-10.09 ISO 4014
BG 160: Screw M 16-10.09 ISO 4014
BG 190: Screw M 20-10.09 DIN 933
BG 240: Screw M 20-10.09 DIN 933

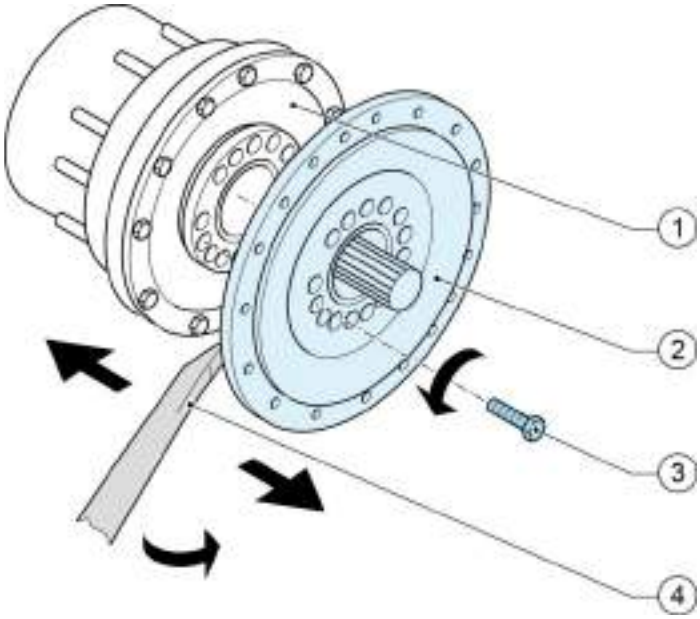


Fig. 262 Loosen intermediate flange from the planetary gear

NOTE

For BG 190 and BG 240, there is no intermediate flange (2). Screw the wheel head directly on the tandem housing.

5.8.1.4 Assemble planetary gear on flange

Step 1a **BG 110**

Clean all contact surfaces on the flange (3) and on the planetary gear (1) with brake cleaner.

Knock 2 cotter pins (2) each into the planetary gear (1).

Affix the round ring (3) with lubricating grease**.**

Apply sealant on all contact surfaces on the intermediate flange (4) and on the planetary gear (1).

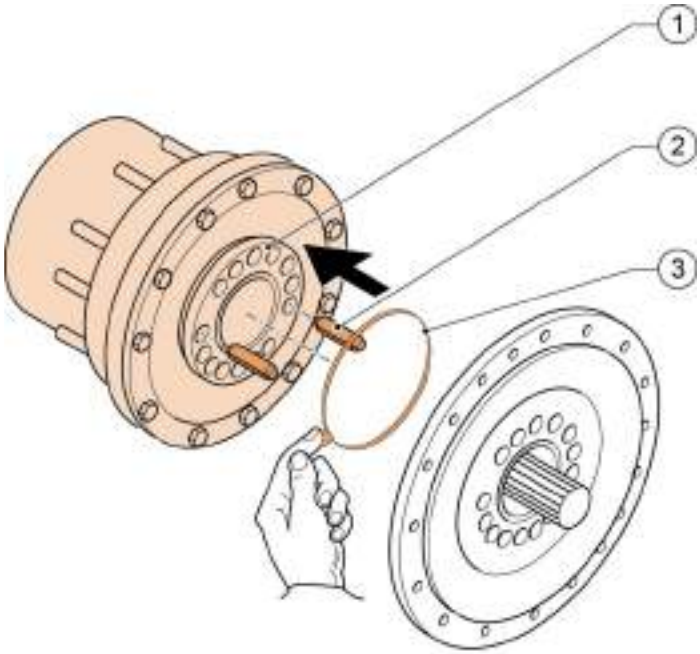
Tools:
hammer

BG 110 size: 24, 26

O-ring 140x3 (3)

Equipment:
lubricating grease,
Atmosit or similar sealant.

brake cleaner or similar,
putty,
rag



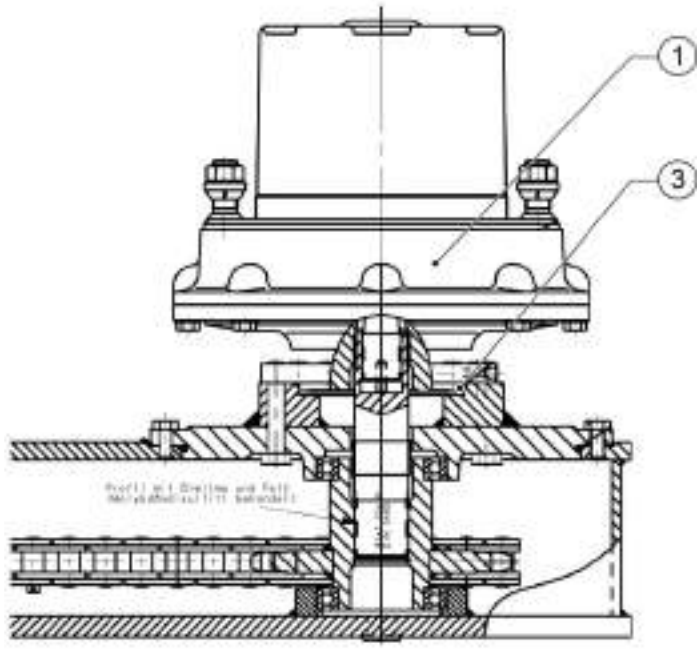


Fig. 263 Cotter pins in planetary gear - BG 110

See drawing 2701520.

Step 1b **BG 130 / BG 160**

Clean all contact surfaces on the flange (3) and on the planetary gear (1) with brake cleaner.

Knock 2 cotter pins (2) each into the planetary gear (1).

Apply sealant on all contact surfaces on the intermediate flange (4) and on the planetary gear (1).

Tools:
hammer

BG 130 size: 24, 26
BG 160 size: 24, 26

Equipment:
lubricating grease,
Atmosit or similar sealant.

brake cleaner or similar,
putty,
rag

See drawing 3001550.

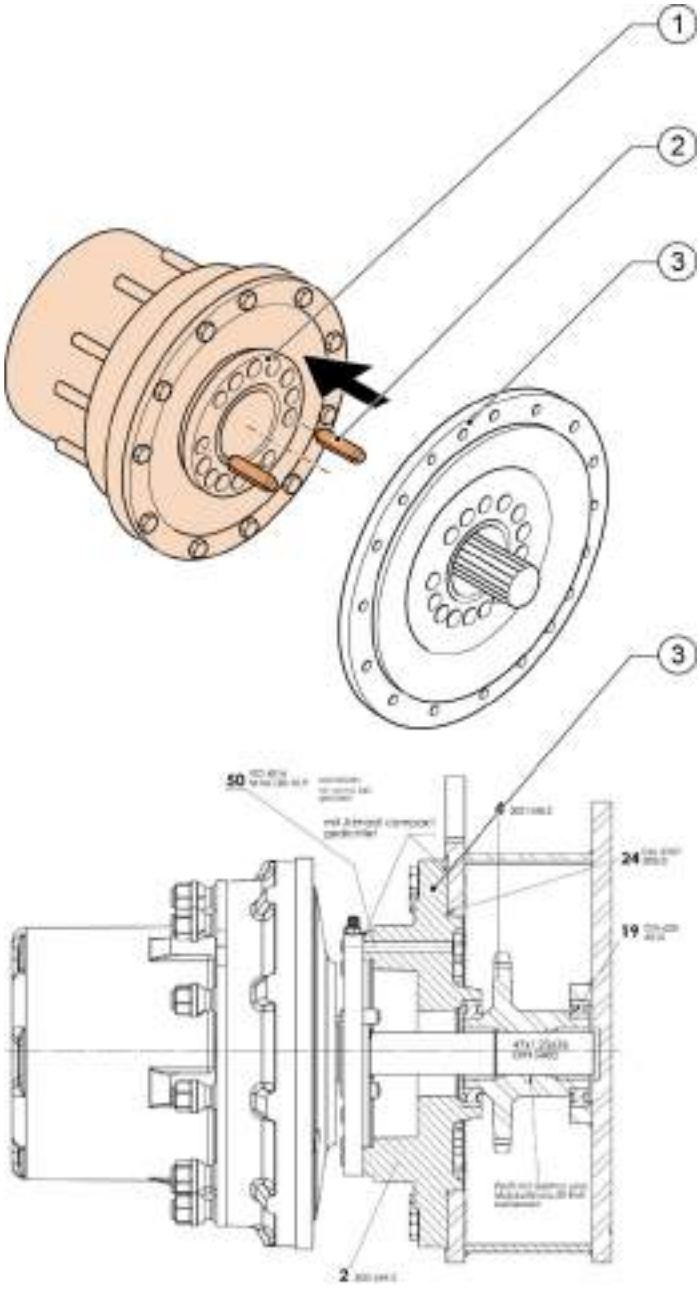


Fig. 264 Cotter pins in planetary gear BG 130 / BG 160

Step 2 **BG 110 / BG 130 / BG 160**

Secure all hex screws with Loctite (4).

Set the flange (2) on the planetary gear (1).
Check the position of the cotter pins and for BG110, also the position of the washer!

Secure the intermediate flange (2) with hex screws (3).

Use torque wrench to tighten all hex screws (3).

Tools:

box wrench, crescent wrench,
socket wrench

BG 110 size: 19
BG 130 size: 24, 26
BG 160 size: 24, 26

Standardized parts: (3)

BG 110: Screw M 12
BG 130: Screw M 16
BG 160: Screw M 16

Starting torques: (3)

BG 110: M_T=120 Nm
BG 130: M_T=265 Nm
BG 160: M_T=265 Nm

Equipment:
Loctite 243

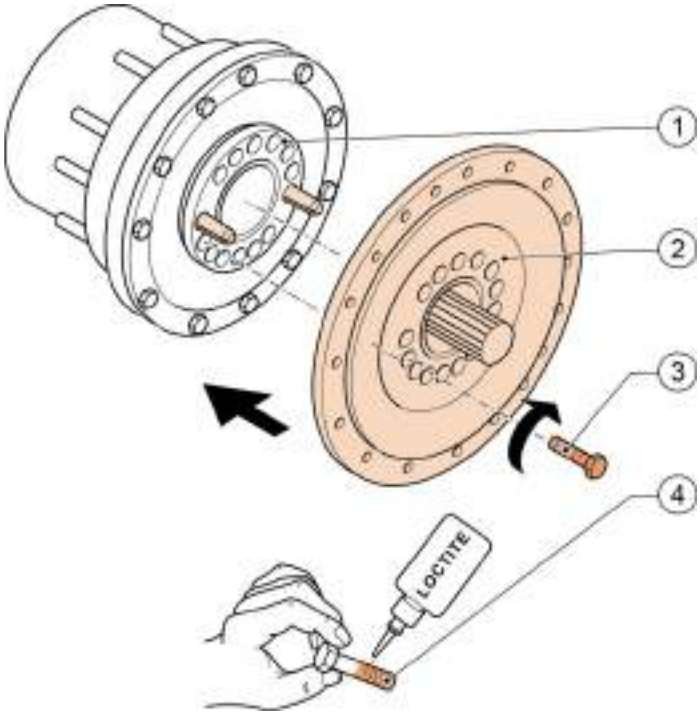


Fig. 265 Screw on intermediate flange

NOTE
For BG 190 and BG 240, there is no intermediate flange (2). Screw the wheel head directly on the tandem housing.

5.8.1.5 Mounting wheel heads on the tandem axle

Step 1

Apply sealant on all contact surfaces on the intermediate flange (3) of the wheel head and on the tandem housing (1).

Use grease (4) to stick the washer (2) to the sealing surface of the intermediate flange (3) for tandem housing (1).

Equipment:
lubricating grease,
Atmosit or similar sealant.

O-ring 285x3 (4)

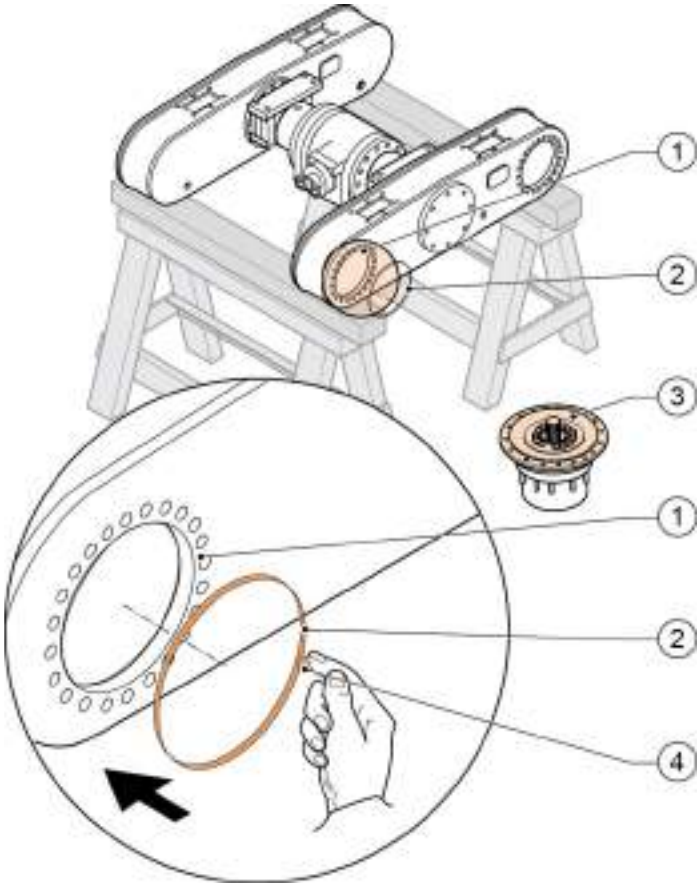


Fig. 266 Stick on washer

Step 2

Place a cable (1) loop around the wheel head (3) and secure.

Lift the wheel head (3) with the cable and align with the tandem housing (2).

Watch the position of the connections from the brake line - mark on tandem housing (4)!

Coat the gearing of the drive shaft (6) with grease (7).

Align the gearing of the drive shaft (6) and the wheel chain (5) in the tandem housing (2). Check the position of the planetary gear to the tandem housing (2).

Equipment:

crane,
cables,
lubricating grease

Weight with oil:

BG 110: approx. 150 kg
BG 130: approx. 220 kg
BG 160: approx. 220 kg
BG 190: approx. 260 kg
BG 240: approx. 260 kg

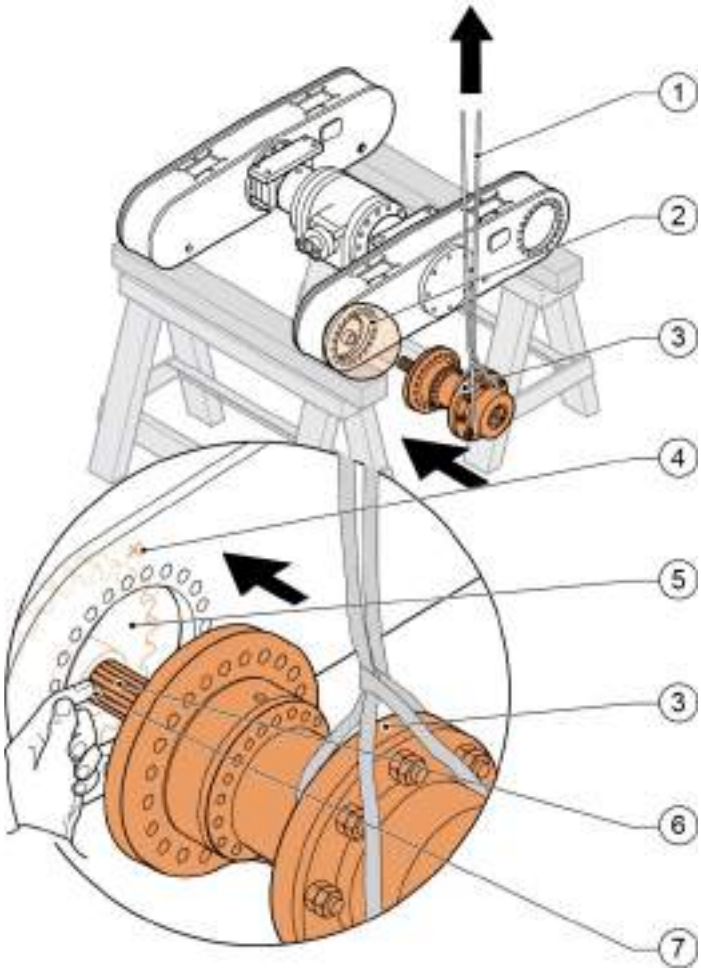


Fig. 267 Push drive shaft in chain wheel

Step 3

Use 2 hex screws (1) with mounted nuts (4) to screw the wheel head (2) on the tandem housing (3).

Use a flat wrench (5) to tighten the wheel head (2) by tightening the nuts (4) up to the sealing surface of the tandem housing (3).

Tools:

open-end wrench

BG 110: sizes 19
BG 130: SIZES 24
BG 160: SIZES 24
BG 190: size 30
BG 240: size 30

Standardized parts:

BG 110: Screw M 12x70 (1)
BG 130: Screw M 16x80 (1)
BG 160: Screw M 16x80 (1)
BG 190: Screw M 20x80 (1)
BG 240: Screw M 20x80 (1)

BG 110: nut M 12 (4)
BG 130: nut M 16 (4)
BG 160: nut M 16 (4)
BG 190: nut M 20 (4)
BG 240: nut M 20 (4)

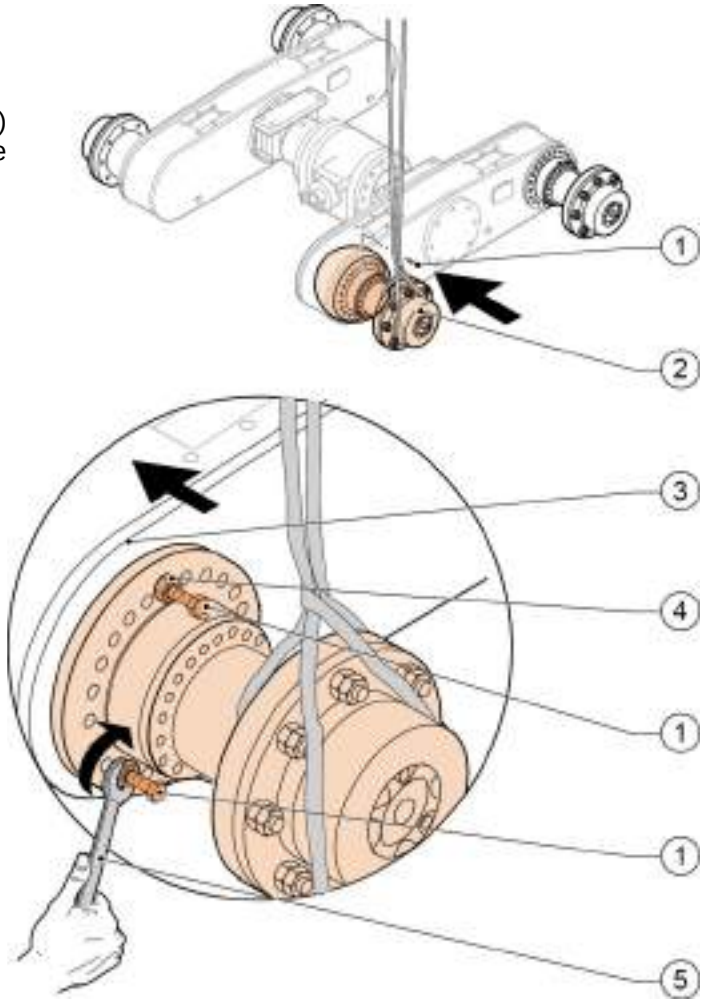


Fig. 268 Pull the wheel head on the tandem housing

Step 4

Secure all hex screws (1) with Loctite 243 (4) and tightly screw the wheel head (2) to the tandem housing (3).

Unscrew the 2 hex screws M12x70 and hex nuts again and replace with 2 original hex screws (1).

Retighten hex screws (1) crosswise with torque wrench.

Tools:

open-end wrench + ratchet
torque wrench

BG 110: sizes 19
BG 130: SIZES 24
BG 160: SIZES 24
BG 190: size 30
BG 240: size 30

Standardized parts: (1)

BG 110: Screw M 12
BG 130: Screw M 16
BG 160: Screw M 16
BG 190: Screw M 20
BG 240: Screw M 20

Starting torques: (1)

BG 110: M_T=120 Nm
BG 130: M_T=265 Nm
BG 160: M_T=265 Nm
BG 190: M_T=510 Nm
BG 240: M_T=510 Nm

Equipment:
Loctite 243

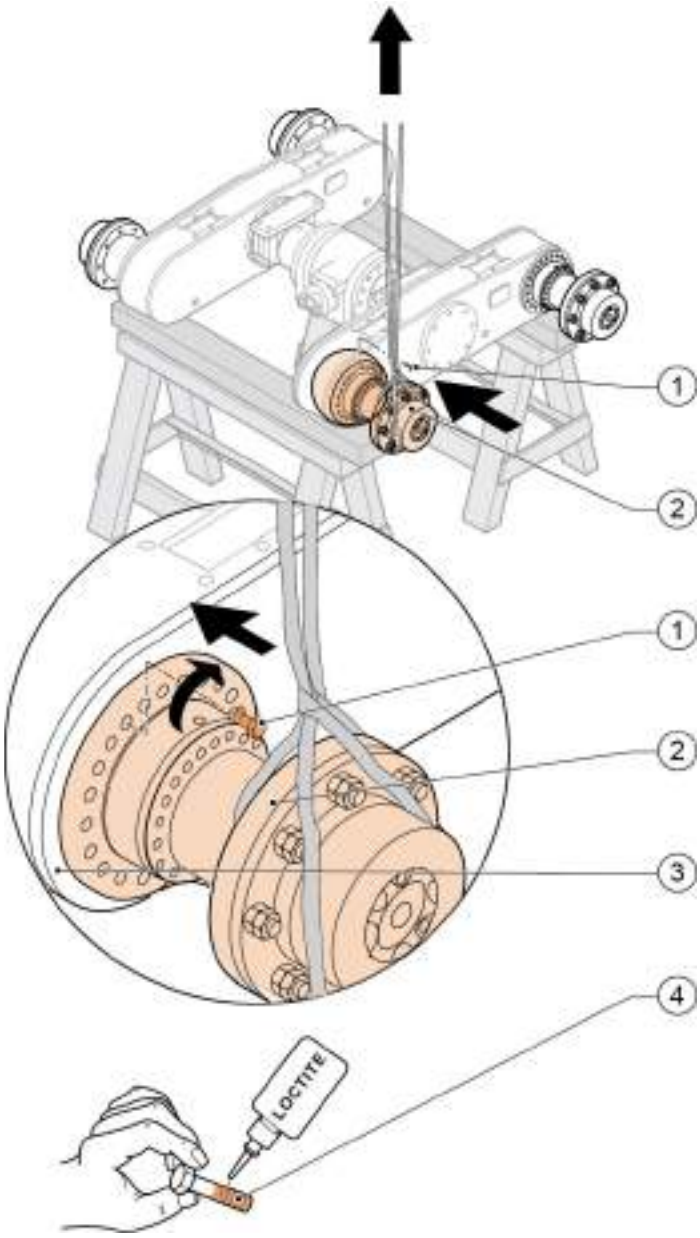


Fig. 269 Tightly screw wheel heads

Step 5

Remove safety (1) (wood, crowbar) to prevent the chain wheels (3) from slipping out in the tandem housing and pull out of the opening (2).

Equipment:

crowbar,
wood

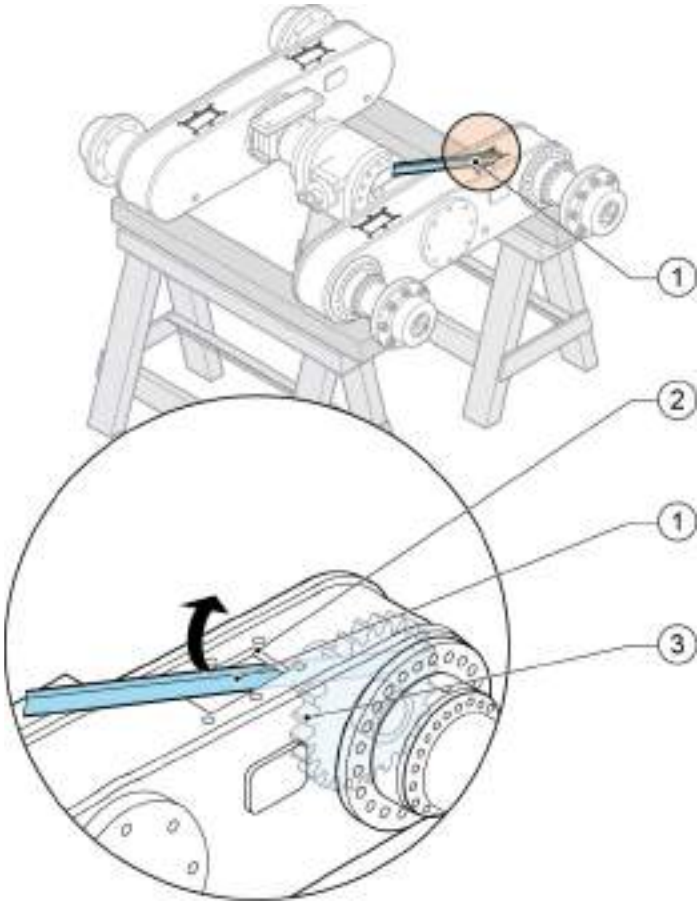


Fig. 270 Remove safety to prevent slipping out of chain wheels

5.8.1.6 Mounting the tandem axle

Step 1

Seal contact surfaces on the tandem housing with Atmosit compact.

Secure all hex screws (1) with Loctite 243 (4).

Use box wrench to screw in all hex screws (1) and secure the cover (2) to the tandem housing (3).

Tools:

box spanner

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Standardized parts: (1)

BG 110: Screw M 8
BG 130: Screw M 8
BG 160: Screw M 8
BG 190: Screw M 8
BG 240: Screw M 8

Starting torques: (1)

BG 110: M_T=12 Nm
BG 130: M_T=12 Nm
BG 160: M_T=12 Nm
BG 190: M_T=12 Nm
BG 240: M_T=12 Nm

Equipment:

Loctite 243,
Atmosit compact

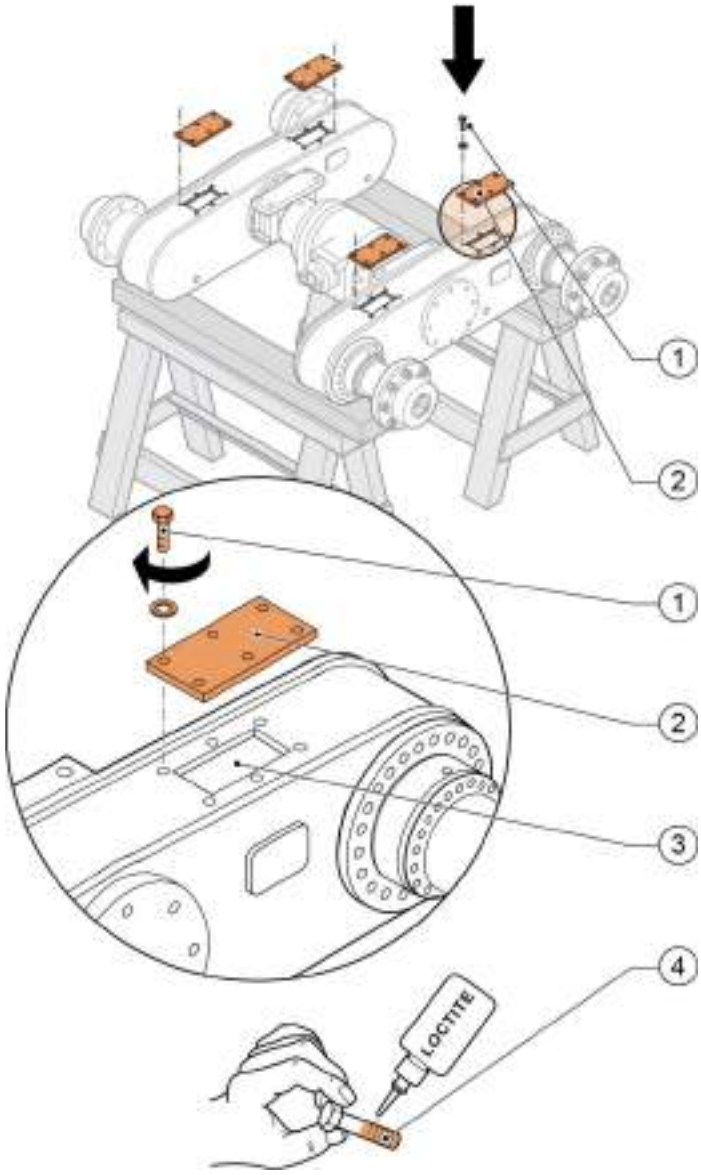


Fig. 271 Screw cover tightly to tandem housing

Step 2

Place a funnel (1) on the fill openings (2) and fill the oil levels.

Only check the oil level on the planetary gears (3), do not fill with oil!

Close all fill openings (2).

Oil quantities:

See the following tables.

Tools:

hex wrench

BG 110 sizes: 10, 12, 14
BG 130 sizes: 10, 12, 14
BG 160 sizes: 10, 12, 14
BG 190 sizes: 10, 12, 14
BG 240 sizes: 10, 12, 14

Consumables:

Oil: Titan Gear LS 90, SAE 85W90

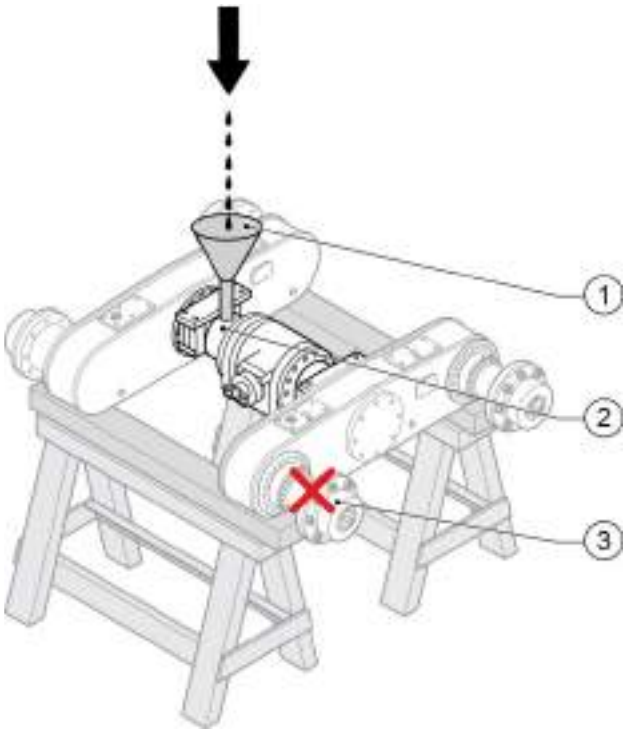


Fig. 272 Top up oil levels

Lubricants, operating materials, fill volumes BG 110

Lubricants, Fuels and lubricants, Filling quantities	Fill volume in litres (USgal)	Lubricants, Operating materials (international specification) *	Temperature limits	Viscosity classes
Working hydraulic Hydraulic steering system	approx. 140 (37)	H-LP 46 DIN 51524 part 2	10° to 50 °C (50° to 122 °F) -10° to 30 °C (14° to 86 °F) -15° to 20 °C (5° to 68 °F) -30° to 0 °C (-22° to 32 °F)	ISO VG 100 ISO VG 68 ISO VG 46 + ISO VG 22
Tandem axle: - wheel hubs - axle gear - axle carrier - tandems Turning gear	 approx. 4 x 2 (4 x 0.5) approx. 9 (2.4) approx. 2 x 1 (2 x 0.26) approx. 2 x 18 (2 x 4.8) approx. 6 (1.6)	 MIL-L-2105 B API-GL5 LS		 SAE 80 W 90 LS+ SAE 90 LS SAE 85 W 90 LS SAE 85 W 140 LS
Fuel tank	approx. 195 (51.5)	Diesel fuel per DIN 51601	See "Diesel fuels"	
Cooling system	approx. 16 (4.2)	Long-term coolants	See "Long-term coolants"	
Grease fitting and lubrication points		Multipurpose grease on lithium base	KP2K per DIN 51825 Part 1 or KP2K per DIN 51825 Part 3	
Powershift transmission with converter 6 WG 115 (1)	approx. 30 (7.9)	API-CH4	15° to 40 °C (50° to 104 °F) -10° to 50 °C (14° to 122 °F) -30° to -10 °C (-22° to 14 °F)	SAE 10 W 30 SAE 15 W 40 + (TYPE A suffix)
Diesel motor: PERKINS	approx. 10 (2.6)	API-CH4	10° to 50 °C (50° to 122 °F) 0° to 40 °C (32° to 104 °F) -5° to 50 °C (23° to 122 °F) -15° to 40 °C (5° to 104 °F) -10° to 50 °C (14° to 122 °F) -25° to 20 °C (-13° to 68 °F)	SAE 40 + SAE 30 SAE 20 W 50 SAE 10 W 30 SAE 15 W 40 + SAE 5 W 20

The specified fill volumes are guidelines; the test facilities are binding. The viscosity class selection is based on the respective longer time of the predominant outside temperature.
The temperature levels should be considered as guidelines, which allow for brief variations above or below.

\+ Plant filling
* API = American Petroleum Institute
MIL = USA - military specification
SAE = Society of Automotive Engineers

(1) For the corresponding lubricants and viscosity grades, please refer to the manufacturer's lubricant list. To find this, go to www.zf.com/schmierstoffe (German) or www.zf.com/interoele (English).

Lubricants, operating materials, fill volumes BG 130

Lubricants, Fuels and lubricants, Filling quantities	Fill volume in litres (USgal)	Lubricants, Operating materials (international specification) *	Temperature limits	Viscosity classes
Working hydraulic Hydraulic steering system	approx. 160 (42.3)	H-LP 46 DIN 51524 part 2	10° to 50 °C (50° to 122 °F) -10° to 30 °C (14° to 86 °F) -15° to 20 °C (5° to 68 °F) -30° to 0 °C (-22° to 32 °F)	ISO VG 100 ISO VG 68 ISO VG 46 + ISO VG 22
Rear axle: - wheel hubs (1) - axle gear - tandems Turning gear	 approx. 4 x 4 (4 x 1.1) approx. 13.5 (3.6) approx. 2 x 21 (2 x 5.6) approx. 6 (1.6)	 MIL-L-2105 B API-GL5 LS		 SAE 80 W 90 LS + SAE 90 LS SAE 85 W 90 LS SAE 85 W 140 LS
Fuel tank	approx. 220 (58.1)	Diesel fuel per DIN 51601	See "Diesel fuels"	
Cooling system	approx. 34 (9)	Long-term coolants	See "Long-term coolants"	
Grease fitting and lubrication points		Multipurpose grease on lithium base	KP2K per DIN 51825 Part 1 or KP2K per DIN 51825 Part 3	
Powershift transmission with converter 6 WG 115 (1)	approx. 30 (7.9)	API-CH4	15° to 40 °C (50° to 104 °F) -10° to 50 °C (14° to 122 °F) -30° to -10 °C (-22° to 14 °F)	SAE 10 W 30 SAE 15 W 40 + (TYPE A suffix)
Diesel motor: PERKINS	approx. 18 (4.8)	API-CH4	10° to 50 °C (50° to 122 °F) 0° to 40 °C (32° to 104 °F) -5° to 50 °C (23° to 122 °F) -15° to 40 °C (5° to 104 °F) -10° to 50 °C (14° to 122 °F) -25° to 20 °C (-13° to 68 °F)	SAE 40 + SAE 30 SAE 20 W 50 SAE 10 W 30 SAE 15 W 40 + SAE 5 W 20

The specified fill volumes are guidelines; the test facilities are binding. The viscosity class selection is based on the respective longer time of the predominant outside temperature.
The temperature levels should be considered as guidelines, which allow for brief variations above or below.

\+ Plant filling
* API = American Petroleum Institute
MIL = USA - military specification
SAE = Society of Automotive Engineers

(1) For the corresponding lubricants and viscosity grades, please refer to the manufacturer's lubricant list. To find this, go to www.zf.com/schmierstoffe (German) or www.zf.com/interoele (English).

Lubricants, operating materials, fill volumes BG 160

Lubricants, Fuels and lubricants, Filling quantities	**Fill volume in litres (USgal)**	**Lubricants, Operating materials (international specification) ***	**Temperature limits in °C (°F)**	**Viscosity classes**
Working hydraulic Hydraulic steering system	approx. 170 (44.9)	H-LP 46 DIN 51524 part 2	10° to 50 °C (50° to 122 °F) -10° to 30 °C (14° to 86 °F) -15° to 20 °C (5° to 68 °F) -30° to 0 °C (-22° to 32 °F)	ISO VG 100 ISO VG 68 ISO VG 46 + ISO VG 22
Tandem axle: - wheel hubs - axle gear - tandems Turning gear	 approx. 4 x 4 (4 x 1) approx. 13.5 (3.5) approx. 2 x 21 (2 x 5.5) approx. 6 (1.6)	 MIL-L-2105 B API-GL5 LS		 SAE 80 W 90 LS + SAE 90 LS SAE 85 W 90 LS SAE 85 W 140 LS
Fuel tank	approx. 310 (81.9)	Diesel fuel per DIN 51601	See "Diesel fuels"	
Cooling system	approx. 33 (8.7)	Long-term coolants	See "Long-term coolants"	
Grease fitting and lubrication points		Multipurpose grease on lithium base	KP2K per DIN 51825 Part 1 or KP2K per DIN 51825 Part 3	
Powershift transmission with converter 6 WG 160 (1)	approx. 34 (8.9)	API-CH4	15° to 40 °C (50° to 104 °F) -10° to 50 °C (14° to 122 °F) -30° to -10 °C (-22° to 14 °F)	SAE 10 W 30 SAE 15 W 40 + (TYPE A suffix)
Diesel motor: CUMMINS	approx. 18 (4.7)	API-CH4	10° to 50 °C (50° to 122 °F) 0° to 40 °C (32° to 104 °F) -5° to 50 °C (23° to 122 °F) -15° to 40 °C (5° to 104 °F) -10° to 50 °C (14° to 122 °F) -25° to 20 °C (-13° to 68 °F)	SAE 40 + SAE 30 SAE 20 W 50 SAE 10 W 30 SAE 15 W 40 + SAE 5 W 20

The specified fill volumes are guidelines; the test facilities are binding. The viscosity class selection is based on the respective longer time of the predominant outside temperature.
The temperature levels should be considered as guidelines, which allow for brief variations above or below.

+ Plant filling
* API = American Petroleum Institute
MIL = USA - military specification
SAE = Society of Automotive Engineers

(1) For the corresponding lubricants and viscosity grades, please refer to the manufacturer's lubricant list. To find this, go to www.zf.com/schmierstoffe (German) or www.zf.com/interoele (English).

Lubricants, operating materials, fill volumes BG 190

Lubricants, Fuels and lubricants, Filling quantities	Fill volume in litres (USgal)	Lubricants, Operating materials (international specification) *	Temperature limits in °C (°F)	Viscosity classes
Working hydraulic Hydraulic steering system	approx. 200 (52.8)	H-LP 46 DIN 51524 part 2	10° to 50 °C (50° to 122 °F) -10° to 30 °C (14° to 86 °F) -15° to 20 °C (5° to 68 °F) -30° to 0 °C (-22° to 32 °F)	ISO VG 100 ISO VG 68 ISO VG 46 + ISO VG 22
Tandem axle: - wheel hubs (1) - axle gear - tandems Turning gear	 approx. 4 x 6.5 (4 x 1.7) approx. 13.5 (3.6) approx. 2 x 21 (2 x 5.5) approx. 6 (1.6)	 MIL-L-2105 B API-GL5 LS		 SAE 80 W 90 LS + + SAE 90 LS SAE 85 W 90 LS SAE 85 W 140 LS
Fuel tank	approx. 386 (101.9)	Diesel fuel per DIN 51601	See "Diesel fuels"	
Cooling system	approx. 33 (8.7)	Long-term coolants	See "Long-term coolants"	
Grease fitting and lubrication points		Multipurpose grease on lithium base	KP2K per DIN 51825 Part 1 or KP2K per DIN 51825 Part 3	
Powershift transmission with converter 6 WG 160 (1)	approx. 34 (8.9)	API-CH4	15° to 40 °C (50° to 104 °F) -10° to 50 °C (14° to 122 °F) -30° to -10 °C (-22° to 14 °F)	SAE 10 W 30 SAE 15 W 40 + (TYPE A suffix)
Engine: CUMMINS	approx. 18 (4.7)	API-CH4	10° to 50 °C (50° to 122 °F) 0° to 40 °C (32° to 104 °F) -5° to 50 °C (23° to 122 °F) -15° to 40 °C (5° to 104 °F) -10° to 50 °C (14° to 122 °F) -25° to 20 °C (-13° to 68 °F)	SAE 40 + SAE 30 SAE 20 W 50 SAE 10 W 30 SAE 15 W 40 + SAE 5 W 20

The specified fill volumes are guidelines; the test facilities are binding. The viscosity class selection is based on the respective longer time of the predominant outside temperature.
The temperature levels should be considered as guidelines, which allow for brief variations above or below.

\+ Plant filling
* API = American Petroleum Institute
MIL = USA - military specification
SAE = Society of Automotive Engineers

(1) For the corresponding lubricants and viscosity grades, please refer to the manufacturer's lubricant list. To find this, go to www.zf.com/schmierstoffe (German) or www.zf.com/interoele (English).

Lubricants, operating materials, fill volumes BG 240

Lubricants, Fuels and lubricants, Filling quantities	Fill volume in litres (USgal)	Lubricants, Operating materials (international specification) *	Temperature limits in °C (°F)	Viscosity classes
Working hydraulic Hydraulic steering system	approx. 200 (52.8)	H-LP 46 DIN 51524 part 2	10° to 50°C (50° to 122°F) -10° to 30°C (14° to 86°F) -15° to 20°C (5° to 68°F) -30° to 0°C (-22° to 32°F)	ISO VG 100 ISO VG 68 ISO VG 46 + ISO VG 22
Tandem axle: - wheel hubs - axle gear - tandems Turning gear	 approx. 4 x 6.5 (4 x 1.7) approx. 27.5 (7.2) approx. 2 x 21 (2 x 5.5) approx. 6 (1.6)	 MIL-L-2105 B API-GL5 LS		 SAE 80 W 90 LS + SAE 90 LS SAE 85 W 90 LS SAE 85 W 140 LS
Fuel tank	approx. 515 (136)	Diesel fuel per DIN 51601	See "Diesel fuels"	
Cooling system	approx. 38 (10)	Long-term coolants	See "Long-term coolants"	
Grease fitting and lubrication points		Multipurpose grease on lithium base	KP2K per DIN 51825 Part 1 or KP2K per DIN 51825 Part 3	
Powershift transmission with converter 6 WG 210 (1)	approx. 44 (11.6)	API-CH4	15° to 40°C (50° to 104°F) -10° to 50°C (14° to 122°F) -30° to -10°C (-22° to 14°F)	SAE 10W30 SAE 15W40 + (TYPE A suffix)
Engine: CUMMINS	approx. 18 (4.7)	API-CH4	10° to 50°C (50° to 122°F) 0° to 40°C (32° to 104°F) - 5° to 50°C (23° to 122°F) -15° to 40°C (5° to 104°F) -10° to 50°C (14° to 122°F) -25° to 20°C (-13° to 68°F)	SAE 40 + SAE 30 SAE 20W50 SAE 10W30 SAE 15W40 + SAE 5W20

The specified fill volumes are guidelines; the test facilities are binding. The viscosity class selection is based on the respective longer time of the predominant outside temperature.
The temperature levels should be considered as guidelines, which allow for brief variations above or below.

\+ Plant filling
* API = American Petroleum Institute
MIL = USA - military specification
SAE = Society of Automotive Engineers

(1) For the corresponding lubricants and viscosity grades, please refer to the manufacturer's lubricant list. To find this, go to www.zf.com/schmierstoffe (German) or www.zf.com/interoele (English).

Maintenance **BG 110**

Rear axle

When performing welding tasks on the machine, the (-) pole must not be connected to the rear axle.

Welding tasks are not permitted on the rear axle!

Check oil level

Check oil level in the axle gear

Fig. 273

First clean off the dirt from the area around the check screw (K).

Bring the machine into a horizontal position.

Shut down the diesel engine.

Slowly unscrew the check screw (K).

The oil level must be on the lower edge of the check hole. If necessary, refill oil.

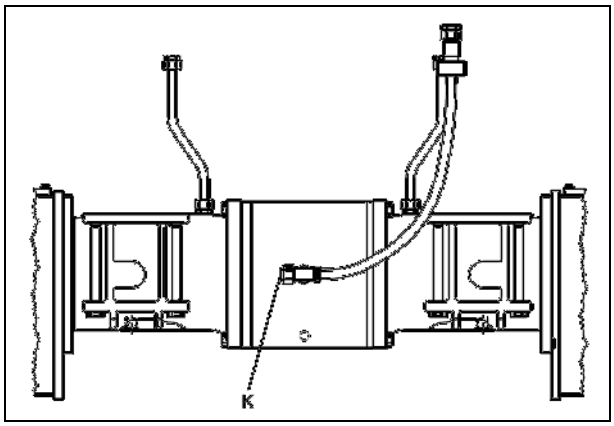


Fig. 273 Check oil level - BG 1100

Check oil level in the tandems

Fig. 274

Bring the machine into a horizontal position.

Shut down the diesel engine.

The oil level is displayed on the check window (K).

The oil level must be at least at the half window.

If necessary, refill oil.

Fig. 274 Check oil level of tandem axle BG 110

Check oil level in wheel hubs (planetary gear)

Fig. 275

First clean off the dirt from the area around the check screw (K).

By moving the machine to the the testing wheel hub, position such that the check screw (K) is horizontal.

Slowly unscrew the check screw (K).

Oil must be on the lower edge of the hole.

If necessary, refill oil.

The tightening torque for the check screw (K) is 45^{+5} Nm.

Fig. 275 Check oil level in wheel hubs

Maintenance **BG 110**

Oil change on the rear axle

Prior to changing the oil, clean dirt from the areas around the check, fill and drain screws.

Generally only change oil in warm conditions.
To do this, place machine so that it is level.
Do not allow any oil to drain into the soil.
Always use oil pan.
Replace the drain screw gasket each time oil is changed.

Prevent oil from making contact with soil in areas where people live!

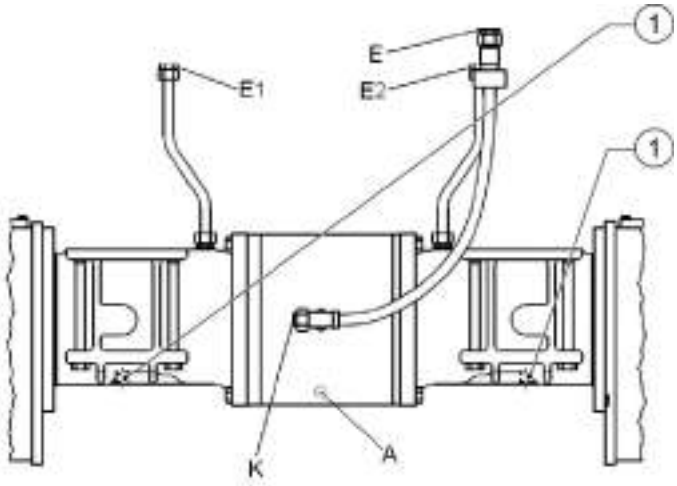


Fig. 276 Oil change in the axle gear

Oil change in the axle gear

Fig. 276

Remove the fill screw (E) and then open the drain screw (A) and allow the oil to drain into a container.
The oil fill opening (E) is easily accessible on the right of the engine compartment.
Close the drain screws (A) again.
Fill with new oil according to the lubricant table until the oil level reaches the lower edge of the check opening (K) .
Close the fill screw (E) and the check screw (K).

Check the oil level again after approx. 5 minutes and refill if necessary.

Change oil on axle carrier (left and right)

Fig. 276

The oil fill is a lifetime lubricant; do not change the oil here.

If approx. 1 l of oil is lost, fill via the fill screws (E1 and E2).

Drain screw axle carrier (1) R 1/2“

Maintenance **BG 110**

Tandem oil change

Screw off the cover of the fill opening (E) and unscrew the oil drain screw (A).

Let oil drain out into container.

Close drain opening (A) and fill with oil until the level is halfway up the check window (K).

Close fill opening (E).

Fig. 277 Tandem oil change - check window

Fig. 278 Tandem oil change - fill opening

Fig. 279 Tandem oil change - drain opening

Maintenance **BG 110**

Oil change wheel hubs (planetary gear) and axle funnel (multi-disc brakes)

Fig. 280 and Fig. 281

To drain the oil, set the machine such that the lock screws (50 and 52) of the respective wheel are down (lowest point).

Remove the fill screw (51) first and then unscrew the lock screws (50 and 52).

Let the oil drain out into a container.

Turn the wheel hubs back by 90 degrees (See Fig. 281), until the lock screws (50 and 52) are horizontal.

Close the lock screw (52).

Fill the oil through the fill screw (51) up to the bottom edge of the lock screw (50).

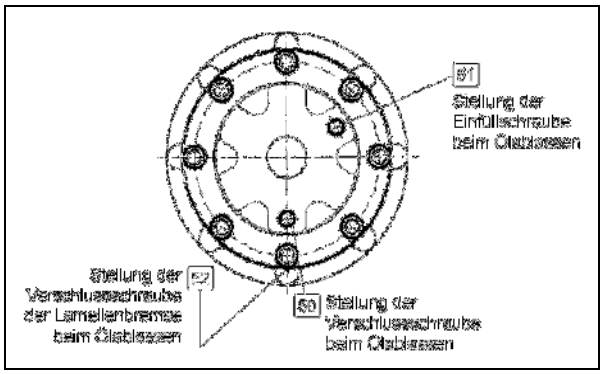
Check the oil level.

Close the fill opening (51) and the lock screw (50) again.

Tightening torque of the fill screws (51) and the lock screws (50 and 52) is 45^{+5} Nm

Notice!

Only LS-alloyed oil or Tractor Universal Oil (oil for wet brakes with limited slip supplement) may be used for wheel hubs.

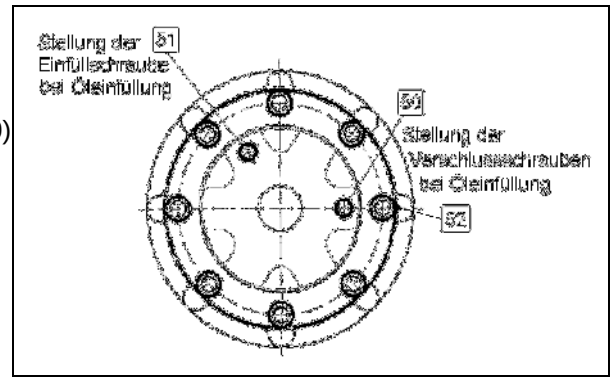


52 - Position the lock screw for the multi-disc brake when draining oil

51 - Position the fill screw when draining oil

50 - Position the lock screw when draining oil

Fig. 280 Oil change wheel hubs

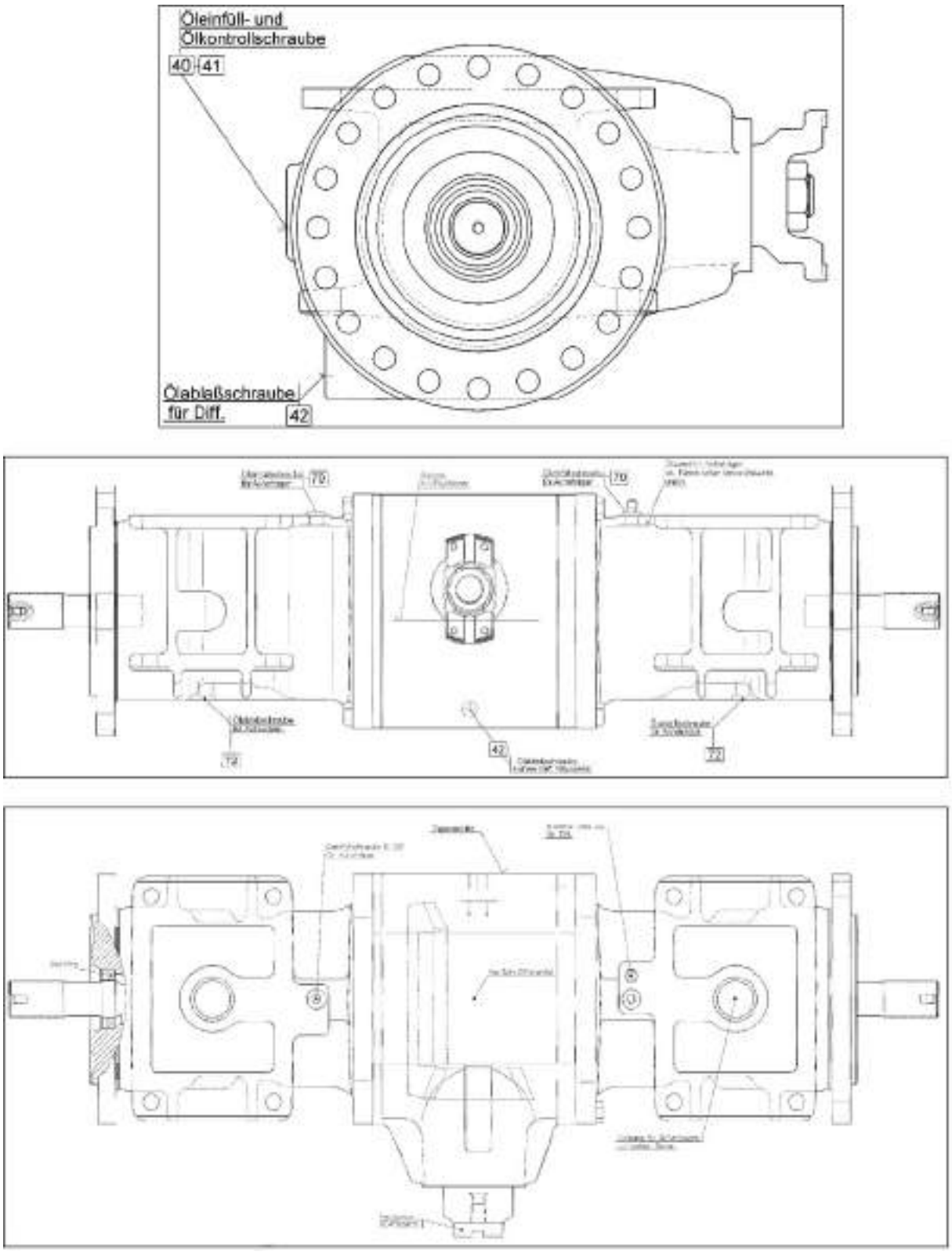


51 - Position the fill screw for oil filling

50 - Position the locking screw for oil filling

Fig. 281 Oil change wheel hubs - lock screws

Maintenance **BG 110**



40, 41 - Oil fill and oil check screw
42 - Oil drain screw for differential

Fig. 282 Oil change differential gear BG 110 - drawing 1

Maintenance	**BG 110**

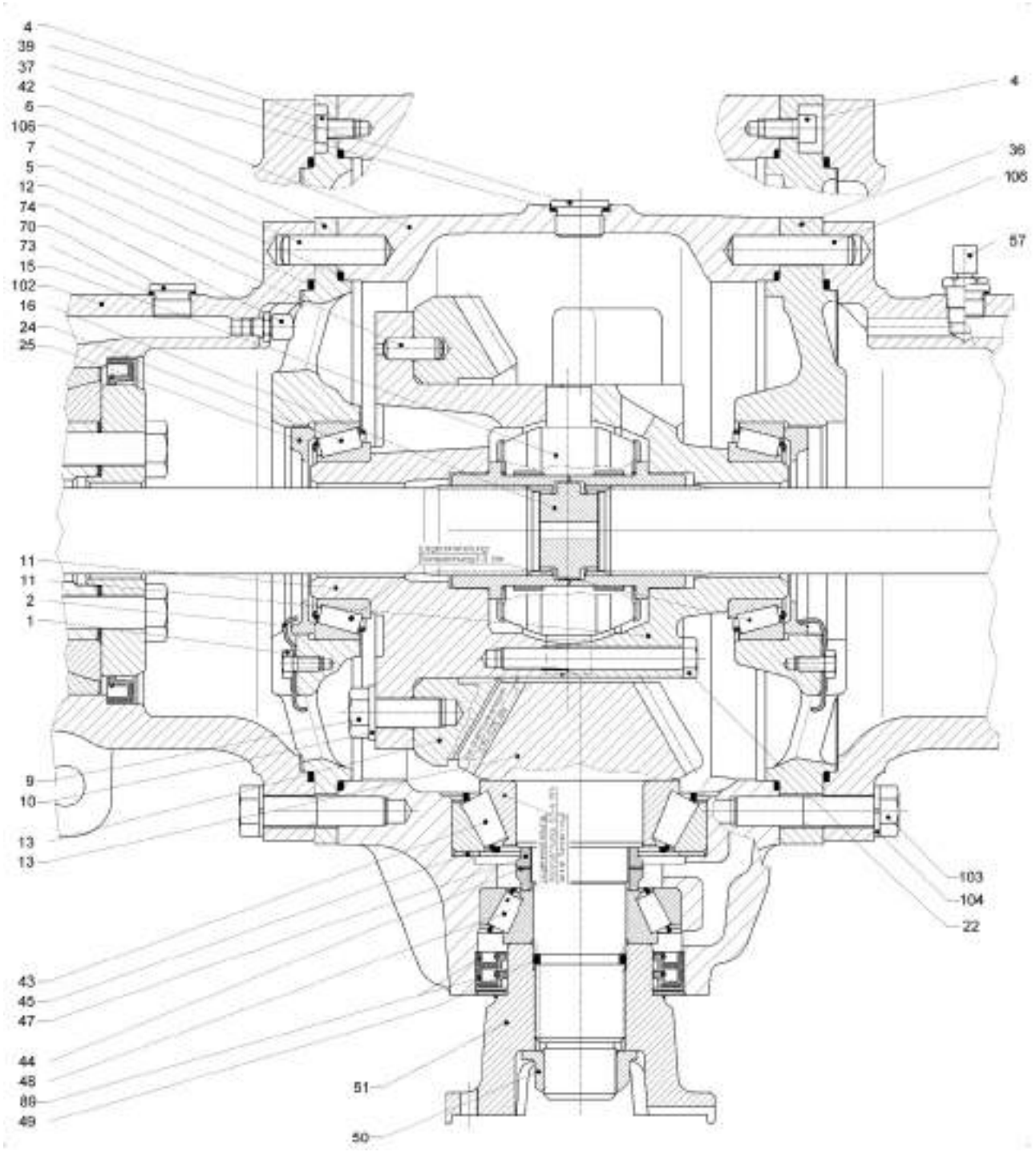


Fig. 283 Oil change differential gear BG 110 - drawing 2

Maintenance **BG 110**

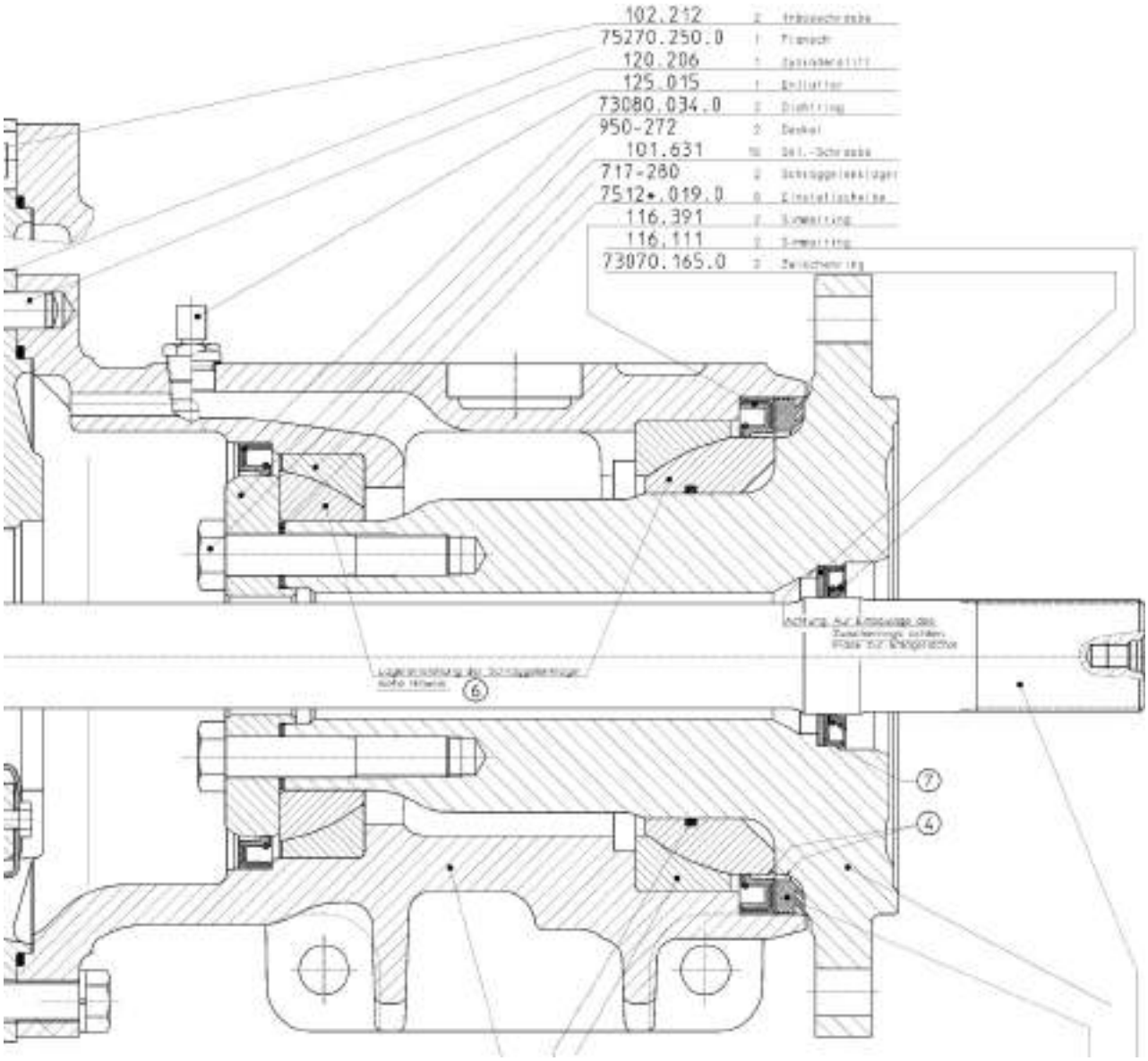


Fig. 284 Oil change differential gear BG 110 - drawing 3

Maintenance **BG 130 / BG 160**

rear axle

When performing welding tasks on the machine, the (-) pole must not be connected to the rear axle.

Welding tasks are not permitted on the rear axle!

Check oil level

Check oil level in the axle gear
Fig. 285

Bring the machine into a horizontal position. Shut down the diesel engine. Slowly unscrew the check screw (K).

The oil level must be on the lower edge of the check hole. If necessary, refill oil.

Fig. 285 Check oil level in the axle gear BG 130 / BG 160

Check oil level in the tandems
Fig. 286

The oil level is displayed on the check window (K). The oil level must be at least at the half window. If necessary, refill oil.

Fig. 286 Check oil level in the tandem BG 130 / BG 160

Check oil level in wheel hubs (planetary gear)
Fig. 287

By moving the machine to the the testing wheel hub, position such that locking screw (K) is horizontal. Oil must be on the lower edge of the hole. If necessary, refill oil.

Fig. 287 Check oil level in wheel hubs BG 130 / BG 160

Maintenance **BG 130 / BG 160**

Oil change on the rear axle

Generally only change oil in warm conditions. To do this, place machine so that it is level. Do not allow any oil to drain into the soil. Always use oil pan. Replace the drain screw gasket each time oil is changed.

Prevent oil from making contact with soil in areas where people live!

Fig. 288 Oil change rear axle BG 130 / BG 160

Oil change in the axle gear

Fig. 288 and Fig. 289

Unscrew drain screw (A) and fill screw (E); let oil drain out into a container. Close drain screw (A) and fill oil. Check oil level and close fill screw.

Fig. 289 Oil change axle gear BG 130 / BG 160

Maintenance **BG 130 / BG 160**

Tandem oil change

Fig. 290, Fig. 291, Fig. 292

Screw off the cover of the oil fill opening (E) and unscrew both oil drain screws (A). Let oil drain out into container. Close drain screws (A) fill with oil until the level is halfway up the check window. Close fill opening.

Fig. 290 Tandem oil change - check window BG 130 / BG 160

Fig. 291 Tandem oil change oil fill opening BG 130 / BG 160

Fig. 292 Tandem oil change oil drain screws BG 130 / BG 160

Maintenance **BG 130 / BG 160**

Oil change wheel hubs (planetary gearing)

Fig. 293, Fig. 294, Fig. 295

Set the machine to drain the oil such that the oil drain screw (A) of the respective wheel is down (lowest position). Unscrew drain screws (A) and (B). Let oil drain out into container. Close drain openings (A) and (B). Tightening torque of the drain screws (A) and (B) is 45^{+5} Nm.

Oil drain screw (A) is used as check screw (K).

Set the machine for oil filling such that the check screw (K) is horizontal.

Unscrew fill screw (E) and check screw (K).

Fill oil into the oil fill opening (E) until the oil level reaches the lower edge of the check screw (K).

Close fill screw (E) and check screw (K) (tightening torque is 45^{+5} Nm).

Clean any dirt from the area of the lock screws before unscrewing.

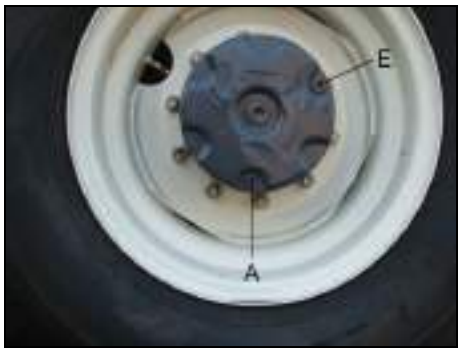


Fig. 293 Oil change wheel hubs oil drain openings A and E
BG 130 / BG 160

Fig. 294 Oil change wheel hubs drain opening B
BG 130 / BG 160

Fig. 295 Oil change wheel hubs fill screw E and check screw K
BG 130 / BG 160

Maintenance **BG 190**

Rear axle

When performing welding tasks on the machine, the (-) pole must not be connected to the rear axle.

Welding tasks are not permitted on the rear axle

Check oil level

Check oil level in the axle gear

Fig. 296

First clean off the dirt from the area around the check screw (K).

Bring the machine into a horizontal position.

Shut down the diesel engine.

Slowly unscrew the check screw (K).

The oil level must be on the lower edge of the check hole.

If necessary, refill oil.

Fig. 296 Check oil level in the axle gear - BG 190

Check oil level in the tandems

Fig. 297

Bring the machine into a horizontal position.

Shut down the diesel engine.

The oil level is displayed on the check window (K).

The oil level must be at least at the half window.

If necessary, refill oil.

Fig. 297 Check oil level in the tandem - check screw BG 190

Check oil level in wheel hubs (planetary gear)

Fig. 298

Unscrew the oil dipstick (3). To check the oil level, set lose on the thread. **Do not turn in!**

Oil level must be between min. and max. marks.

If necessary, refill oil.

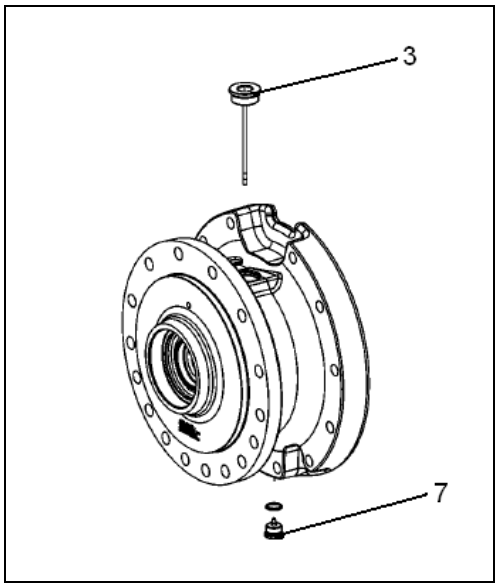


Fig. 298 Check oil level in wheel hubs - BG 190

Maintenance **BG 190**

Oil change on the rear axle

Generally only change oil in warm conditions. To do this, place machine so that it is level.

Do not allow any oil to drain into the soil. Always use oil pan. Replace the drain screw gasket each time oil is changed.

⚠ Prevent oil from making contact with soil in areas where people live!

Oil change in the axle gear

Fig. 299 and Fig. 300

Unscrew drain screw (A) and fill screw (E); let oil drain out into a container.

Close drain screw (A) and fill oil. Check oil level and close fill screw.

Fig. 299 Oil change axle gear drain screw - BG 190

Fig. 300 Oil change axle gear fill screw - BG 190

Maintenance **BG 190**

Lubricate slewing ring

Fig. 301 and Fig. 302

Notice!
The slewing ring has 2 separate chambers to lubricate.

Chamber 1 as ball groove and chamber 2 as anteroom with protective grease fill.

The ball groove (chamber 1) is already filled with grease. This so-called "lifetime" grease fill does not need to be refilled.

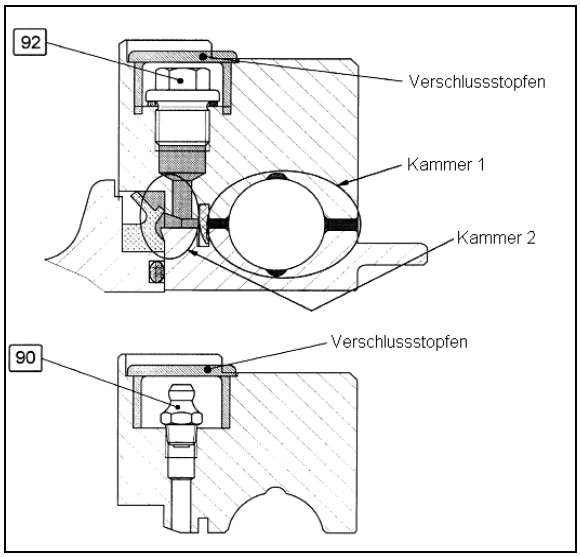
The anteroom (chamber 2) must be regularly relubricated with standard grease.

Clean dirt from the areas around the grease fitting (no. 90) and drain screws (no. 92) 4x per slewing ring and then remove the black stoppers.

Open the lock screw (II) and add grease to the grease fitting (I) using a manual grease gun until grease leaks out at the lock screw (II) approx. a thumb's width.

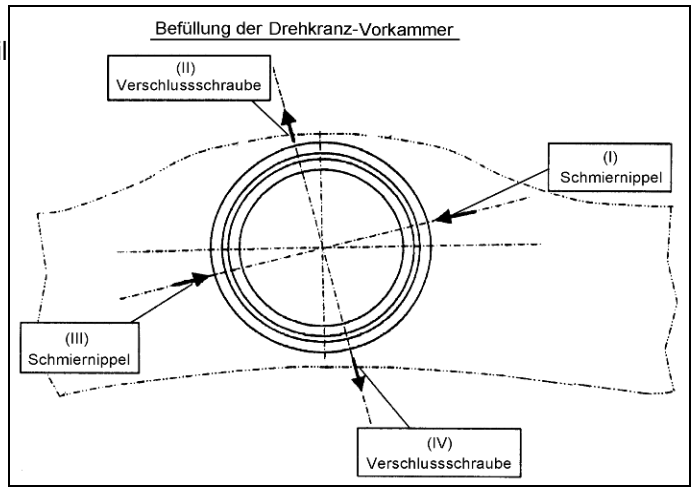
Open the lock screw (IV) and add grease to the grease fitting (III) using a manual grease gun until grease leaks out at the lock screw (IV) approx. a thumb's width.

Close the opening again with the lock screw and the stoppers.



Sealing plugs
chamber 1
chamber 2

Fig. 301 Lubricate slewing ring - BG 190



Fill the slewing ring anteroom

(II), (IV) - locking screw

(I), (III) - lubricating nipple

Fig. 302 Lubricate slewing ring - Fill the slewing ring anteroom - BG 190

Maintenance	**BG 190**

Tandem oil change

Screw off the cover of the oil fill opening (E) and unscrew both oil drain screws (A).

Let oil drain out into container.

Close drain screws (A) fill with oil until the level is halfway up the check window (K).

Close fill opening (E).

Fig. 303 Tandem oil change oil - check screw - BG 190

Fig. 304 Tandem oil change - fill opening - BG 190

Fig. 305 Tandem oil change - oil drain screws - BG 190

Maintenance **BG 190**

Oil change in the axle gear

Drain screw (A) and fill screw (E) oil change wheel hubs (planetary gear)

Unscrew the drain screws (7). Let oil drain out into container. Close oil drain openings.

Top up oil. Check oil level with oil dipstick (3).

Clean any dirt from the area of the lock screws before unscrewing.

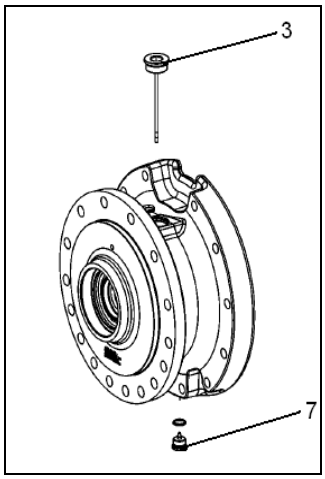


Fig. 306 Oil change wheel hubs - BG 190

Maintenance **BG 240**

Rear axle

When performing welding tasks on the machine, the (-) pol must not be connected to the rear axle.

Fig. 307

Welding tasks are not permitted on the rear axle!

Check oil level

Check oil level in the axle gear

Fig. 308

Bring the machine into a horizontal position. Shut down the diesel engine.

Slowly unscrew lock screw (1) on the T-section.

The oil level must be on the lower edge of the check hole. If necessary, refill oil.

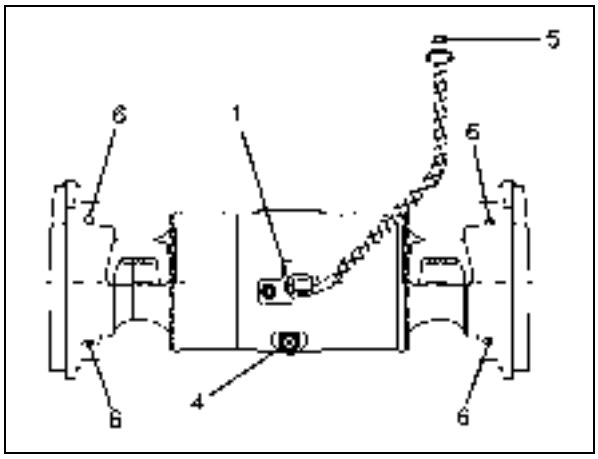


Fig. 307 Check oil level in the axle gear - BG 240

Check oil level in the tandems

The oil level is displayed on the check window (2). The oil level must be at least at the half window.

If necessary, refill oil.

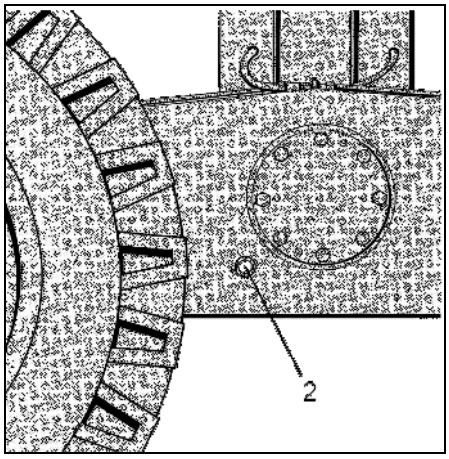


Fig. 308 Check oil level in the tandem - check window BG 240

Check oil level in wheel hubs (planetary gear)

Fig. 309

Unscrew the oil dipstick (3). To check the oil level, set lose on the thread. **Do not turn in!**

Oil level must be between min. and max. marks.

If necessary, refill oil.

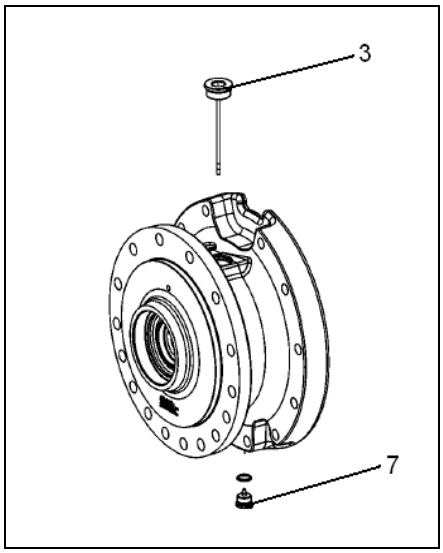


Fig. 309 Check oil level in wheel hubs - BG 240

Maintenance **BG 240**

Oil change and lubrication on the rear axle

Generally only change oil in warm conditions. To do this, place machine so that it is level. Do not allow any oil to drain into the soil.

Always use oil pan.
Replace the drain screw gasket each time oil is changed.

Prevent oil from making contact with soil in areas where people live!

Oil change in the axle gear

Fig. 310

Unscrew drain screw (4); let oil drain out into a container. Close drain opening (4). Fill oil via the fill opening (5).

Check oil level and close fill opening.

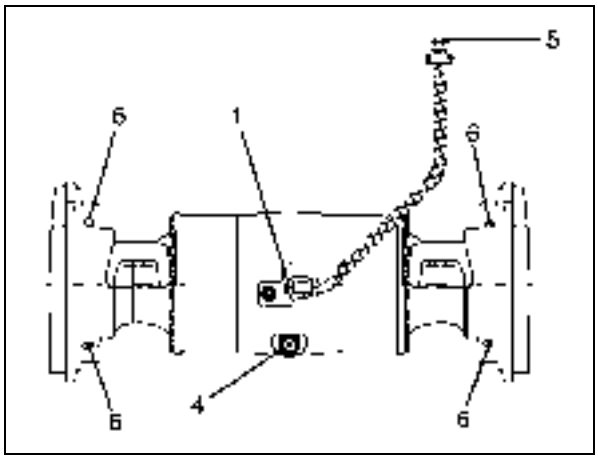


Fig. 310 Oil change in the axle gear - BG 240

Grease fittings on the four-point bearings

Relubricate on the grease fittings (6)

→ Lubrication schedule: 1,000 hours or annually

Greases:
„MOBILITH SHC 460, DIN 51502 KPHC ½-P-30" (Mobil company)

AEROSHELL Grease 22

Total AEROGREASE N31089

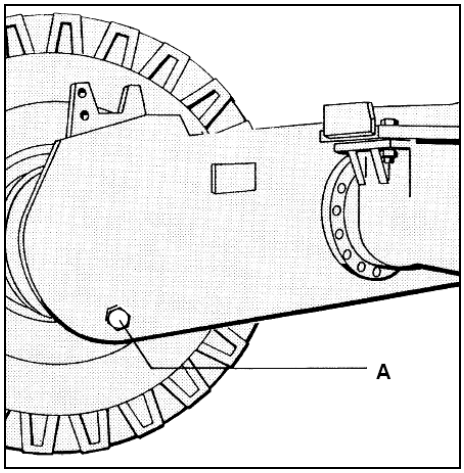


Fig. 311 Tandem oil change - BG 240

Tandem oil change

Fig. 311 and Fig. 312

Screw off the cover of the oil fill opening (T) and unscrew the oil drain screw (A). Let oil drain out into container. Close drain opening (A) fill with oil until the level is halfway up the check window. Close fill opening.

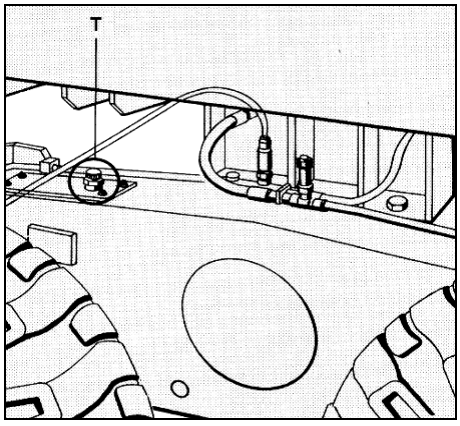


Fig. 312 Oil change in tandem - oil fill opening - BG 240

Maintenance **BG 240**

Oil change wheel hubs (planetary gearing)

Fig. 313

Unscrew the drain screws (7). Let oil drain out into container. Close oil drain openings.

Top up oil. Check oil level with oil dipstick (3).

Clean any dirt from the area of the lock screws before unscrewing.

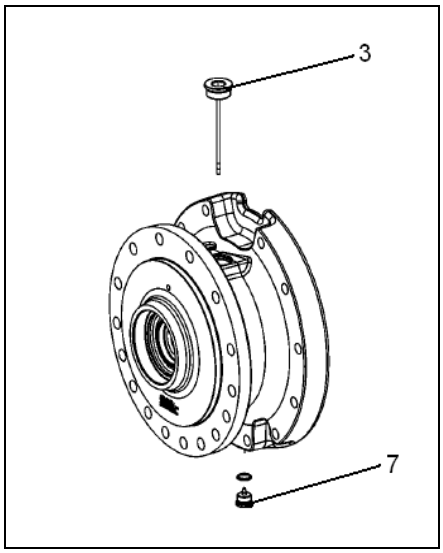


Fig. 313 Oil change wheel hubs - BG 240

Propeller shafts

The drive must be turned off in its rest position before starting any work on the drive shaft(s). Switch off the diesel engine, and secure the grader from rolling away and make certain that the drive cannot be restarted by any unauthorized third person.

Lubricate the joints as per lubrication chart during both installation and servicing. Relubrication is sufficient when fresh grease is flowing out at the gaskets. Use only lithium soap grease of consistency grade 2 without MoS2 additives for relubricating the drive shafts.

The sliding sections should only be greased during installation. No further lubrication is needed after this. Do not relubricate the sliding section unless the sliding section is pushed together!

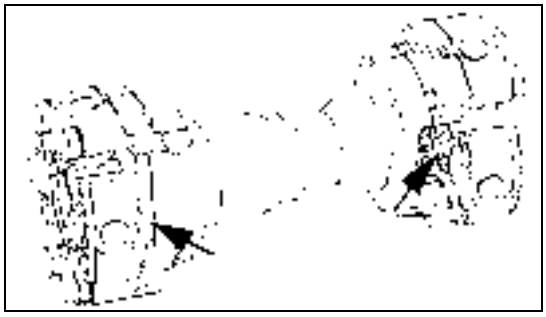


Fig. 314 Propeller shafts - BG 240

Clean every grease fitting before greasing, and apply grease **slowly** using a grease gun.

When greasing, check the tight fit of screws and connecting flanges.

Drive shaft between diesel engine and powershift transmission

Fig. 314

- 2 greasing points

Drive shaft between powershift transmission and rear axle differential

Lubrication is the same as for the drive shaft between diesel engine and powershift transmission.

- 2 greasing points

Step 3

Remove the closure material on the planetary gears (2).

Use a flat wrench to screw all brake lines (1) on the planetary gears (2). Check the marking (3) of the setting of the brake lines (1) on the tandem housing.

Tools:

open-end wrench

Connection to the brake planetary gear:

BG 110 size: 17
BG 130 size: 19
BG 160 size: 19
BG 190 size: 19
BG 240 size: 19

Connection to the brake hose frame rear part:

BG 110 size: 22
BG 130 size: 22
BG 160 size: 22
BG 190 size: 22
BG 240 size: 22

Closure material:

4x ROV 12 LX
4x VkA 12
4x M12 Lx

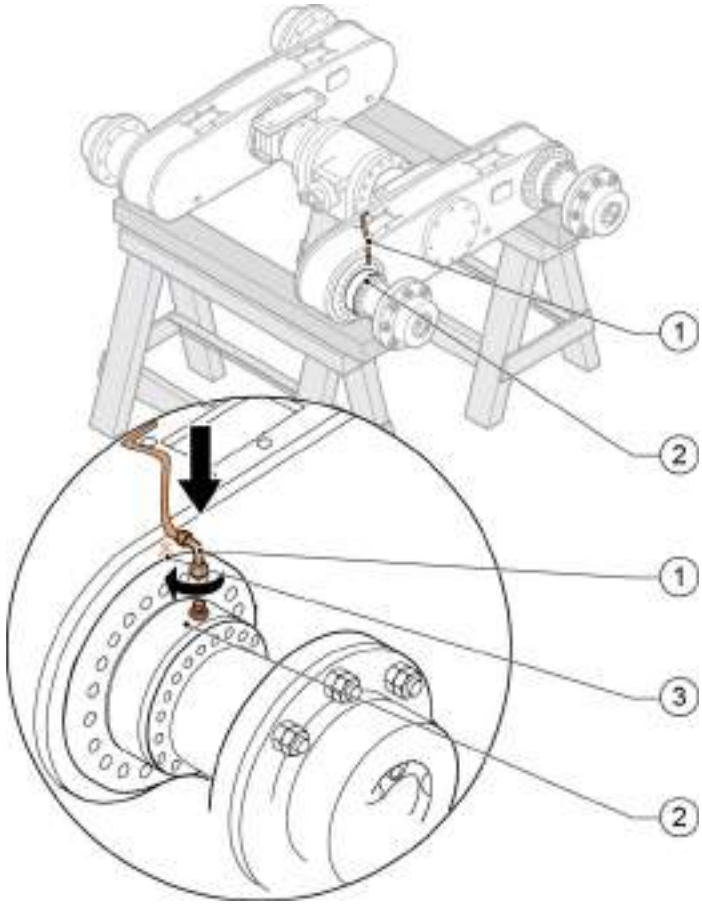


Fig. 315 Brake lines to planetary gear

Step 4

Secure all hex screws (4) with Loctite (243).

Use a hex wrench (4) to screw on all protective plates (1) over the brake hose (2) connections on the planetary gear.

Tools:

hex wrench

BG 110 size: 19
BG 130 size: 24, 26
BG 160 size: 24, 26
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: Screw M 12-10.9 DIN 933 (4)
BG 130: Screw M 16-10.9 DIN 933 (4)
BG 160: Screw M 16-10.9 DIN 933 (4)
BG 190: Screw M 20-10.9 DIN 933 (4)
BG 240: Screw M 20-10.9 DIN 933 (4)

BG 110: spacer washer (3)
BG 130: spacer washer (3)
BG 160: spacer washer (3)
BG 190: spacer washer (3)
BG 240: spacer washer (3)

Only for BG 190 size: tension disk (5)

Starting torques:

BG 110: M_T=110 Nm (4)
BG 130: M_T=265 Nm (4)
BG 160: M_T=265 Nm (4)
BG 190: M_T=510 Nm (4)
BG 240: M_T=510 Nm (4)

Equipment:

Loctite 243

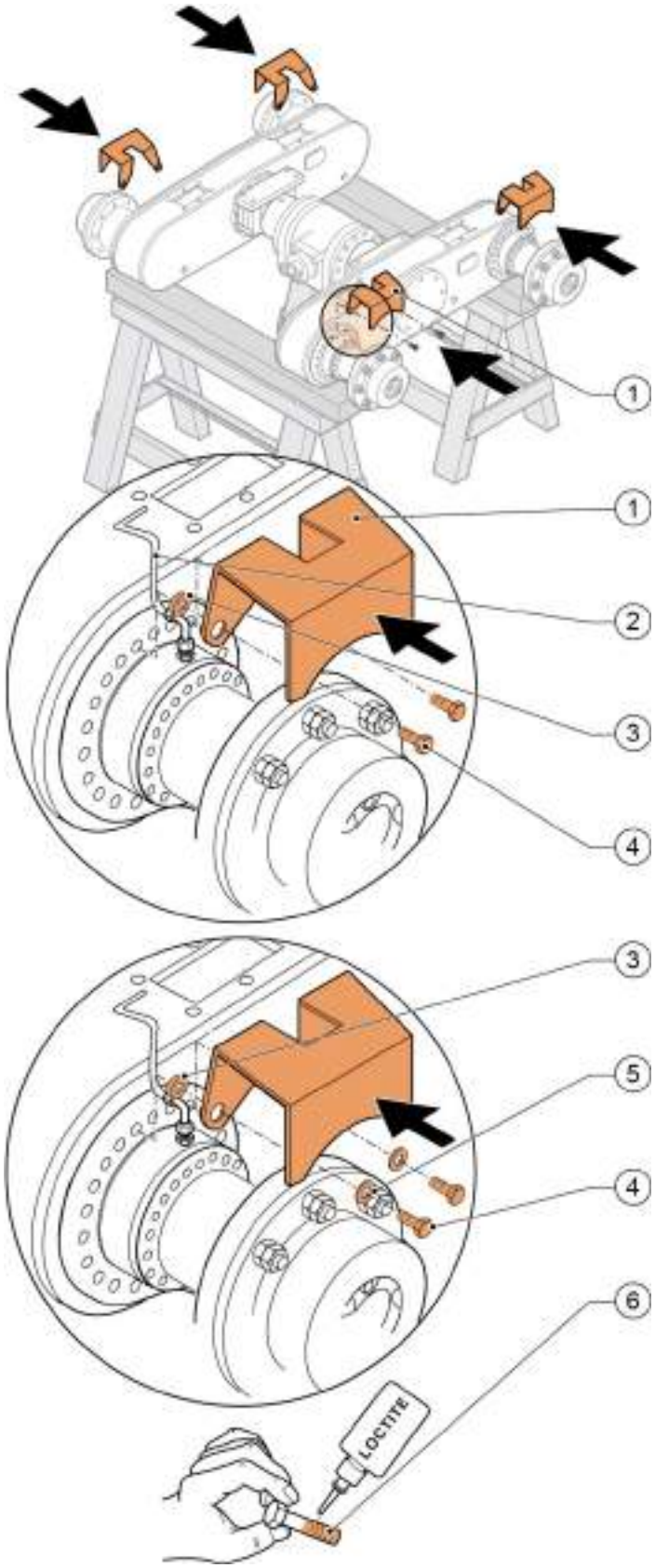


Fig. 316 Attach protective plates on the planetary gear

Step 5

Screw on 2 ring bolts (2) each to the axle carriers (3) in the back holes with washers and hex nuts or hand 4x hook chains (1) in the front holes.

BG 110, BG 130 and BG 160:
Sling cables (4) around each rear wheel (5) and lift to the height of the planetary gear / wheel head (6).

Push wheel on the wheel bolts on the wheel head (6).

Screw on wheel nuts (9) with washers (10).

BG 190 and BG 240:
Mount two loading pins (7) at two opposing points on the wheel head (6).

Sling cables (4) around each rear wheel (5) and lift to the height of the planetary gear / wheel head (6).

Push wheel over the loading pins (7) on the wheel head (6).

Use pneumatic wrench to screw in wheel screws (10).

Tools:

pneumatic wrench + attachment

BG 110 size: 27
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30
BG 240 size: 30

Standardized parts:

BG 110: nut M 20x1,5 B20 AN 9512217 (9)
BG 130: nut M 22x1,5 B22 AN 538201024 (9)
BG 160: nut M 22x1,5 B22 AN 538201024 (9)

BG 190:
screw M 22x1,5 B22 AN 9701500 (10)
BG 240:
screw M 22x1,5 B22 AN 9701500 (10)

Equipment:

4x ring screws from M16,
4 hook chains,
crane, cables

guide mandrel: AN 4501569

Weight without filling:
Deviation according to tyre type

BG 110: approx. 110 kg
BG 130: approx. 150 kg
BG 160: approx. 150 kg
BG 190: approx. 210 kg
BG 240: approx. 340 kg

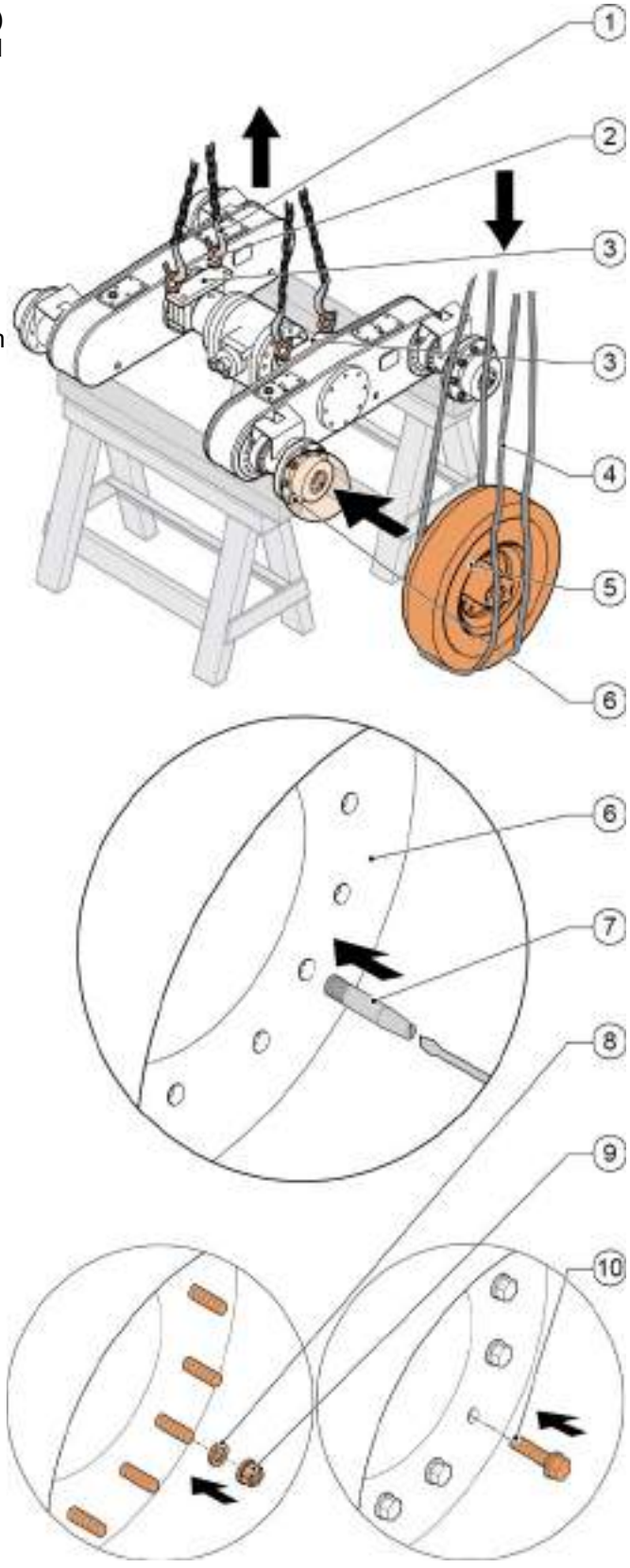


Fig. 317 Pull rear wheels on wheel hubs

Step 6

Use the crane and chains (1) to lift the tandem axle from the metal supports and set on the ground.

BG 110, BG 130 and BG 160:
Use torque wrench to retighten crosswise the wheel nuts (5) with washers (4) on the wheel bolts (3) on all rear wheels (2).

BG 190 and BG 240:
Using a torque wrench, retighten crosswise the wheel screws (6) on all rear wheels (2).

Tools:

pneumatic wrench + attachment,
torque wrench

BG 110 size: 27
BG 130 size: 30
BG 160 size: 30
BG 190 size: 30‘
BG 240 size: 30

Starting torques:

BG 110: M_T=500 Nm (4)
BG 130: M_T=550 Nm (4)
BG 160: M_T=550 Nm (4)
BG 190: M_T=550 Nm (4)
BG 240: M_T=600 Nm (4)

Weight with wheels:

BG 110: approx. 1820 kg
BG 130: approx. 2800 kg
BG 160: approx. 2820 kg
BG 190: approx. 3090 kg
BG 240: approx. 4290 kg

Equipment:
hitching gear,
crane

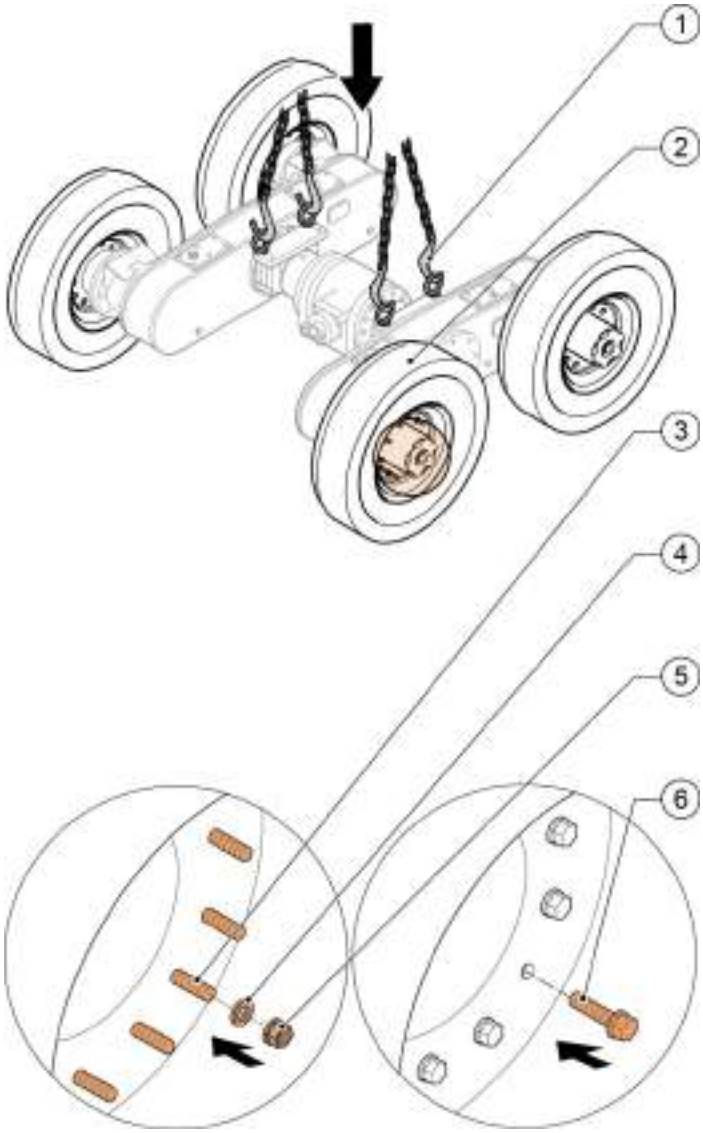


Fig. 318 Retighten wheel nuts / wheel screws

Step 7

Variant tandem axle from back under grader:
Align and set down tandem axle (3) behind the grader (1).

Coat contact surfaces (5) with Loctite (4).

Use the lifting apparatus (1) to lift up the grader (1) so that the differential gear (3) fits under the diesel tank.

Roll the tandem axle (3) under the grader (1) and align contact surfaces (5) axle carrier to contact surfaces rear frame.

Equipment:
hitching gear,
crane

Loctite 586

Weight:
F_{stroke} See table point 3.6.4.

BG 110: approx. 5100 kg
BG 130: approx. 6600 kg
BG 160: approx. 7600 kg
BG 190: approx. 9900 kg
BG 240: approx. 11000 kg

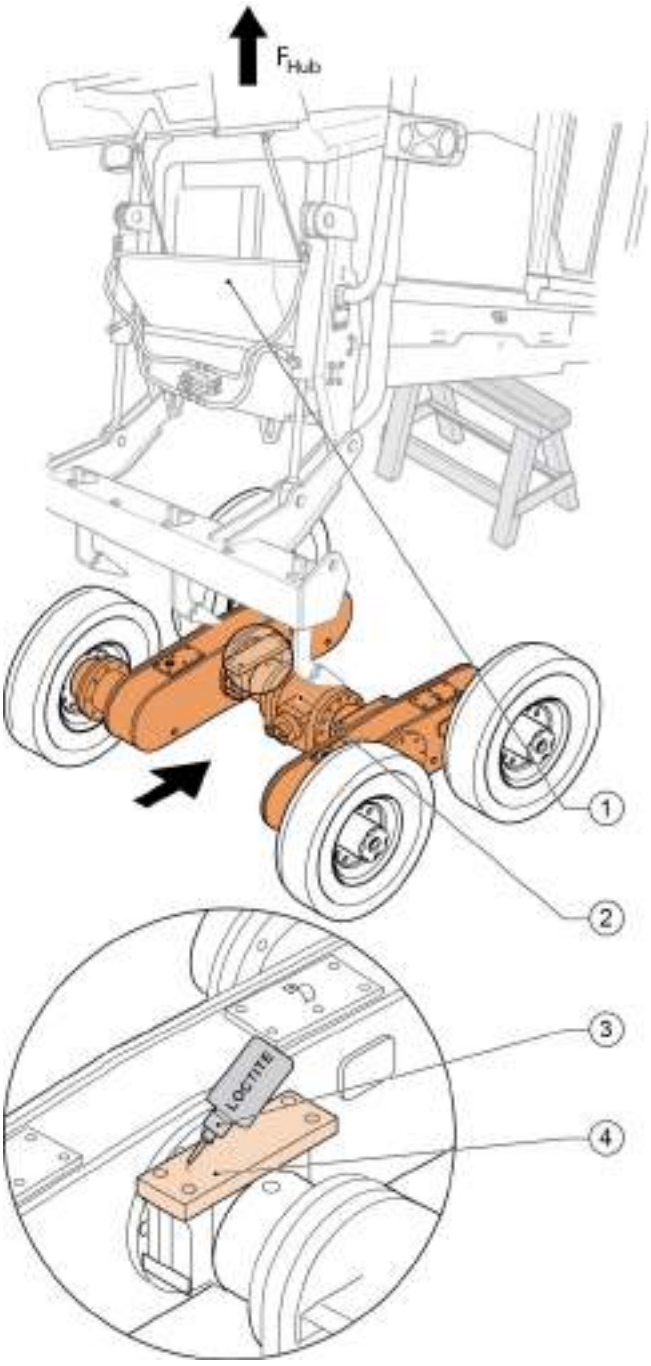


Fig. 319 Position tandem axle under grader

Step 8

Variant tandem axle sideway under grader:

Begin according to step 4 - without rear wheels.

Coat contact surfaces (5) with Loctite (4).

Put sling (2) on the wheel heads on the tandem axle (3).

Set down tandem axle (3) on jack lift (4) or forklift.

Move tandem axle (3) sideways under the grader.

Align the contact surfaces axle carrier (5) to contact surface rear frame.

Equipment:
hitching gear,
crane

Loctite 586

Weight tandem without wheels:

BG 110: approx. 1400 kg
BG 130: approx. 2220 kg
BG 160: approx. 2240 kg
BG 190: approx. 2250 kg
BG 240: approx. 2300 kg

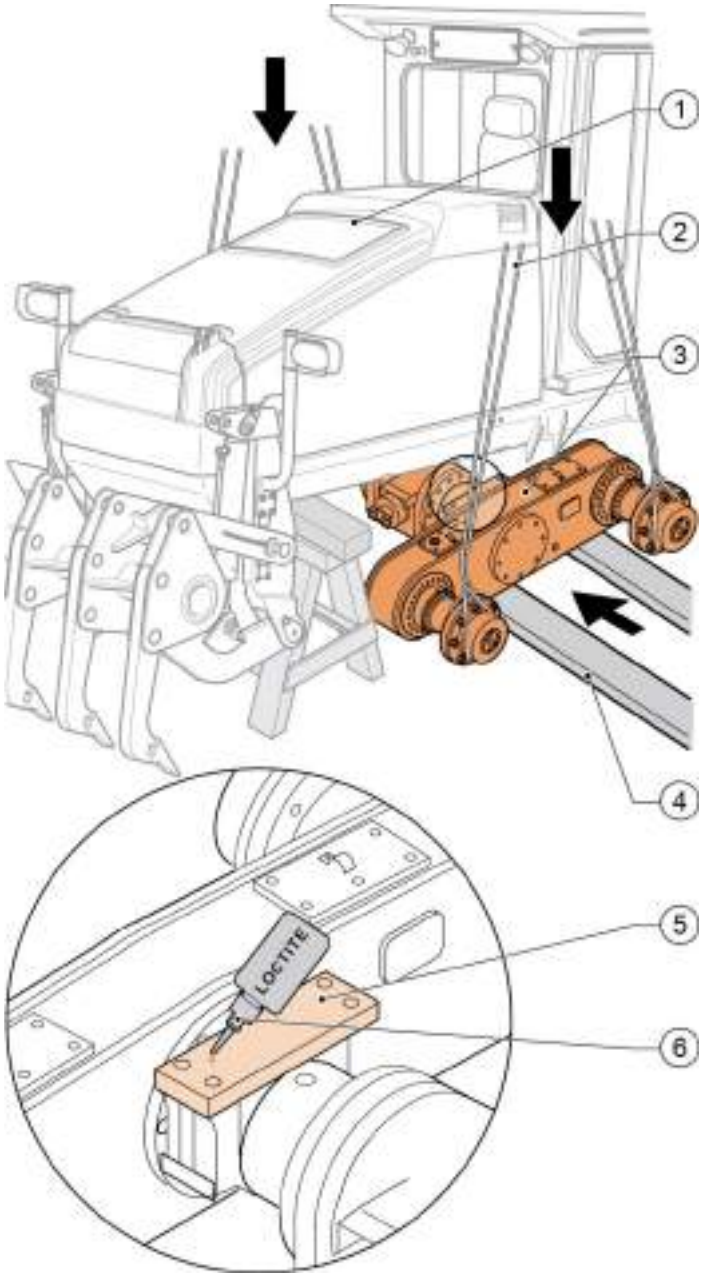


Fig. 320 Position tandem axle under grader

Step 9

Underside of grader:

Secure all hex screws (2) with Loctite (243).

Carefully let the grader off.

Screw in the hex screws (2) on the axle carriers (1) for the grader underside with washer (3).

Tools:

box wrench,
impact wrench + attachment, extension

BG 110 size: 30
BG 130 size: 36
BG 160 size: 36
BG 190 size: 36
BG 240 size: 36

Standardized parts:

BG 110: Screw M 20-ISO 4014 (2)
BG 130: Screw M 24-ISO 4014 (2)
BG 160: Screw M 24-ISO 4014 (2)
BG 190: Screw M 24-ISO 4014 (2)
BG 240: Screw M 24-DIN 933 (2)

Starting torques: (2)

BG 110: M_T=520 Nm
BG 130: M_T=1020 Nm
BG 160: M_T=1020 Nm
BG 190: M_T=1020 Nm
BG 240: M_T=950 Nm

Equipment:

Loctite 243

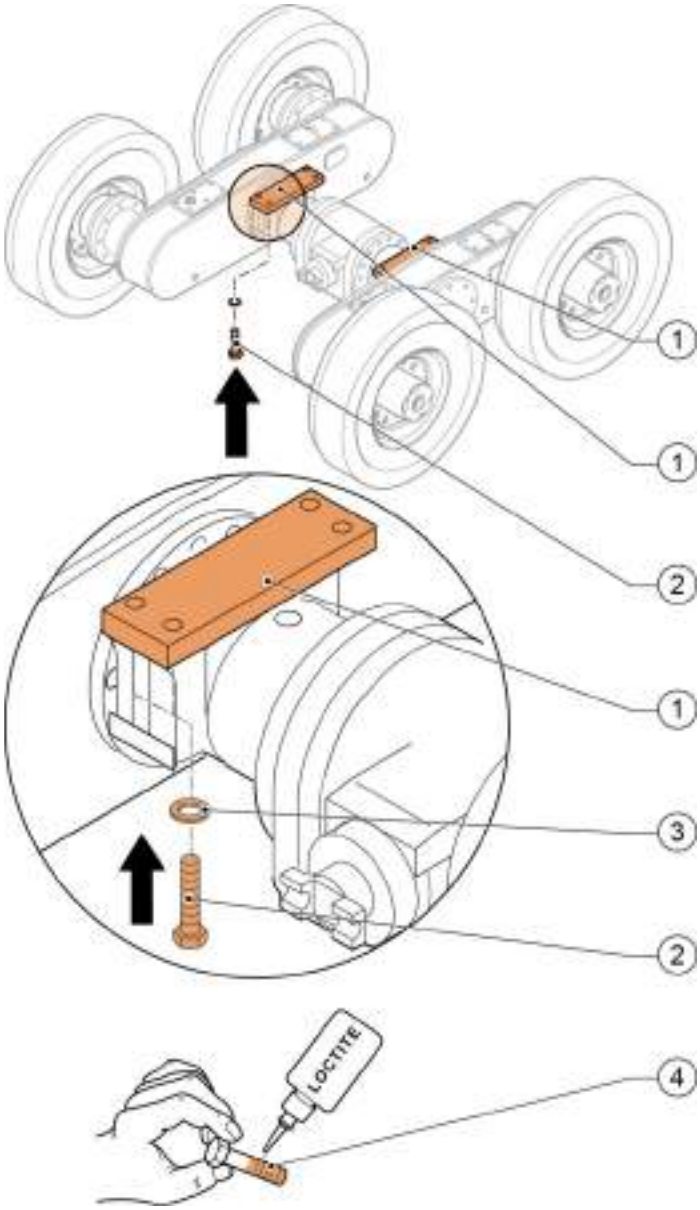


Fig. 321 Screw tandem axle on underside of grader

Step 10

Remove the closure material on the differential (3).

Assemble the screwed connections (2) and oil fill hoses (1) on the differential axle (differential gear, planetary rigid axle).

Tools:

open-end wrench

BG 110 size: 36
BG 130 size: 36
BG 160 size: 36
BG 190 size: 36
BG 190 size: 36

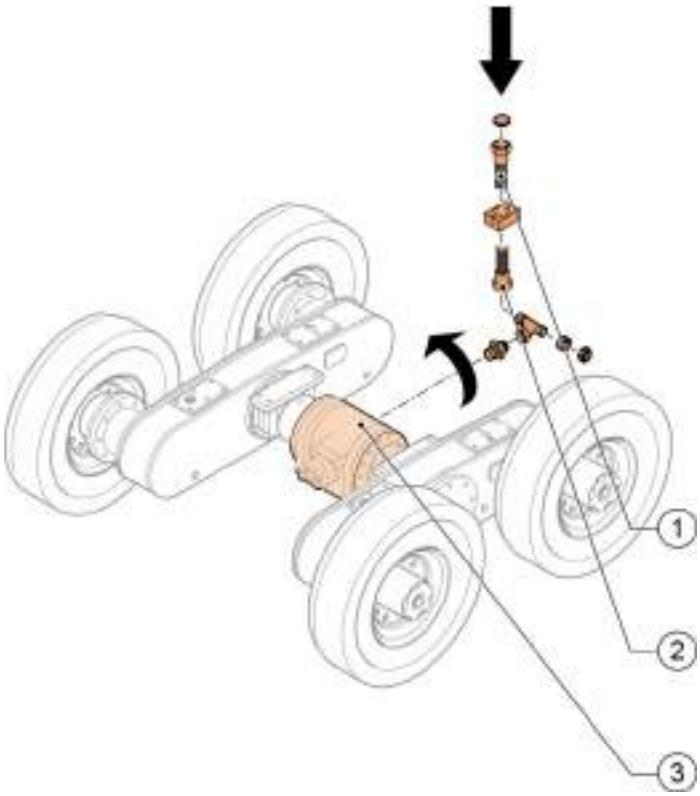


Fig. 322 Screw down oil fill hose

Step 11

Remove the closure material on the axle carriers (2).

Insert oil fill pipes (1) from above and screw them down on the axle carriers (2) with screw in socket (3).

Also fasten the differential oil fill hose in the engine compartment.

Fill the oil fill pipe with oil up to the top edge and close off.

Tools:
open-end wrench

Only for BG 110 size: 10, 13, 24, 27, 30, 36

Equipment:
hitching gear,
crane

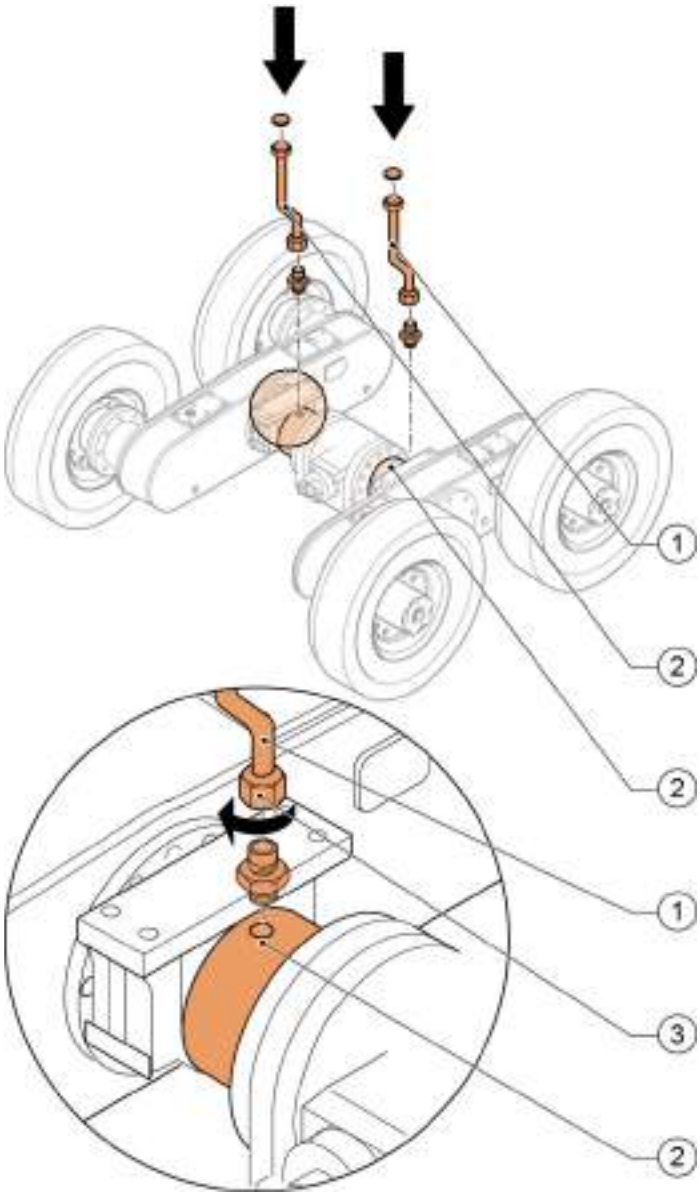


Fig. 323 Screw the oil fill tubes

NOTE

For **BG 130, BG 160** and **BG 190**, the axle carriers are filled using the differential axle filling apparatus.
On **BG 240** the differential axle (planetary rigid axle) is one compact unit.

Step 12

Secure all hex screws (3) with Loctite (4).

Attach the universal drive shaft (2) to the differential gear (1).

Screw in the hex screws (3) with a hex wrench and tighten using a torque wrench.

Tools:

Hex wrench with extension and tensile force increase,
torque wrench

BG 110 size: 8
BG 130 size: 8
BG 160 size: 8
BG 190 size: 8
BG 240 size: 8

Standardized parts: (3)

BG 110: Screw 3/8“-24 UNFx44-10.9
BG 130: Screw 3/8“-24 UNFx44-10.9
BG 160: Screw 3/8“-24 UNFx44-10.9
BG 190: Screw 3/8“-24 UNFx44-10.9
BG 240: Screw 1/2“-20 UNFx44-10.9

Starting torques: (3)

BG 110: M_T=65 Nm
BG 130: M_T=65 Nm
BG 160: M_T=62 Nm
BG 190: M_T=62 Nm
BG 240: M_T=135 Nm

Equipment:

Wire, cable binder

Loctite 243

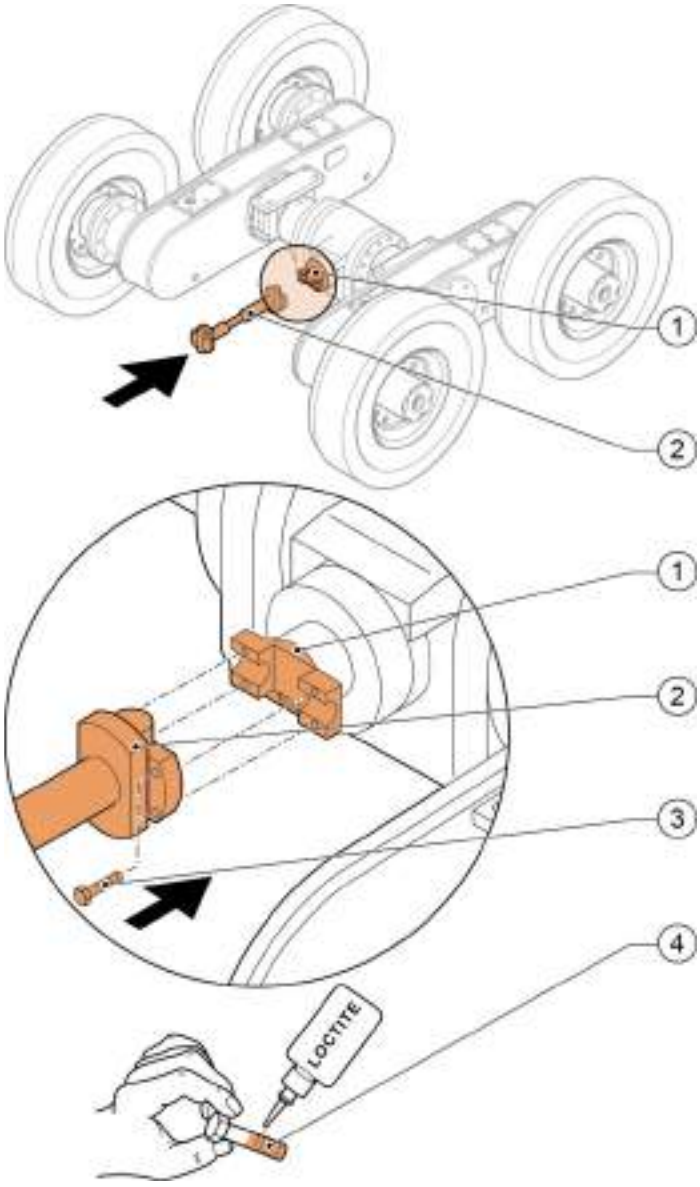


Fig. 324 Screw down universal drive shaft

Step 13

Remove the closure material on the connections (1) on the grader and the brake hoses (2).

Use flat wrench to screw all brake lines (2) to the connections (1).

Bleed all brakes.

Tools:

open-end wrench

BG 110 size: 22
BG 130 size: 22
BG 160 size: 22
BG 190 size: 22
BG 240 size: 22

Closure material:

4x ROV 12 LX
4x VkA 12
4x M12 Lx

Equipment:

hose,
reservoir

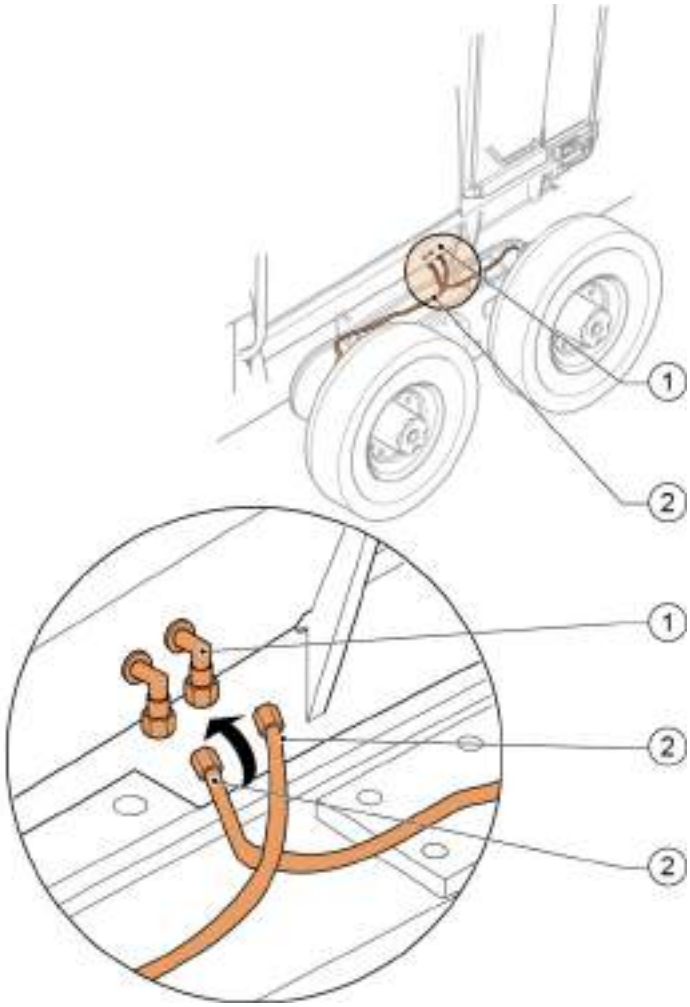


Fig. 325 Connect brake lines

Step 14

Secure all hex screws (4) with Loctite (5).

Use box wrench or open-ended wrench to screw the hex screws (4) on the supports (2) of both splash boards (2) on the tandem axle.

Tools:

Box wrench or flat wrench

BG 110 size: 19
BG 130 size: 19
BG 160 size: 19
BG 190 size: 19
BG 240 size: 19

Secure screws with Loctite 243.

Install right and left splash boards.

Standardized parts: (4)

BG 110: Screw M 12
BG 130: Screw M 12
BG 160: Screw M 12
BG 190: Screw M 12
BG 240: Screw M 12

Starting torques: (4)

BG 110: M_T=74 Nm
BG 130: M_T=74 Nm
BG 160: M_T=74 Nm
BG 190: M_T=74 Nm
BG 240: M_T=74 Nm

Weight

BG 110: approx. 56 kg
BG 130: approx. 85 kg
BG 160: approx. 96 kg
BG 190: approx. 96 kg
BG 240: approx. 108 kg

Equipment:

Loctite 243

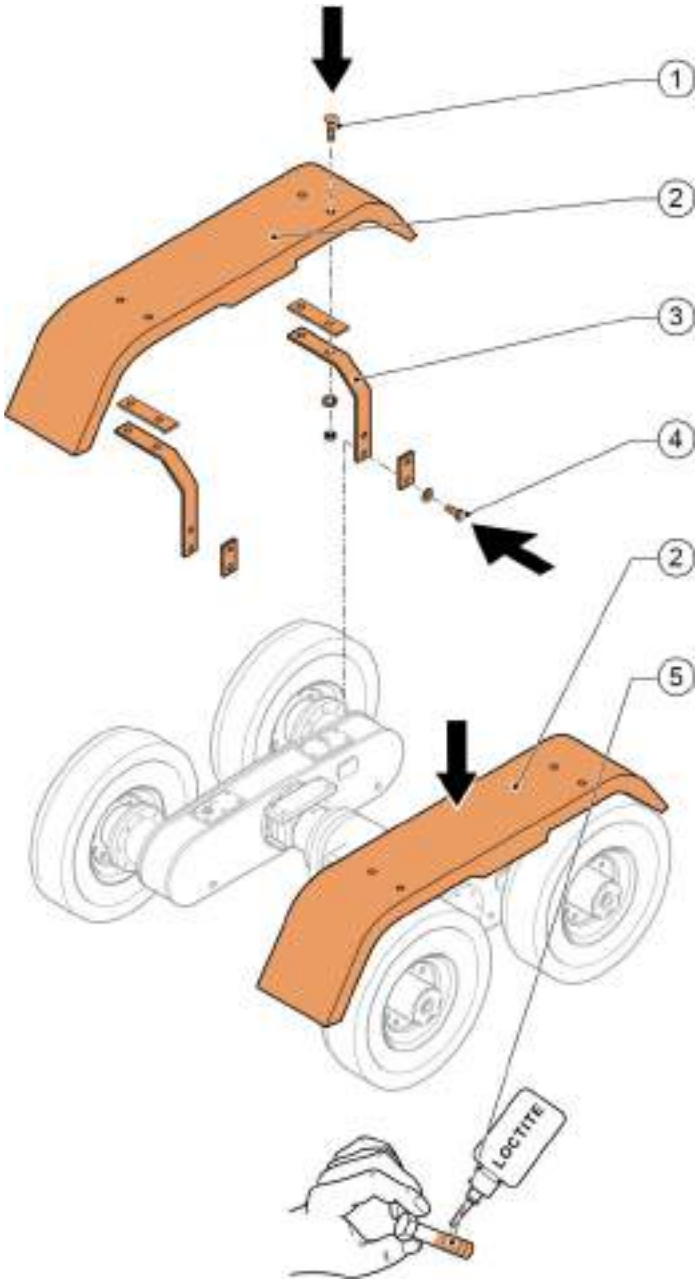


Fig. 326 Attach splash boards

Step 15

Perform functional test, brake test and seal integrity test on the grader.

5.8.2 Changing differential gear

5.8.2.1 Dismounting differential gear from axle carriers

Step 1

Mark the position of the axle carrier to the differential.

Use torque wrench to loosen and remove hex screws (3) on the left (1) and right (4) flange of the axle carrier to the differential (2).

For safety, do not unscrew 2 top hex screws (3) on both sides.

Tools:

Hex wrench + ratchet
BG 110 size: 24

open-end wrench

BG 110: SIZES 24
BG 130: SIZES 11
BG 160: SIZES 11
BG 190: SIZES 11

Starting torques: (3)

BG 110: M_T=290 Nm
BG 130: M_T=560 Nm
BG 160: M_T=560 Nm
BG 190: M_T=560 Nm

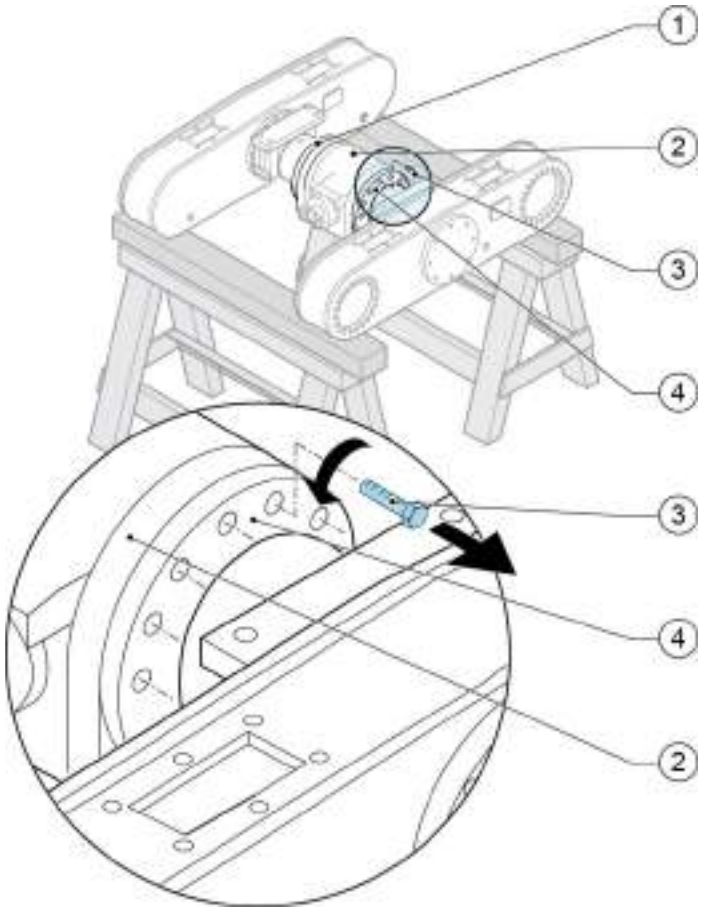


Fig. 327 Loosen hex screws to the differential

NOTE

On **BG 240** the differential axle (planetary rigid axle) is one compact unit.
See repair manual MT-G3085.

Step 2

Suspend suitable slinging equipment (1) from ring bolts.

Using the crane, lift the tandem axle (3) and set on the floor.

Lay wooden beam (2) underneath.

Weight

BG 110: approx. 850 kg
BG 130: approx. 1200 kg
BG 160: approx. 1350 kg
BG 190: approx. 1250 kg

Equipment

hitching gear,
crane,
wooden beam

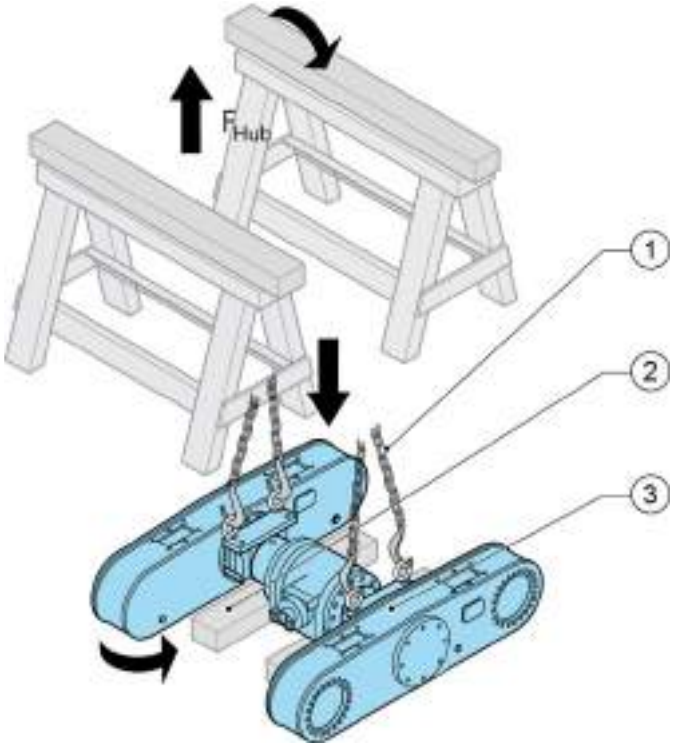


Fig. 328 Place tandem axle on floor.

Step 3

Suspend suitable slinging equipment (1) from eyelets on right tandem housing (2).

Use hex wrench to remove the last hex screws (3) from the right flange (4) of the axle carrier to the differential (5).

Tools:

Hex wrench + ratchet

BG 110: size 24
BG 130: size 30
BG 160: size 30
BG 190: size 30

Weight

BG 110: approx. 650 kg
BG 130: approx. 850 kg
BG 160: approx. 950 kg
BG 190: approx. 800 kg

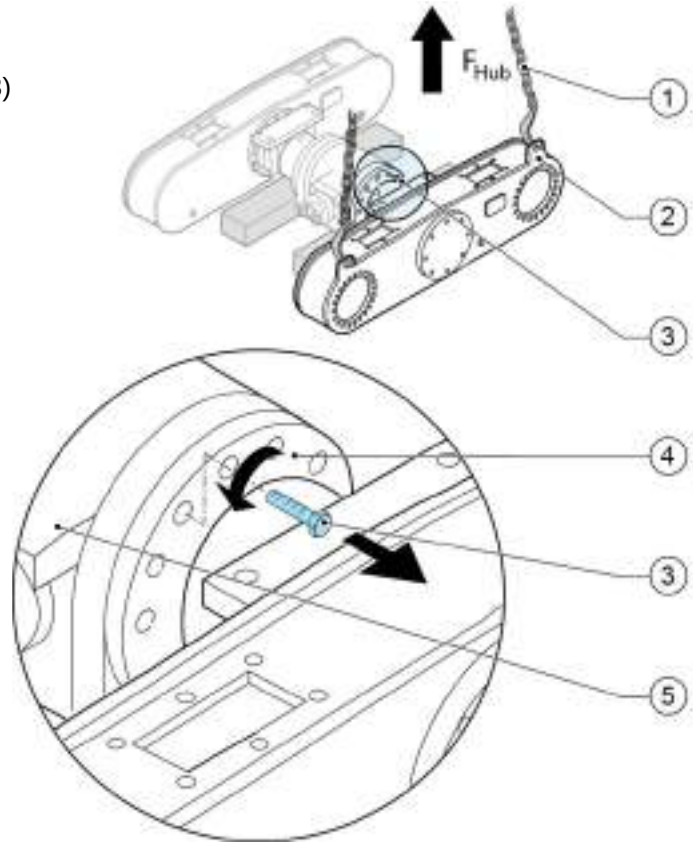


Fig. 329 Loosen the last hex screws from the right flange to the differential

Step 4

Gently lift right tandem housing (1) with axle carrier (2).

By pressing on a crowbar or similar, lever the two parts apart from one another until the knockout spindle (4) is removed from the differential (3). If necessary, support by hitting with the hammer and wood against the tandem housing (1).

Use crane to lay tandem housing (1) aside with right axle carrier.

Equipment:

crane,
hitching gear,
crowbar,
hammer,
wood

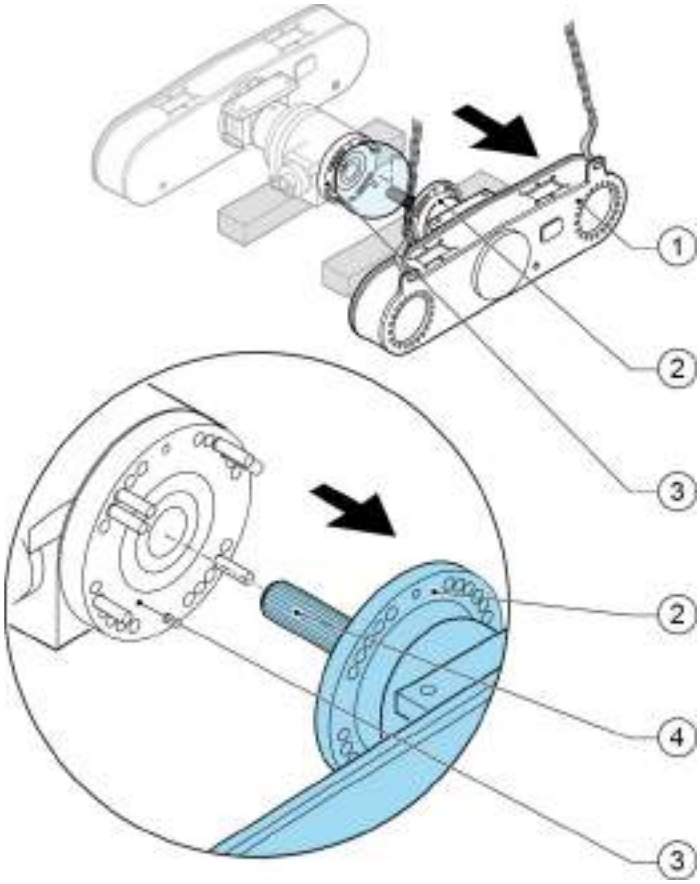


Fig. 330 Separate differential and right axle carrier

Step 5

Make and secure a loop around the differential (2) with the cable (1).
Use the crane to slightly tighten the cable (1).

Use hex wrench to remove the last hex screws (3) from the left flange (4) of the axle carrier to the differential (2).

Tools:

Hex wrench + ratchet
BG 110: sizes 24
BG 130: size 30
BG 160: size 30
BG 190: size 30

Weight

BG 110: approx. 120 kg
BG 130: approx. 154 kg
BG 160: approx. 175 kg
BG 190: approx. 161 kg

Equipment:

cable

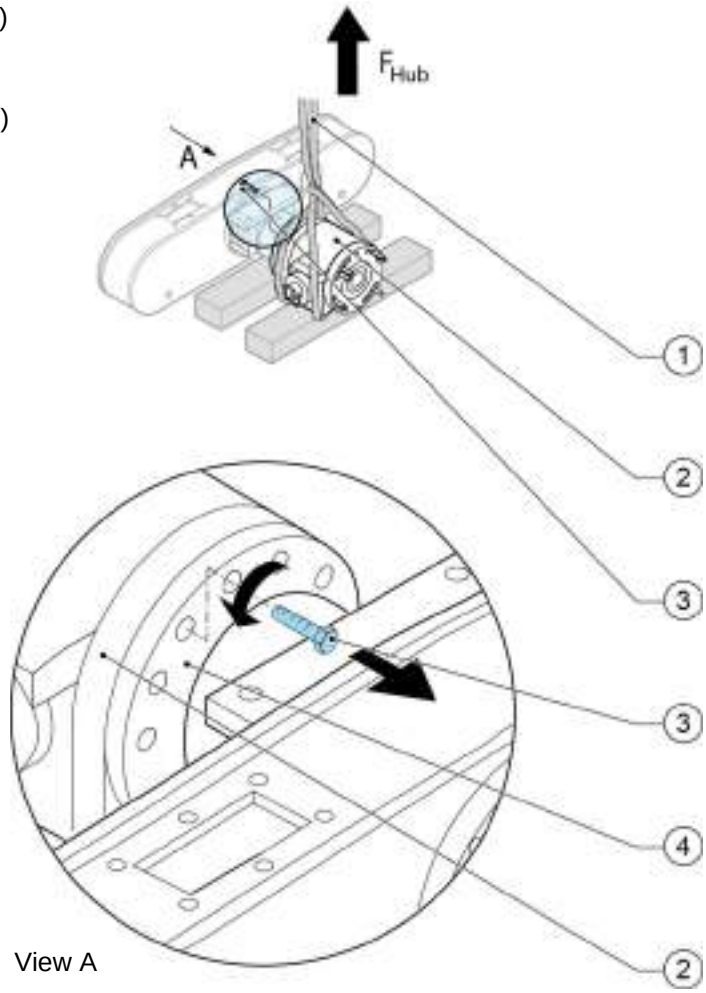


Fig. 331 Loosen the last hex screws from the left flange to the differential

Step 6

Press with a crowbar or similar to lever the differential (2) and the left tandem housing with axle carrier (3) apart from one another. Pull the differential (2) completely out of the knockout spindle (4).

If necessary, support by hitting with the hammer and wood against the tandem housing (3).

Use crane to raise the differential (2) on the cable (1) and set aside.

Weight

BG 110: approx. 120 kg
BG 130: approx. 154 kg
BG 160: approx. 175 kg
BG 190: approx. 161 kg

Equipment:

crane,
cable,
crowbar,
hammer,
wood

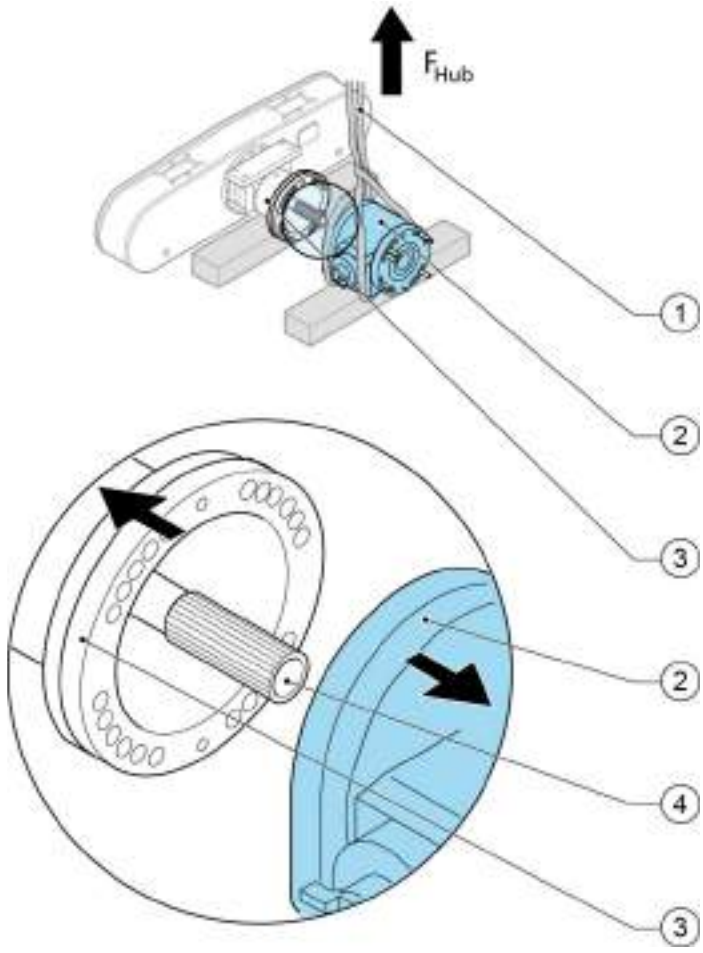


Fig. 332 Separate differential and left axle carrier

5.8.2.2 Mounting differential gear onto axle carriers

Step 1

Make and secure a loop around the new differential (2) with the cable (1).
Use the crane to slightly tighten the cable (1).

Lay a wooden beam under the left axle carrier (4) and differential (2).

Clean the surfaces of the left axle carrier (4) and differential (2).

Hit all cotter pins (3) into the holes provided on both sides of the differential (2).

Affix the round ring (5) on the differential (2) with lubricating grease

Standardized parts:

BG 110: O-ring 144x4 72 NBR
BG 130: O-ring 265x4 72 NBR 872
BG 160: O-ring 265x4 72 NBR 872
BG 190: O-ring 265x4 72 NBR 872

Weight

BG 110: approx. 120 kg
BG 130: approx. 154 kg
BG 160: approx. 175 kg
BG 190: approx. 161 kg

Equipment:

brake cleaner or similar,
rag,
lubricating grease,
hammer

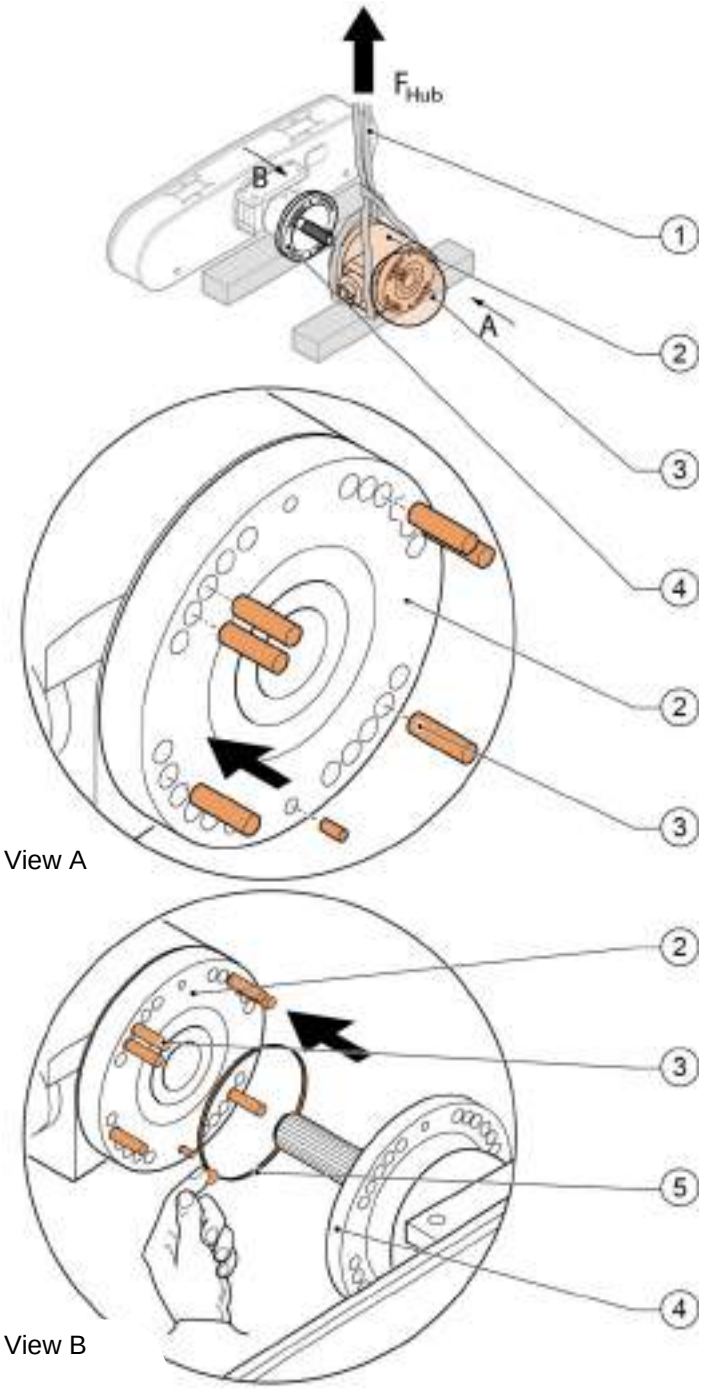


Fig. 333 Prepare differential

DANGER

Old round rings (5) must not be reused!

Step 2

Use crane and cable (1) to raise the differential (2) gently and move to the axle carrier (3).

Insert the differential (2) carefully into the insert shaft (4) of the left axle carrier (3).

Watch cotter pins and the position of the round ring on the differential (2)!

Do not apply any additional sealant!

Equipment:

crane,
cable

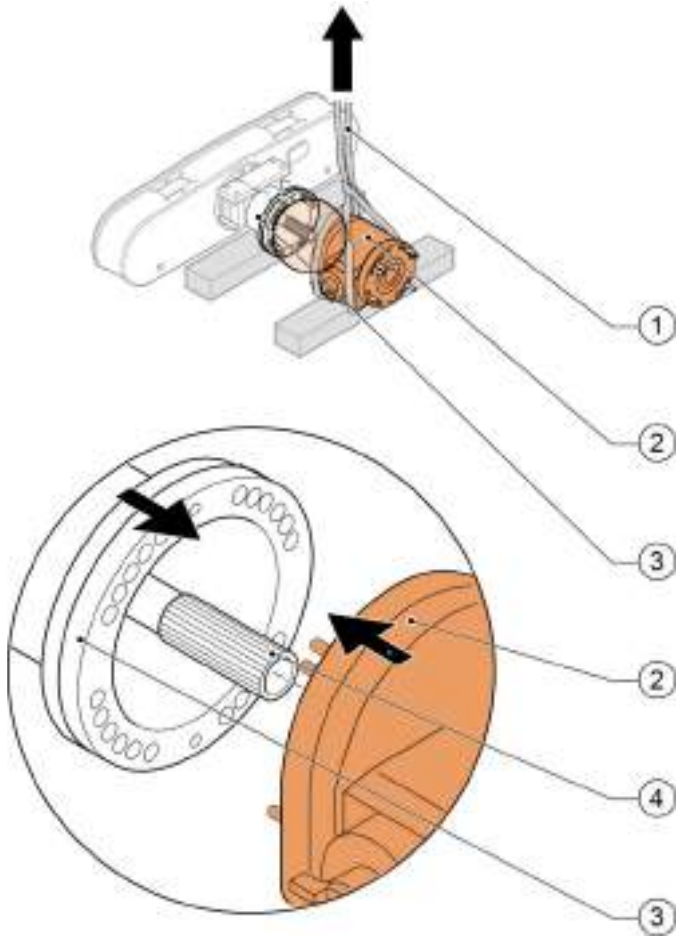


Fig. 334 Insert differential in insert shaft on left axle carrier

Step 3

Use hex wrench to screw in all hex screws (3) on the flange (4) of the left axle carrier to the differential (2), thus joining the two parts (2+4).

Use torque wrench to tighten all hex screws (3).

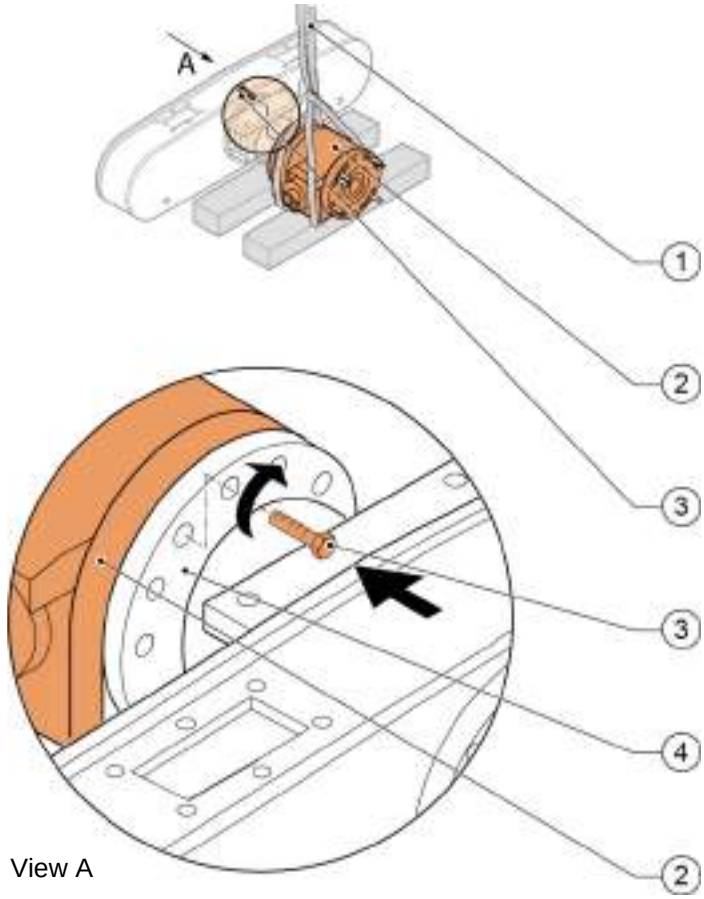
Do not glue screws in place!

Tools:
Hex wrench + ratchet

BG 110: SIZES 24
BG 130: size 30
BG 160: size 30
BG 190: size 30

Starting torques: (4)

BG 110: M_T=300 Nm
BG 130: M_T=590 Nm
BG 160: M_T=590 Nm
BG 190: M_T=590 Nm



View A

Fig. 335 Screw in screws on the left axle carrier to the differential.

Step 4

Sling suitable slinging equipment in eyelets on right tandem housing (1).

Clean the surfaces of right axle carrier (2) and differential (3).

Affix the round ring (5) on the differential (2) with lubricating grease.

Use crane and cable to raise the tandem housing (1) gently and move to the differential (3).

Insert the insert shaft (4) in the left axle carrier (2) carefully into the differential (3).

Watch cotter pins and the position of the round ring on the differential (5)!

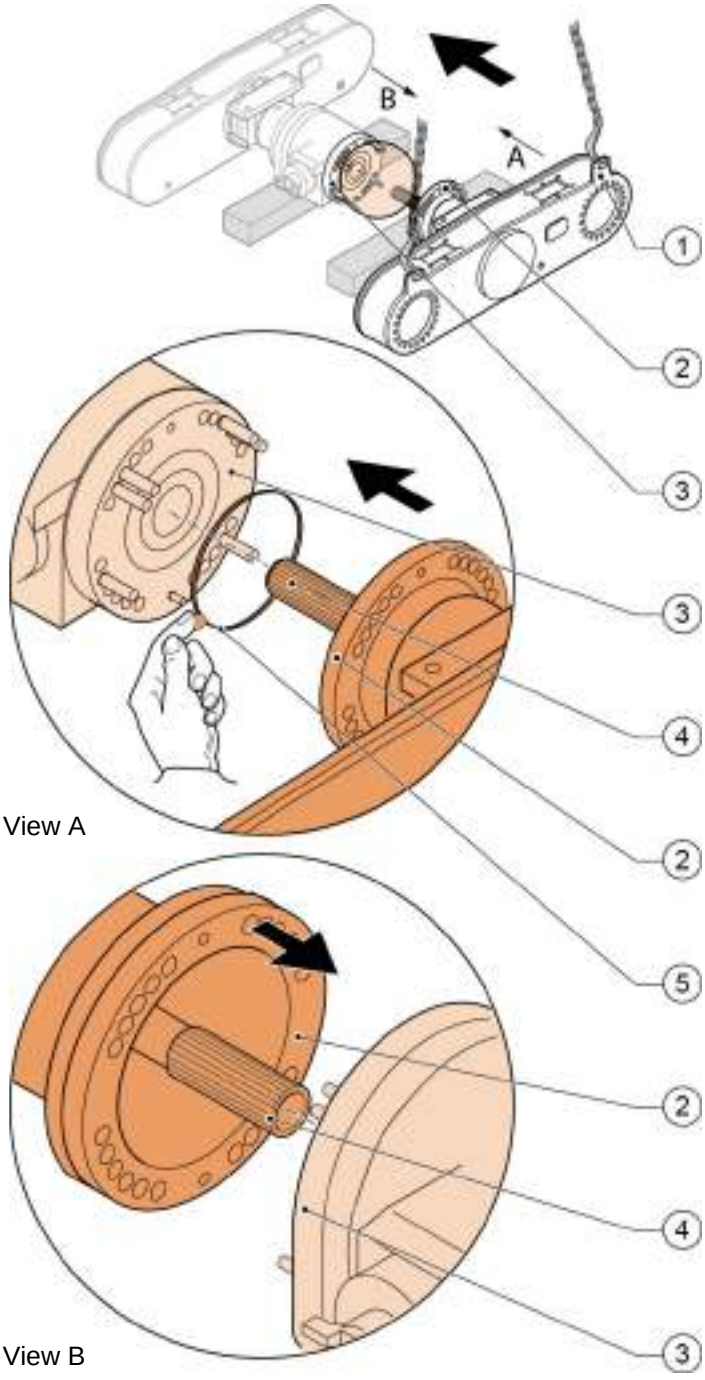
Do not apply any additional sealant!

Weight
Tandem housing + axle carrier

BG 110: approx. 350 kg
BG 130: approx. 470 kg
BG 160: approx. 550 kg
BG 190: approx. 620 kg

Equipment:

brake cleaner or similar,
rag,
lubricating grease,
hammer



View A

View B

Fig. 336 Insert right axle carrier with insert shaft into differential

DANGER

Old round rings (5) must not be reused!

Step 5

Use socket wrench to screw in all hex screws (1) on the flange (2) of the right axle carrier to the differential (3), thus joining the two parts (2+3).

Use torque wrench to tighten all hex screws (1).

Do not glue screws in place!

Tools:
Hex wrench + ratchet

BG 110: SIZES 24
BG 130: size 30
BG 160: size 30
BG 190: size 30

Starting torques: (4)

BG 110: M_T=300 Nm
BG 130: M_T=590 Nm
BG 160: M_T=590 Nm
BG 190: M_T=590 Nm

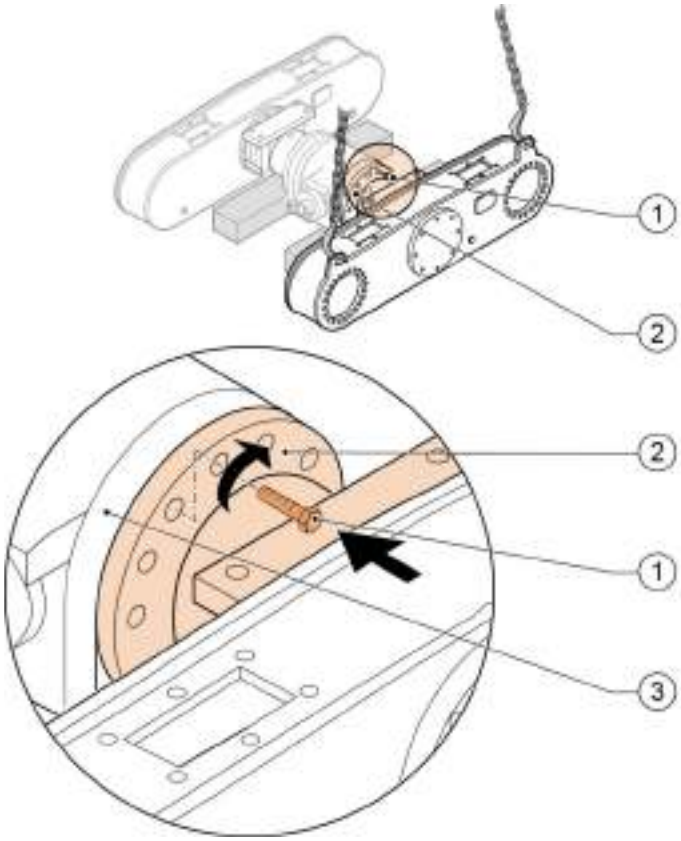


Fig. 337 Screw in screws on right axle carrier to the differential.

Step 6

Suspend hook chains (2) from the eyelets (2).

Using a crane, lift the tandem axle (1) and set on metal supports (4).

Equipment:
crane,
hook chains,
metal supports

Weight
BG 110: approx. 850 kg
BG 130: approx. 1200 kg
BG 160: approx. 1350 kg
BG 190: approx. 1250 kg

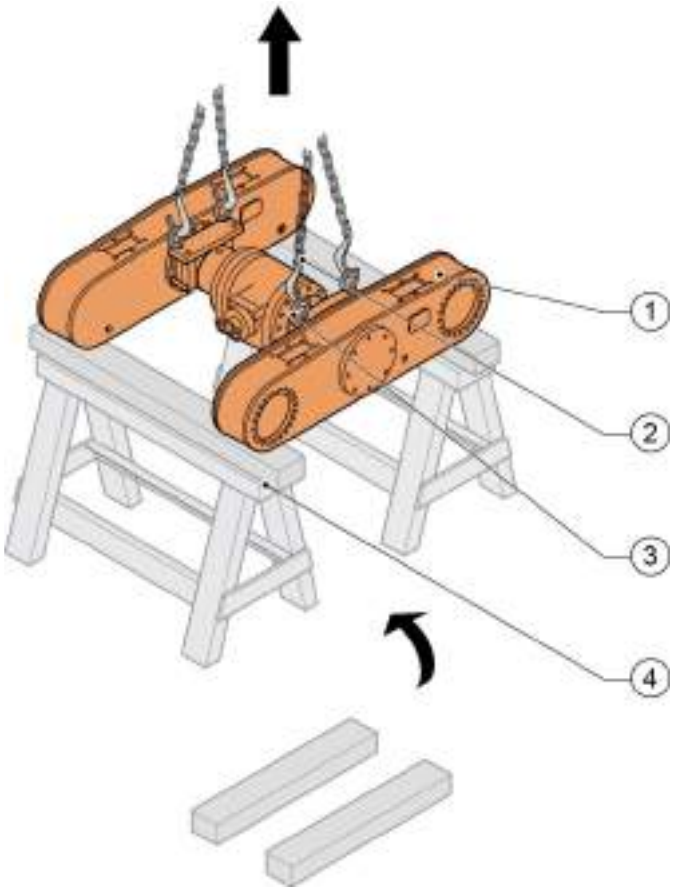


Fig. 338 Place tandem axle on metal supports

5.8.3 Replacing tandem chain

NOTE
For each grader type, the left and right tandem housings are the same. In this way, the arrangement of the front and rear chains and that of the left and right cover are set against one another. For example, on **BG 130, BG 160, BG 190** and **BG 240** in the tandem in the right side, the chain is at the inside front and the chain outside rear. On the left side it is the opposite.

BG 110

Inside chain (1)
Outside chain (2)

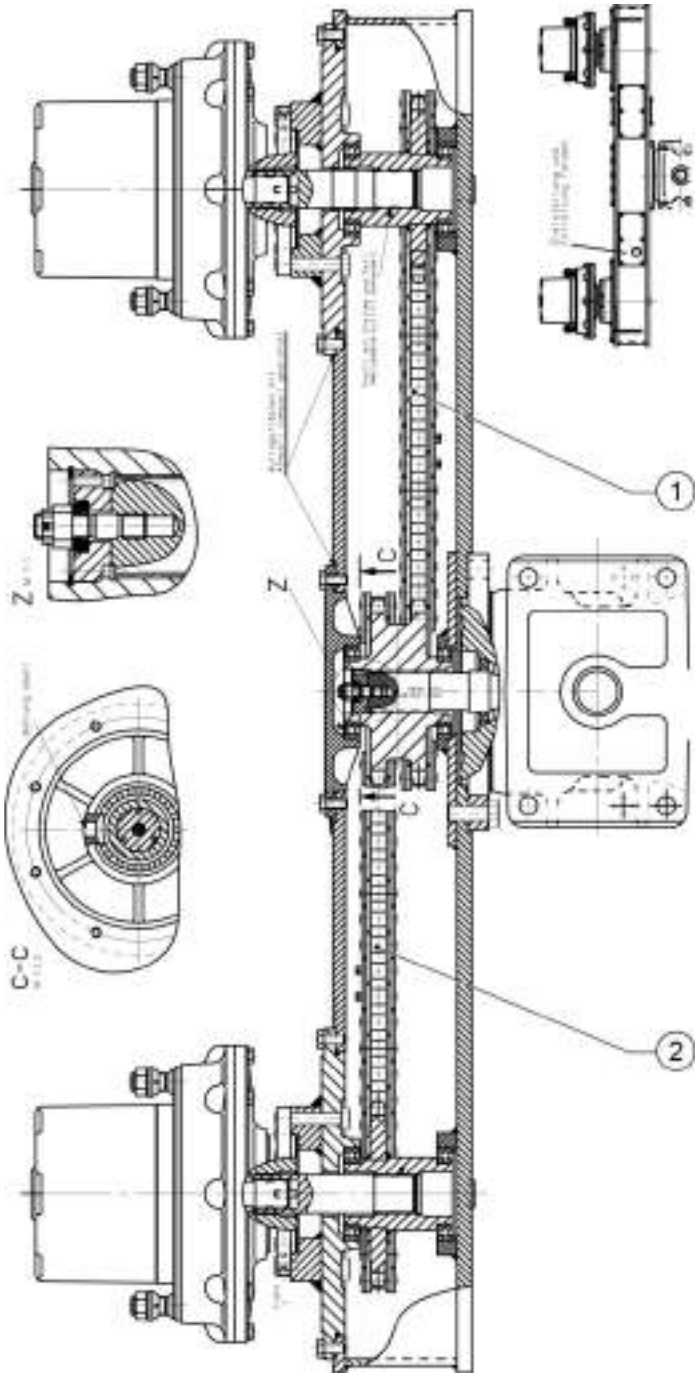


Fig. 339 Tandem chain BG 110

BG 160

Inside chain (2)
Outside chain (1)

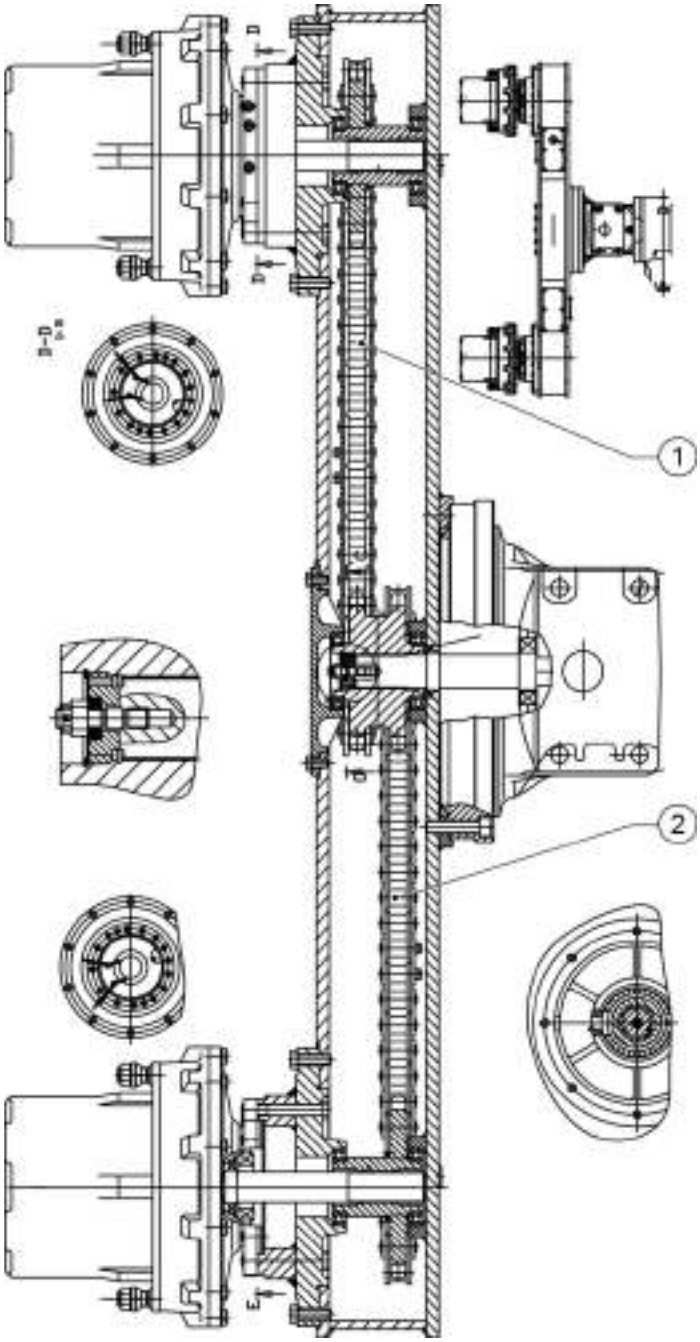


Fig. 340 Tandem chain BG 160

BG 190 / BG 240

Inside chain (2)
Outside chain (1)

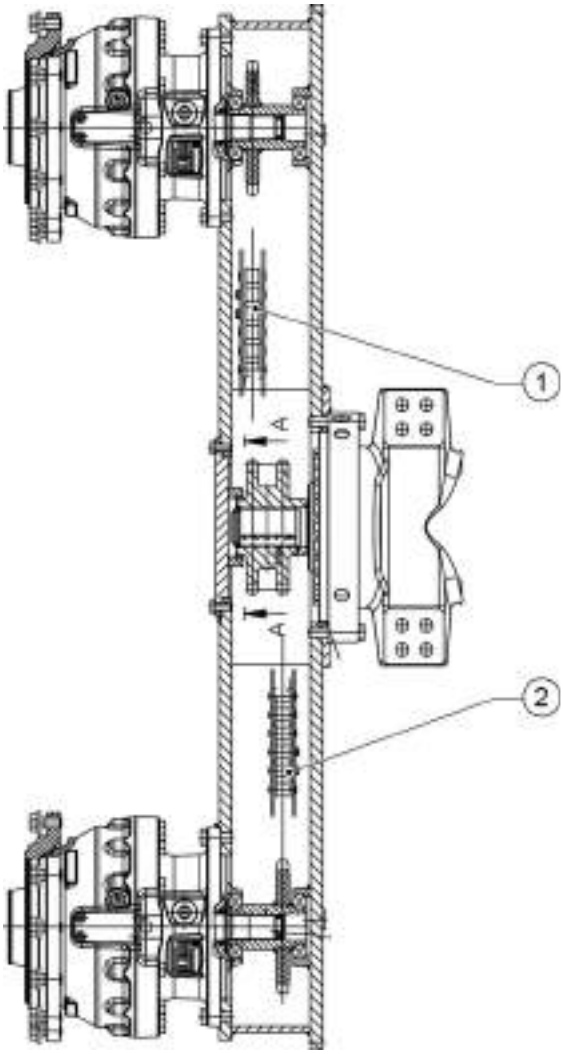


Fig. 341 Tandem chain BG 190 / 240

5.8.3.1 Dismounting chain

Step 1

Open the cover. Chain lock installation and deinstallation.

Use a ring wrench to loosen all hex screws.

Remove all covers from tandem housing.

Equipment:

crane,
hitching gear,
crowbar,
hammer,
wood

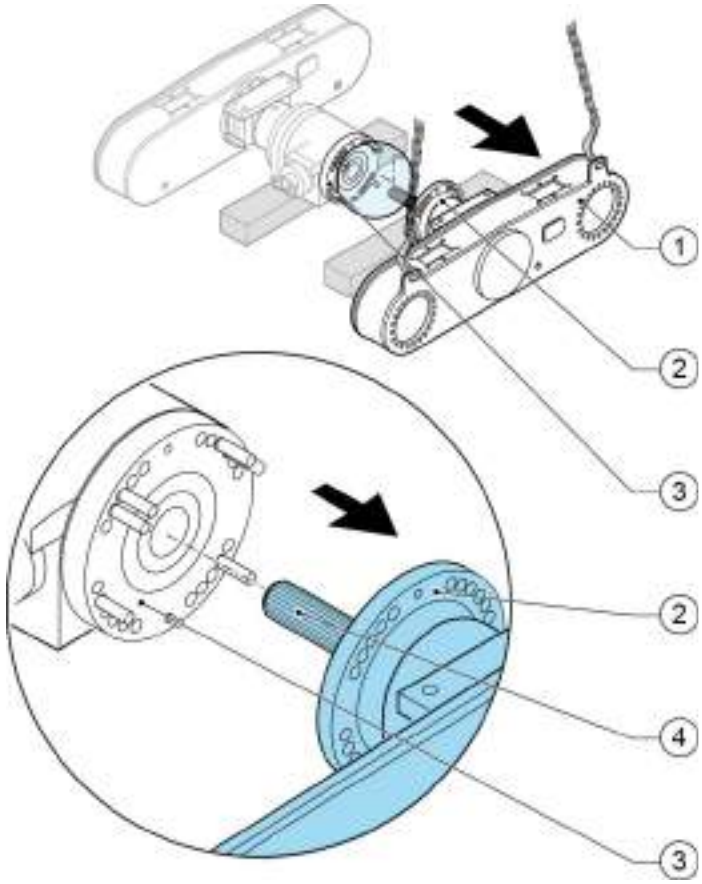


Fig. 342 Separate differential and right axle carrier

Step 2

Use box wrench to loosen all hex screws (1).

Remove all covers (2) from the tandem axle (3).

The contact surface is sealed with Atmosit compact.

Tools:

box spanner

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Standardized parts: (1)

BG 110: Screw M8-10.9 DIN 933
BG 130: Screw M8-8.8 DIN 933
BG 160: Screw M8-8.8 DIN 933
BG 190: Screw M8-8.8 DIN 933
BG 240: Screw M8-8.8 DIN 933

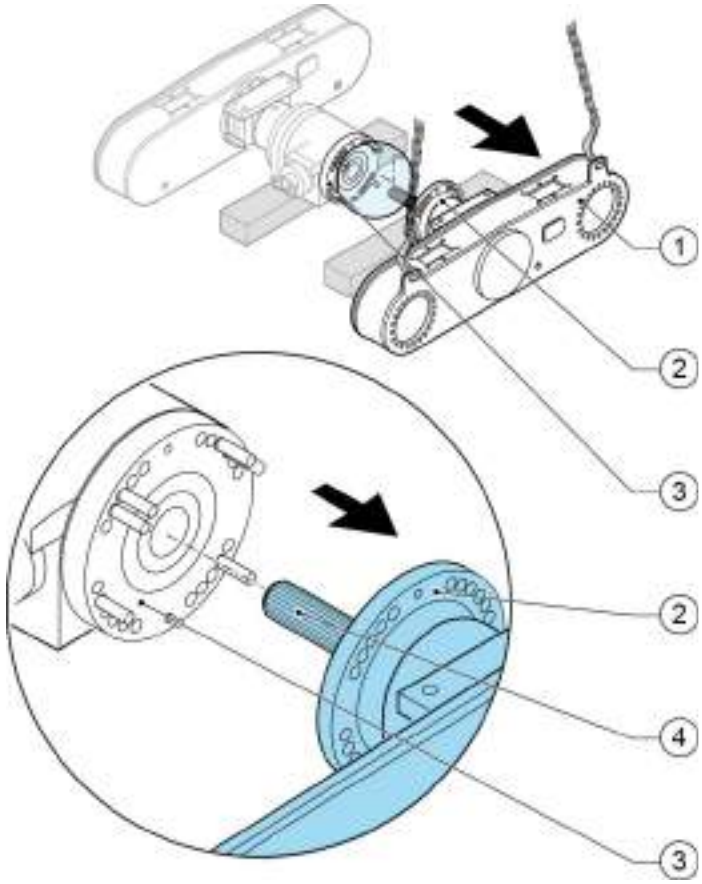


Fig. 343 Loosen top cover from the tandem axle.

Step 3

Use box wrench to loosen all hex screws (5).

Remove all covers (4) from the tandem axle.

The contact surface is sealed with Atmosit compact.

Move rear axle so that the chain lock is positioned by the assembly opening (3).

Tools:

box spanner

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

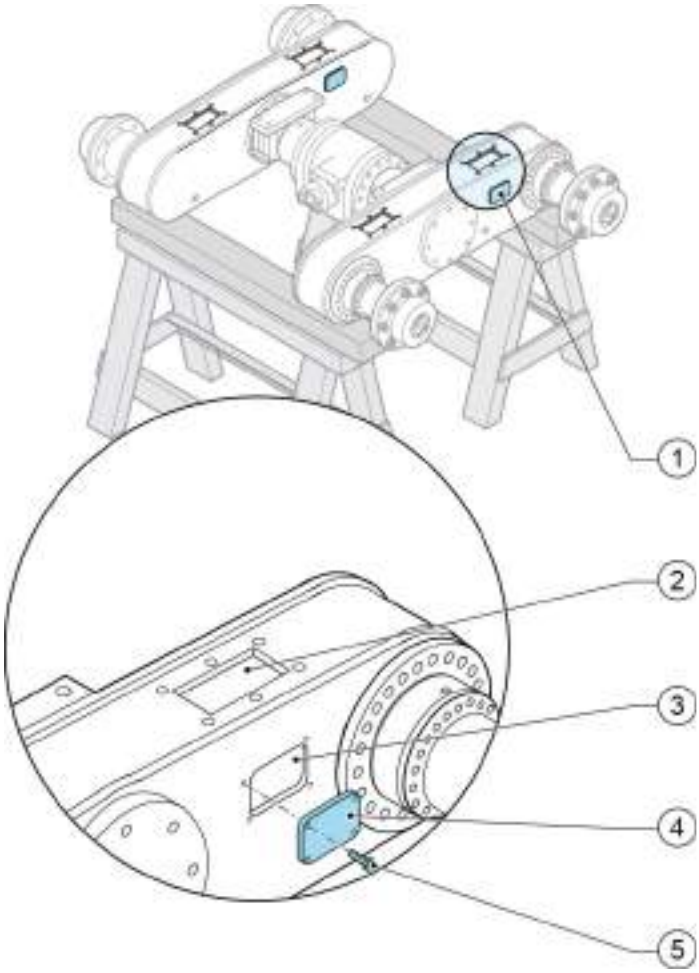


Fig. 344 Loosen side cover from the tandem axle.

Step 3

Set the chain tensioner (1) on the chain (4) through the top opening (2).
Set the chain tensioner to tighten.

Remove the keys (5) from the chain lock (4) and disassemble the chain lock.

Remove the chain above the upper opening (2).

Equipment:

chain tensioner 9080135

screwdriver,
pliers

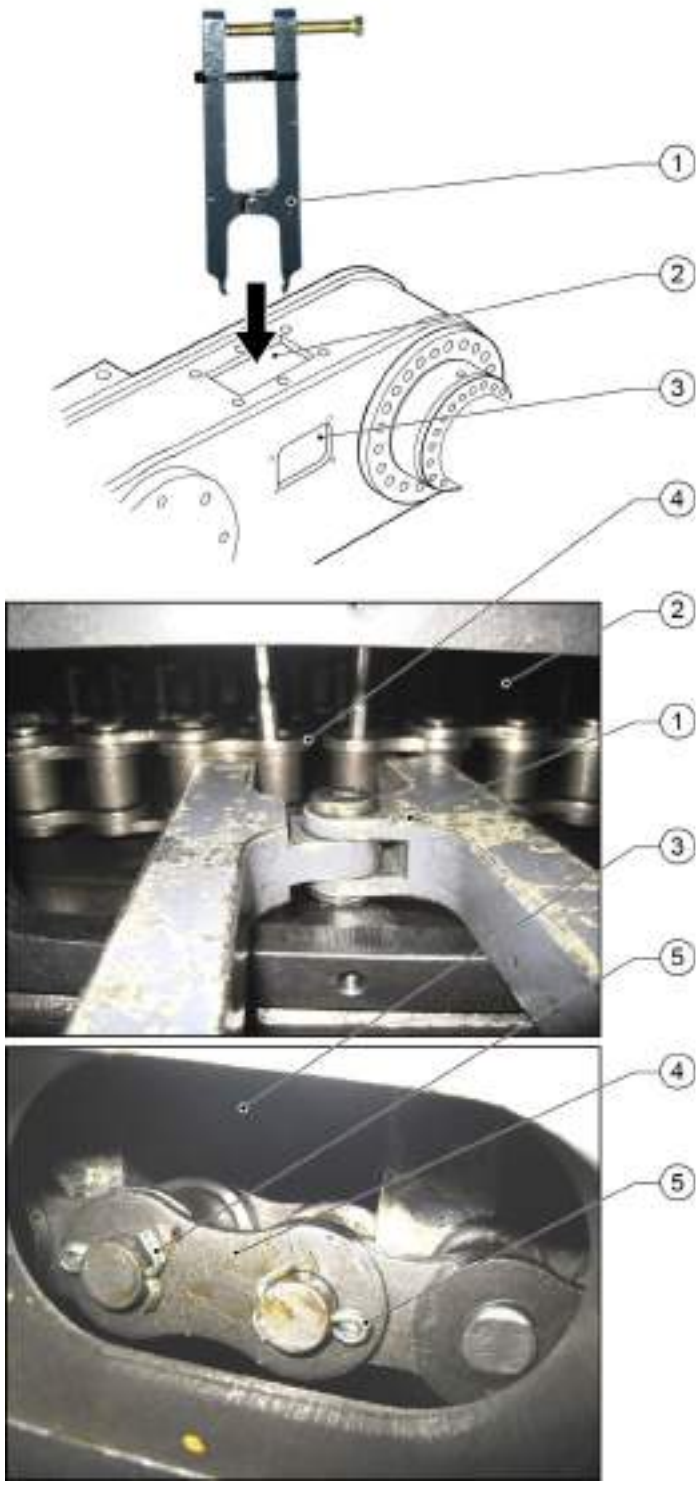


Fig. 345 Open chain with chain tensioner

NOTE

First always remove the external chain from the chain carrier!

5.8.3.2 Mounting the chain

Step 1

Feed the chain (1) through the upper opening (2).

First always mount the internal chain in the chain carrier!

Lay the chain on the double chain wheel and the chain wheel (3) so that the separating points of the chain are located at the opening (4) for the installation of the chain lock.

Feed two mandrels (5) through the chain ends.

Equipment:

2x mandrel

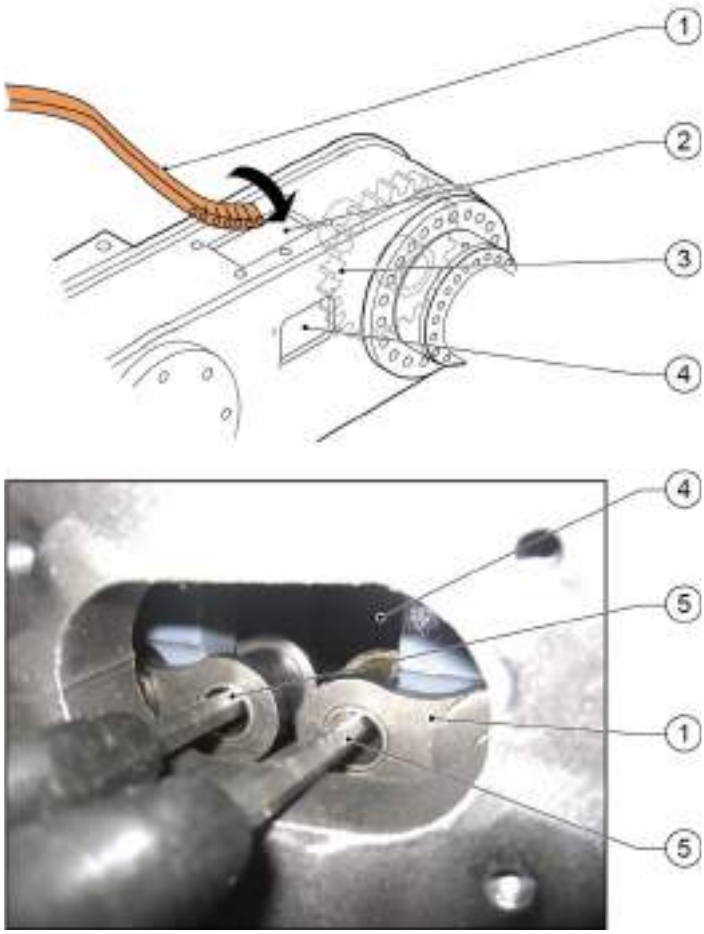


Fig. 346 Feed chain

NOTE
First always mount the internal chain in the chain carrier!

Step 2

Set the chain tensioner (1) on the chain ends (3) through the top opening (2).

Place ratchet (4) on chain tensioner (1) and pull the chain together.

Equipment:

chain tensioner 9080135

ratchet with adapter,
2x mandrel

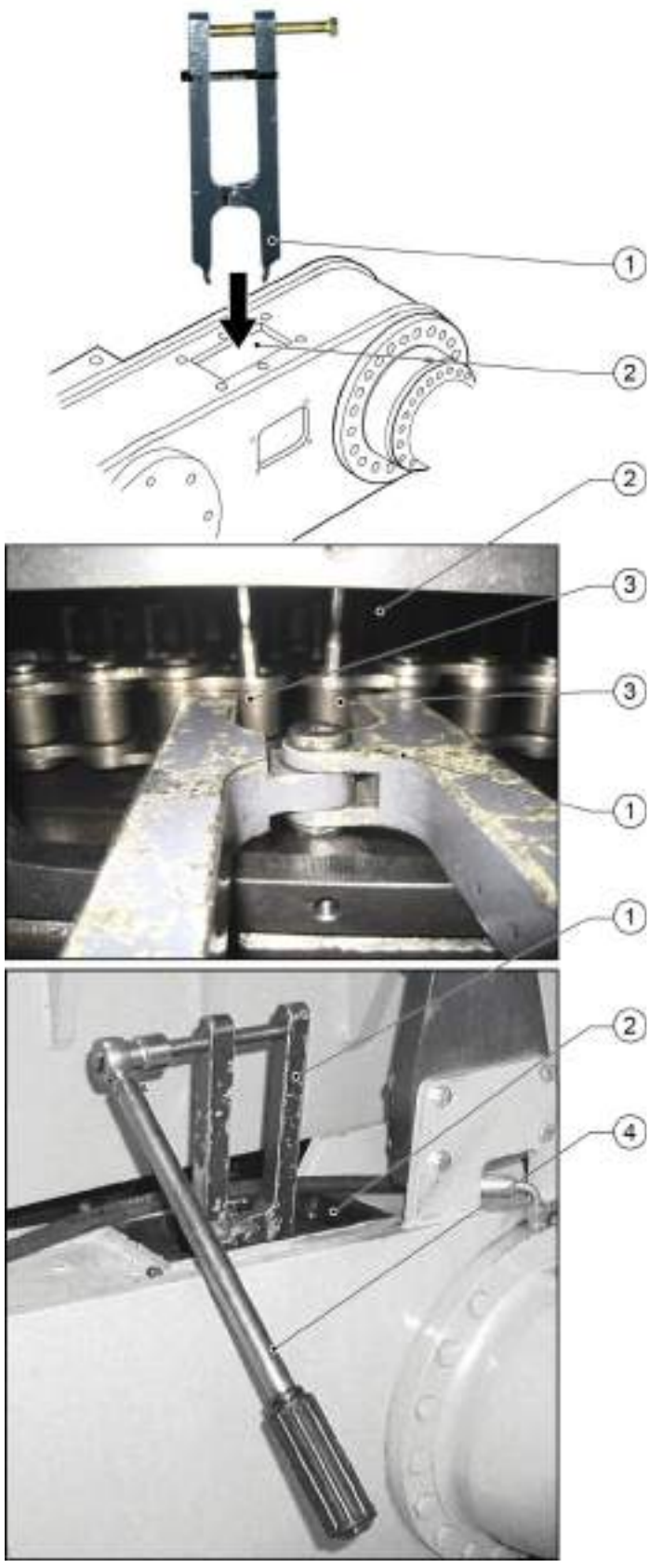


Fig. 347 Use chain tensioner to pull chain together

Step 3

Use the chain tensioner (1) to pull the chain ends (2) together until the chain lock (5) fits.

Insert chain lock (5) from inside to outside.

Secure the chain lock with keys (4).

Equipment:

chain tensioner 9080135

ratchet with adapter,
2x mandrel (3),

pliers

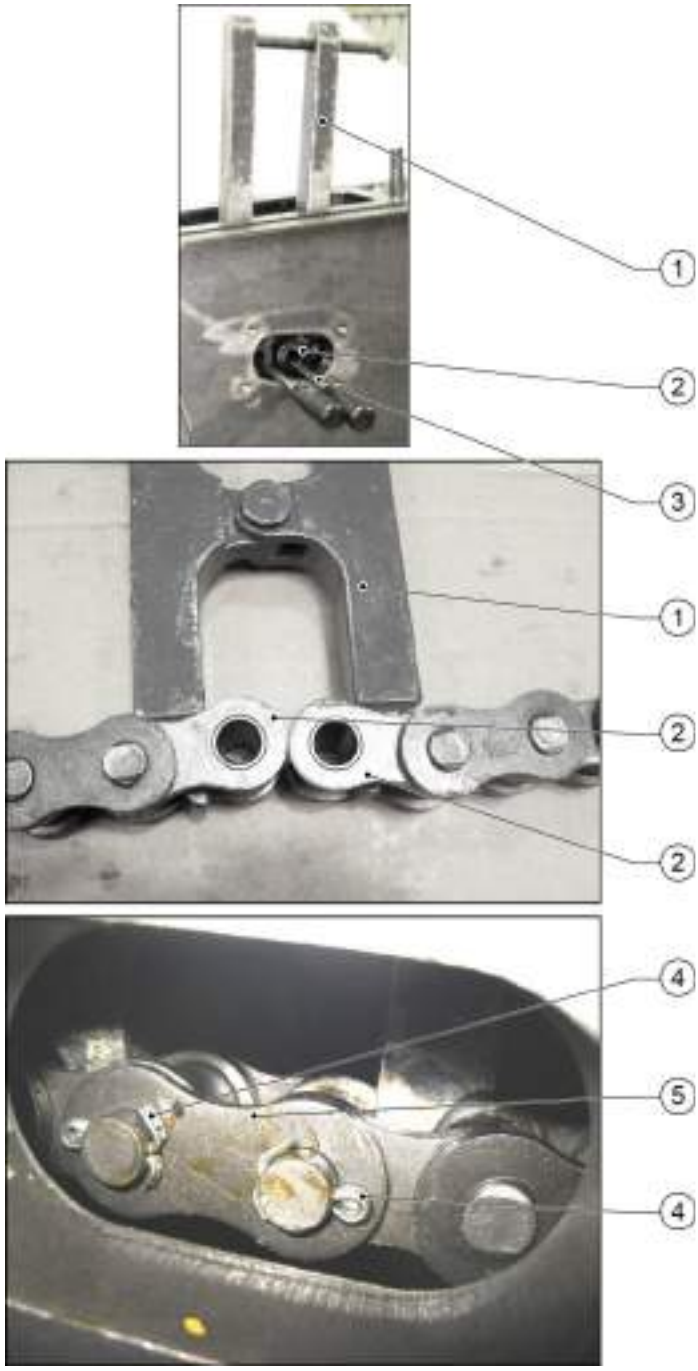


Fig. 348 Feed chain

Step 4

Secure all screws with Loctite 243 (4).

Seal the contact surface using Atmosit compact.

Screw cover (2) to tandem axle with hex screws (3) using ring wrench.

Tools:

box spanner

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Equipment:

Atmosit compact

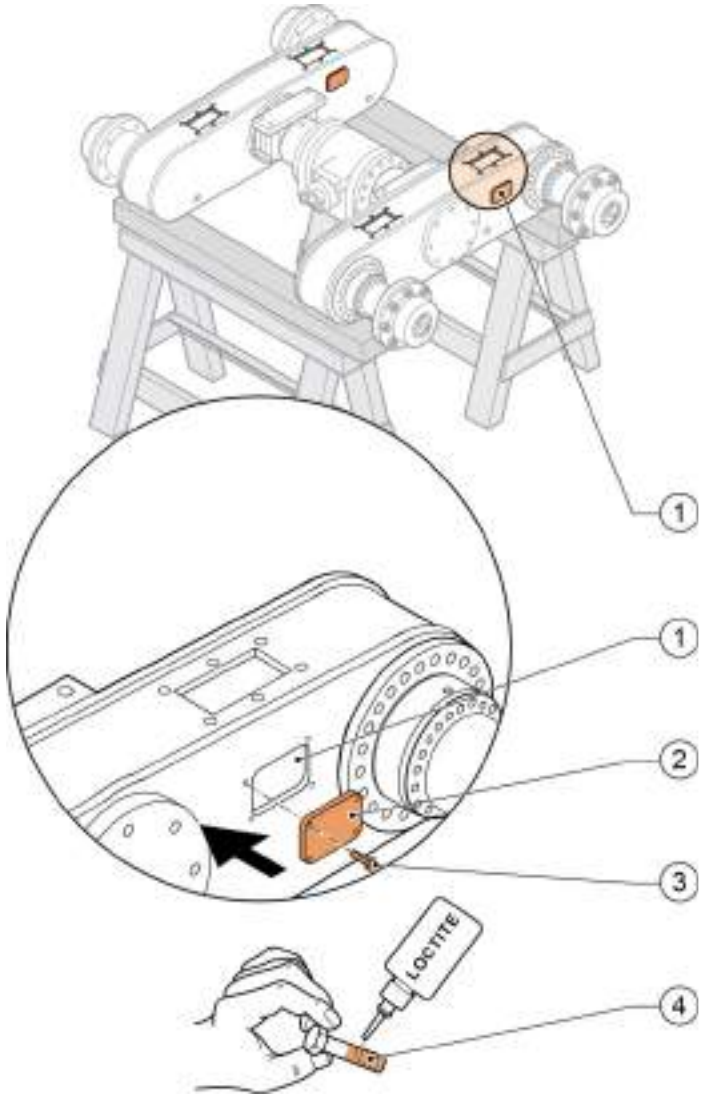


Fig. 349 Screw side cover onto tandem axle

Step 5

Secure all screws with Loctite 243 (4).

Seal the contact surface using Atmosit compact.

Screw cover (2) to tandem axle with hex screws (3) using ring wrench.

Tools:

box spanner

BG 110 size: 13
BG 130 size: 13
BG 160 size: 13
BG 190 size: 13
BG 240 size: 13

Equipment:

Atmosit compact

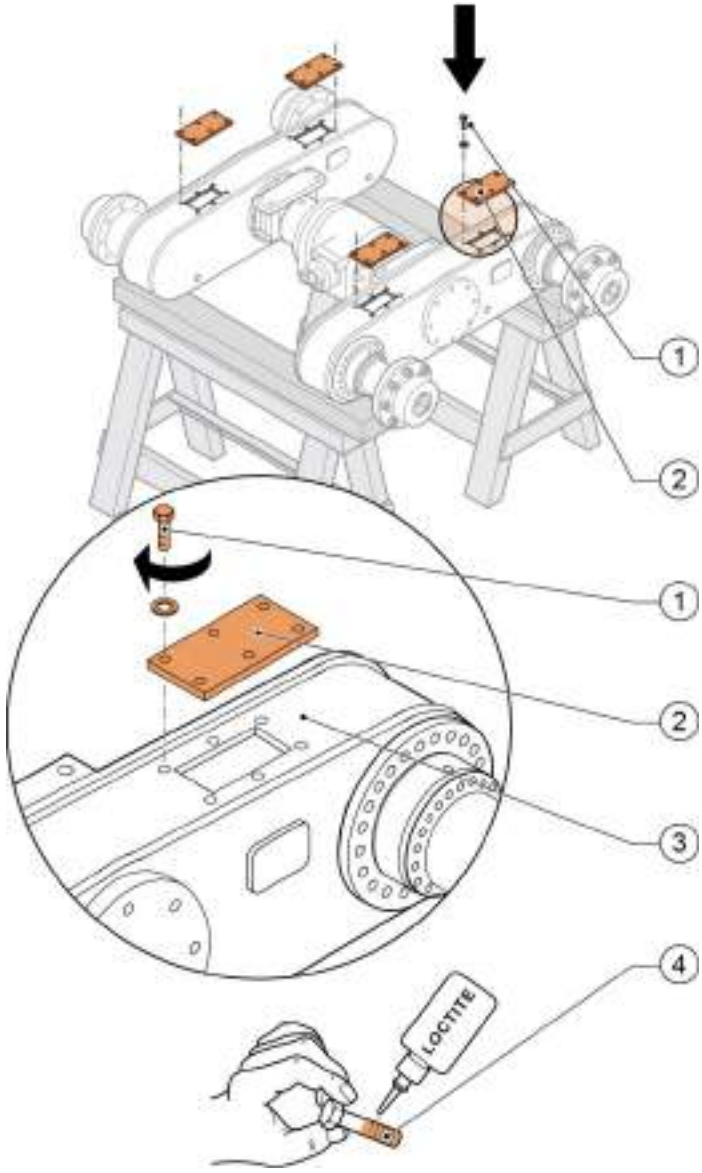


Fig. 350 Screw top cover onto tandem axle