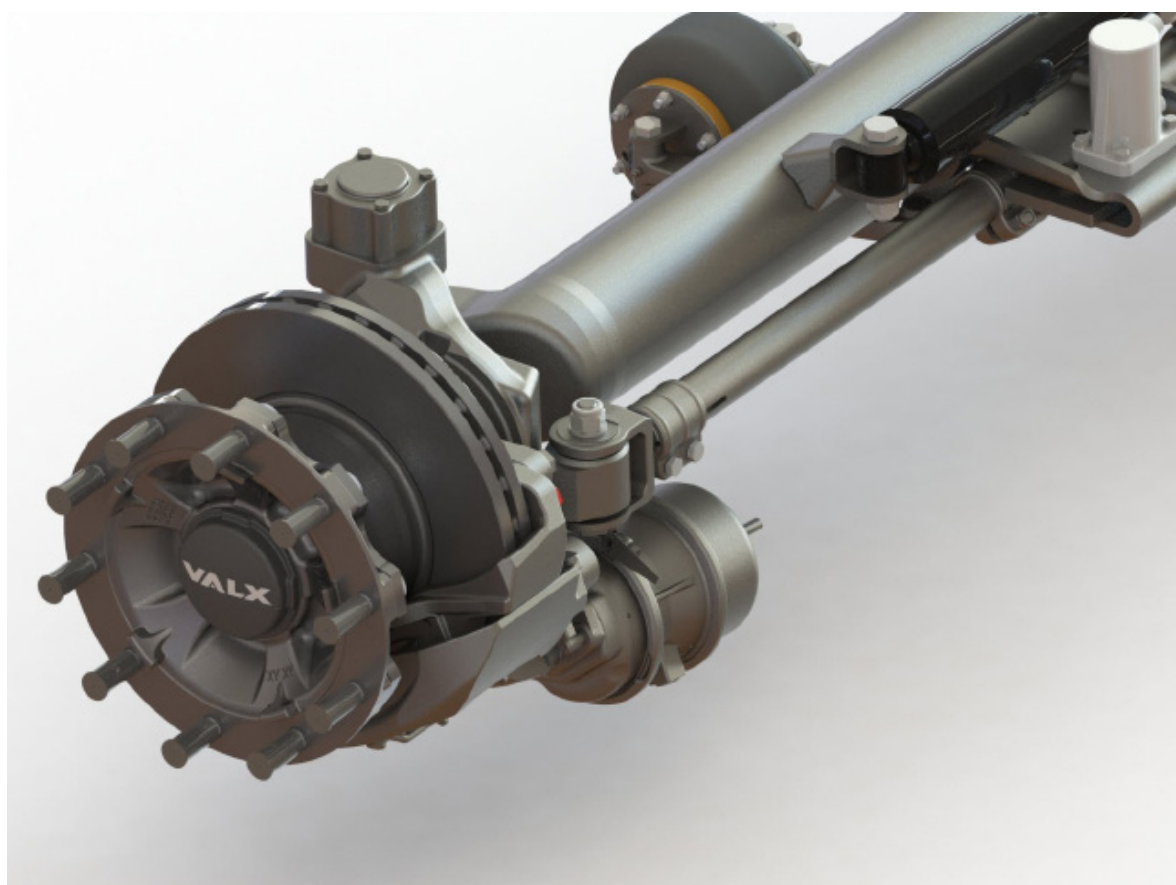


VALX Steering axle

Workshop manual



Document code

WSM_2053-03

Date

Februari 2021



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Revision summary

Date	Revision number	Comment
October 2019	01	Initial version
December 2019	02	Added radial king pin play check
Februari 2021	03	Updated adress info + alignment instruction

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Preface

Use of this manual

This Workshop Manual is intended for trained and qualified service technicians to enable them to perform all required maintenance and repair tasks on VALX products in an efficient, safe and environmentally sound way.

TAKE THE TIME TO READ THIS MANUAL THOROUGHLY BEFORE PERFORMING ANY MAINTENANCE OR REPAIR TASK.

KEEP THIS MANUAL IN A SAFE PLACE, IN THE WORKSHOP.

THIS MANUAL REPLACES ALL PREVIOUS VERSIONS, IF ANY.

Conventions

In this manual:

- The steps required to perform a certain task are always numbered. The procedures must imperatively be carried out in the order given.
- Enumerations (without a prescribed order) are always preceded by a dash (-).
- The words 'left' and 'right' are used to indicate a certain part or assembly as viewed from the perspective of the service technician who is doing the job.
- "VALX" is used as a substitute for "VALX B.V."

Document code

The document code of this manual can be found in the footer of each page. The document code consists of two fields:

- Document type (WSM = Workshop Manual, TBM = Trailer Builder Manual, DM = Driver Manual)
- Document number

The third field contains the document revision number.

Related documents

The following related documents are available:

- Trailer Builder Manual (TBM_20XX)
- Driver Manual (DM_20XX)

Conversion SI-units – imperial units

SI-units -> non-metric units	non-metric units -> SI-units
1 kg \approx 2.2046 lb	1 lb \approx 0.453592 kg
1 mm = 0.03937 in	1 in = 25.4 mm
1 m = 3.28 ft	1 ft = 0.3048 m
1 km = 0.62 mile	1 mile = 1.609 km
1 Nm \approx 0.7376 ft-lb	1 ft-lb \approx 1.3558 Nm
1 mPa (10 Bar) = 145 psi	1 psi = 0.0068966 mPa (0.0689 bar)

Service and technical support

For information about specific maintenance or repair tasks, adjustments or test procedures that are beyond the scope of this document, please contact VALX at support@valx.eu.

Make sure that you have the axle type code at hand. The axle type code is printed on the axle label.

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1 General safety instructions and regulations

1.1 General

- VALX accepts no liability for any damage or physical injury caused by non-compliance with the safety instructions and regulations in this manual, or by carelessness during any maintenance or repair task on the VALX trailer axle.
- Depending on the trailer type, the specific repair or maintenance task(s) that have to be carried out, the workshop conditions, the environmental circumstances and the cargo that may be loaded, additional safety instructions may be applicable. As VALX has no direct control over these specific working conditions or trailer configurations, it is the workshop's sole responsibility to ensure that the national accident prevention guidelines and the local Health and Safety regulations are adhered to. Please inform VALX immediately if you have dealt with unsafe situations that have not been described.
- This steering axle service manual has been prepared to assist customers carrying out their own service procedures. For information about other axle related service procedures please refer to the specific axle maintenance manual on the VALX website www.valx.eu.

1.2 This manual

- Read this manual thoroughly before performing any maintenance or repair task on the trailer axle.
- Keep this manual for future reference. Retain the manual in a safe place in the workshop.
- Carry out the procedures in the order given. Do not change the order of the steps.

1.3 Decals and instructions on the product

- Decals or instructions fitted on the product are part of the safety features provided. They must not be covered or removed, but must be present and legible throughout the entire life of the product. Damaged or illegible decals and instructions must be replaced or repaired immediately.

1.4 Warranty and original VALX parts

- All products of VALX are covered by warranty as stipulated in the "VALX Warranty Conditions" supplied with the product. The "VALX Warranty Conditions" can also be downloaded from our website www.valx.eu.
- Modification and / or conversion of the product without the written consent of VALX is not allowed at the risk of forfeiting all warranty rights.
- When replacing parts, ONLY use original VALX spare parts. Parts approved by VALX for use in the product periodically undergo severe tests. As a result, VALX is able to warranty the quality of these parts.
- VALX can not assess for every single third-party product whether it can be used for the VALX product without any safety risk. This applies even if such products have already been tested by an accredited test authority. Therefore, the VALX warranty becomes null and void if spare parts other than original VALX parts are used.

1.5 Maintenance and repair

- In order to maintain the safe operation and the roadworthiness of the trailer, all maintenance tasks must be carried out according to the prescribed VALX service intervals (see the maintenance chart in chapter 3), and in accordance with the operation and service instructions of the trailer builder.
- Maintenance and repair is strictly reserved to trained and qualified service technicians.

1.5.1 Before starting work

- Make sure that the trailer is properly secured against rolling.
- Make sure that unauthorised persons have no access to the working area.
- Make sure that the working area is sufficiently lit and ventilated.
- Dress properly. Do not wear torn or loose fitting clothes, but wear protective clothing. Remove jewellery, watches, etc. to prevent them from being caught in moving parts.
- Wear protective shoes and keep long hair out of the way.
- Use a dust mask when advised

1.5.2 During work

- Stay alert and watch what you are doing. Use common sense. Do not work on the product when you are tired or have been taking alcohol, medicine or drugs. Do not smoke.
- Use a hoist when lifting 25 kg or more. Only use suitable and technically perfect lifting devices with adequate lifting capacity built in compliance with all safety measures. Fastening of loads and instructions to the operator of the lifting device are restricted to experienced personnel who are within sight or sound of the operator of the lifting device.
- Only use tools, parts, materials, lubricants and service techniques that were approved by VALX. Do not use contaminated or used lubricants. Used lubricants, cleansing agents and expended parts must be disposed of in an environmentally safe way.
- Avoid bodily contact with lubricants.
- Never use worn tools and do not leave tools behind on the trailer axle or on the trailer.
- Never weld on any part of the trailer axle or suspension without the prior written permission of VALX.
- Never re-use self-locking fixing materials. Always replace them.

1.5.3 When work is finished

- Inspect the product. Check for damage, leakage or defects. Any part removed for maintenance or repair purposes must be refitted and checked immediately upon completion of the work.
- Do not clear a product for operation unless it was established that it is absolutely safe and in perfect working order.

1.6 A contribution to the protection of our environment

Please obtain information about recycling or environmentally friendly processing of parts and materials that have been replaced during maintenance or repair tasks.

Almost all used lubricants are considered to be chemical waste. For the disposal of these a specialized company must be contacted.

2 Maintenance intervals

2.1 Periodic maintenance and inspection



NOTE

As road conditions may vary from one country to another, and specific use of the trailer axle may differ per haulier, the maintenance intervals given below are only indicative. The maintenance tables differentiate between on-road use (X) and off-road use (0).

inspection item	maintenance task	maintenance interval		
		after first month	every 6 months	every year
King pin bushings	Greasing		0 / X	
Blocking lever bushing	Greasing		0 / X	
Air bellow lever bushings	Greasing		0 / X	
All above mentioned bushings	Mechanical check		0 / X	
Components for wear and damage in general	Visual inspection		0 / X	
Function of trailing steering axle	Visual inspection	0 / X	0 / X	
Axial play king pin	Mechanical check new 0,3mm - max 1,8mm		0 / X	
Radial play king pin bushing	Mechanical check max. ± 0.7 mm		0 / X	

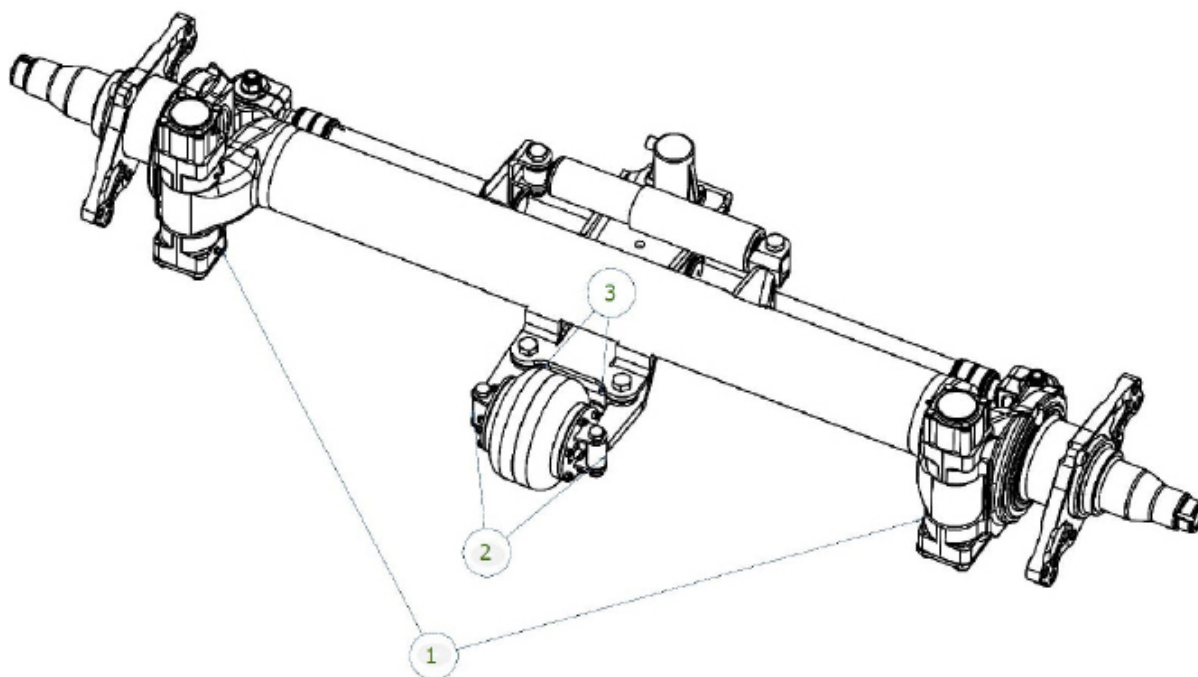
3 Lubrication

3.1 Lubrication points



NOTE

- Use multipurpose class 2 grease
- Always clean the lubricating nipples before greasing and fit the caps back on the nipples after maintenance
- Grease until clean grease exits

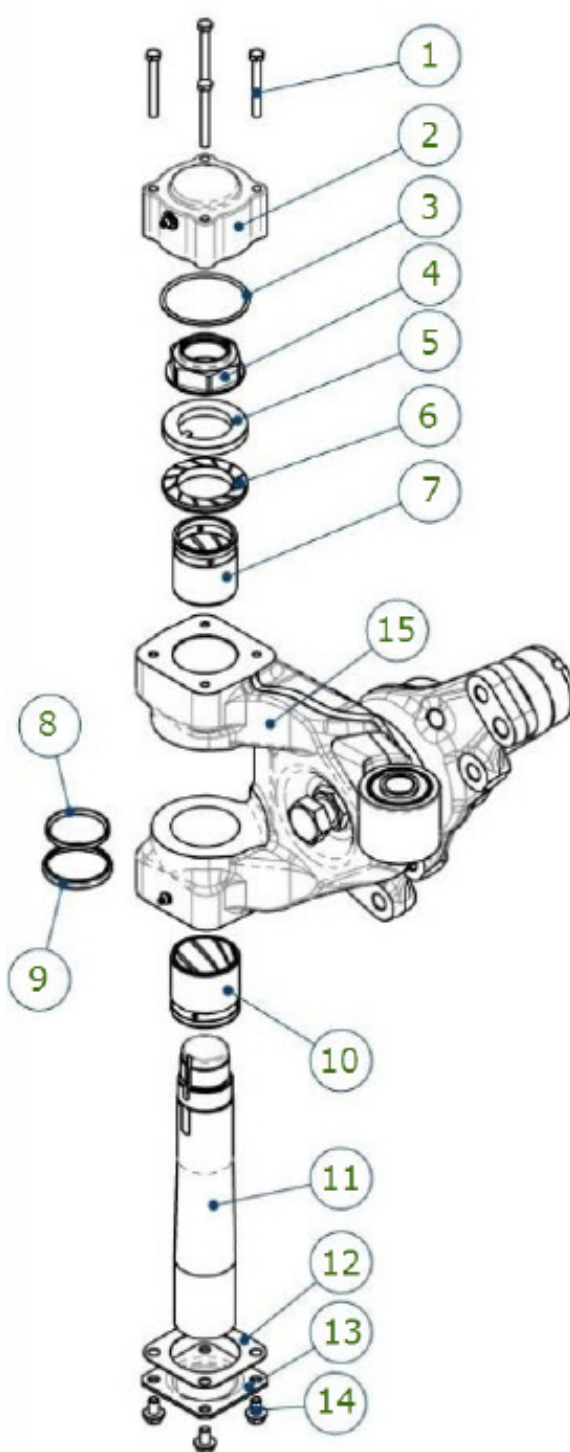


item	maintenance task
Steering knuckle bushings	Lubrication of steering knuckle bushings may only be carried out when the axle is raised. Remove caps from grease nipples and lubricate with a commercially available grease gun until clean grease exits. Clean grease nipples after lubrication and fit caps again.
Bushings of steering axle blocking lever	Remove caps from grease nipples and lubricate with a commercially available grease gun until clean grease exits. Clean grease nipples after lubrication and fit caps again.
Bushings of steering axle air bellow	Remove caps from grease nipples and lubricate with a commercially available grease gun until clean grease exits. Clean grease nipples after lubrication and fit caps again.

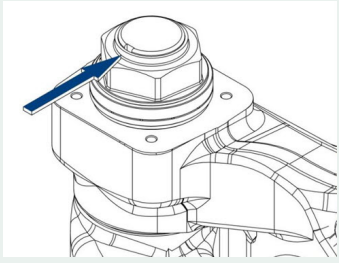
4 Removal/installation steering knuckle

4.1 Exploded view steering knuckle

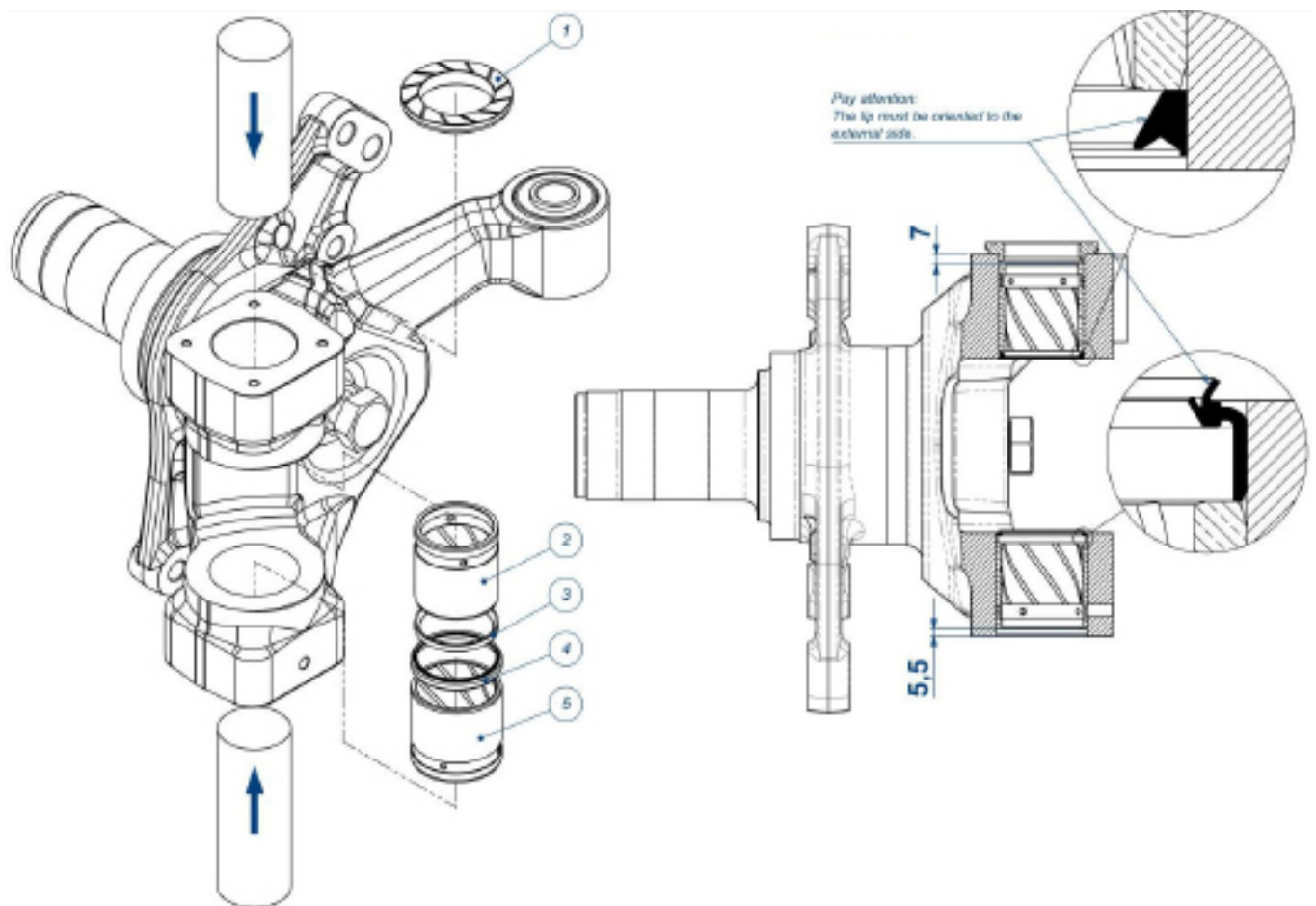
item	description
1	Bolt M8x70
2	King pin top cover
3	Seal
4	King pin nut
5	King pin lock washer
6	King pin push washer
7	King pin upper bush
8	Seal
9	Seal
10	King pin lower bush
11	King pin pin
12	Seal
13	King pin lower cover plate
14	Bolt M16x35
15	Knuckle



4.2 Removal/installation steering knuckle

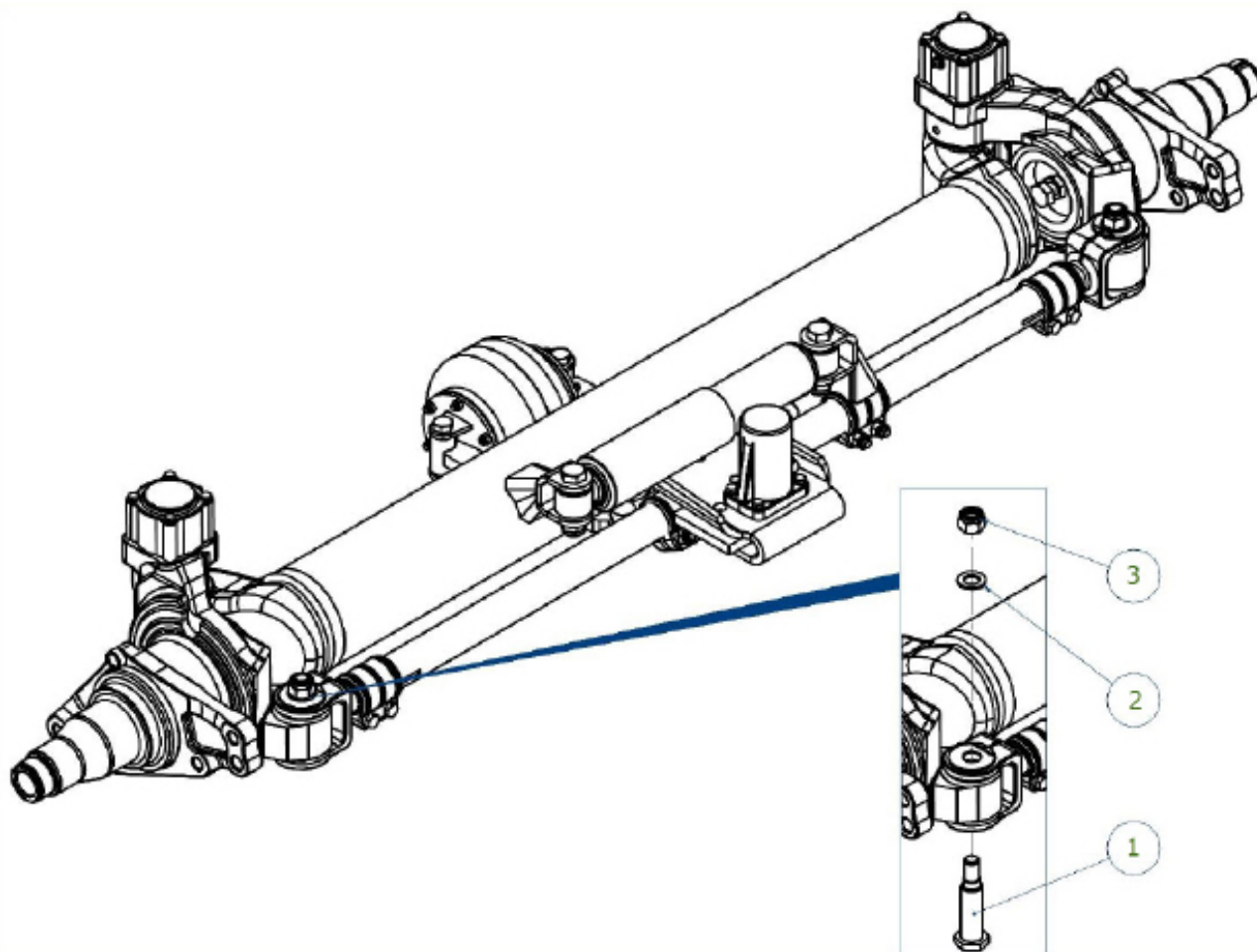
	task	description
1	Remove tie rod from steering knuckle	See operations page 14
2	Remove top cap	Remove bolts (1) and remove upward the top cover (2), remove the seal (3)
3	Remove lower cover plate	Remove bolts (14) the cover plate (13) and the seal (12)
4	Release clamp nut	Release king pin nut (4) (don't remove the nut until the kingpin pen (11) is loose)
5	Remove the kingpin	Unlock the kingpin pen from its taper (11) by using a hammer and if is necessary heat the axle beam end. After that remove the king pin nut (4), lock washer (5) and the kingpin pen (11). Remove the steering knuckle (15)
6	Removal/ installation steering knuckle bushings	See instructions on page 13
7	Install the steering knuckle	Insert the kingpin pen (11), lock washer (5) with grease on the face in contact with washer (6). Finally tighten king pin nut (4) with a tightening torque of 650 Nm with a calibrated torque wrench. Loosen the nut (4) again after tightening
8	Adjust thrust ring play at steering knuckle	Ensure that the axle is raised from the ground. Turn the king pin nut (4) until it comes in contact with washer (5), then release 20° and check if the knuckle can be turned, finally lock the king pin nut by bending the edge into the slot in the kingpin pen. The maximum axial play allowed is: 1.8mm 
9	Install top cover	Insert the seal (3), place the top cover (2) and tighten the four bolts (1). [22,5 ± 2,5 Nm]
10	Install lower cover plate	Insert the seal (12), the cover plate (13) and finally the four bolts (14). [145 ± 15 Nm]
11	Lubricate steering knuckle bushings	See instructions on page 10
12	Install steering-axle tie rod	See instructions on page 14
13	Check wheels alignment and check toe	See instructions on page 20

5 Removal/installation steering knuckle bushings



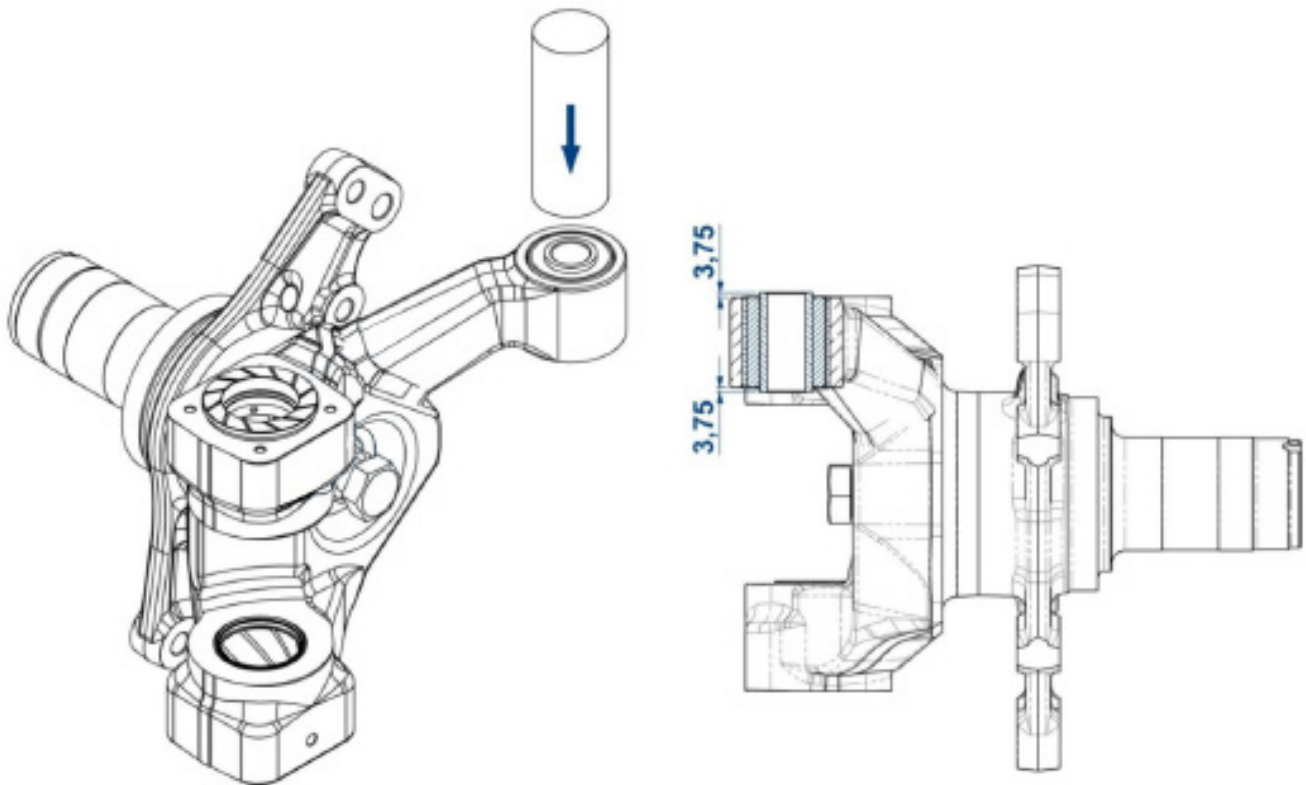
	task	description
1	Remove the steering knuckle bushing and the pushing ring	Remove the pushing washer (1) by means of a chisel. Push down upper bushing (2) (external diameter 63) and washer (3) using a hydraulic press, from the top to the center of the knuckle. Push the lower bearing bushing (5) (external diameter 68) and washer (4) , from the bottom to center of the knuckle.
2	Clean steering knuckle	Clean housing of bushings and bores of lubricating nipples.
3	Install steering knuckle bushings	Install the bushings and the washers, pushing from the top/ bottom to center of the knuckle, pay attention to position of bushings grooves and the direction of ring lips, follow sketch dimensions.
4	Install pushing ring	Install pushing washer (1) paying attention to contact with the surface of steering knuckle.

6 Removal/installation steering axle tie rod



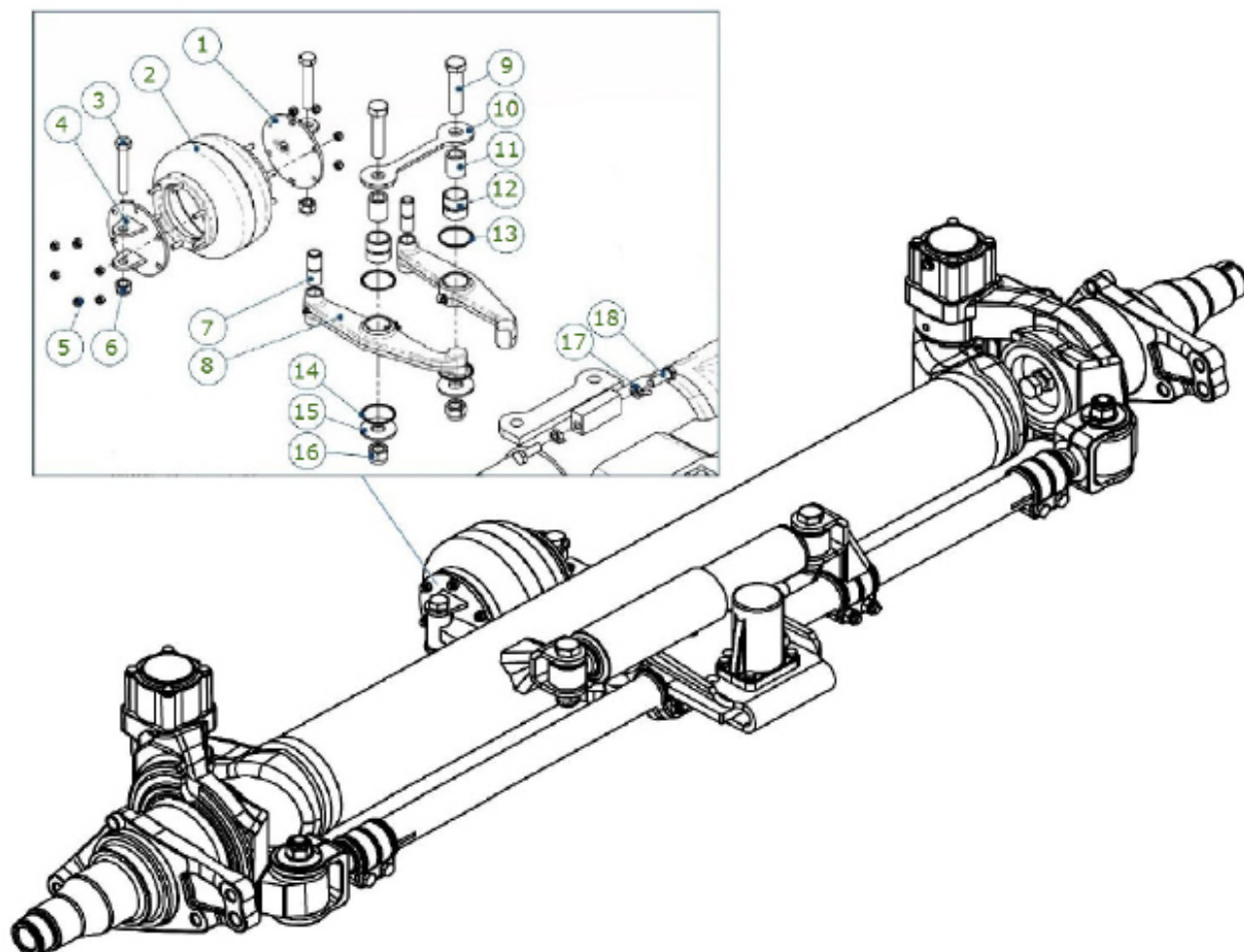
	task	description
1	Remove shock absorber	See instructions on page 19
2	Remove eccentric pin	Unscrew nut (3) and by means of a plastic hammer remove the pin (1)
3	Remove tie rod	Remove tie rod, extracting it from axle side
4	Install tie rod	Do operations in reverse order. See page 21 for the tightening torques
5	Check wheels alignment and check toe	See instructions on page 20

7 Removal/installation rubber bush axle steering tie rod

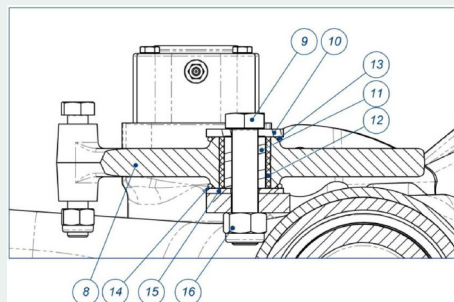


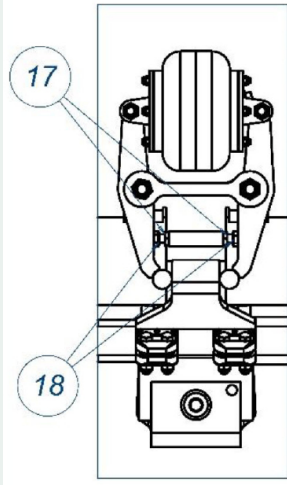
	task	description
1	Remove rubber bush from steering knuckle	Remove rubber bush from steering knuckle by means of a hydraulic press.
2	Install rubber bush from steering knuckle	Install rubber bush by pushing on the outside ring, paying attention not to damage the rubber. The rubber bush must be in center of arm (see sketch dimensions).

8 Removal/installation steering lock adjusting lever and air bellow

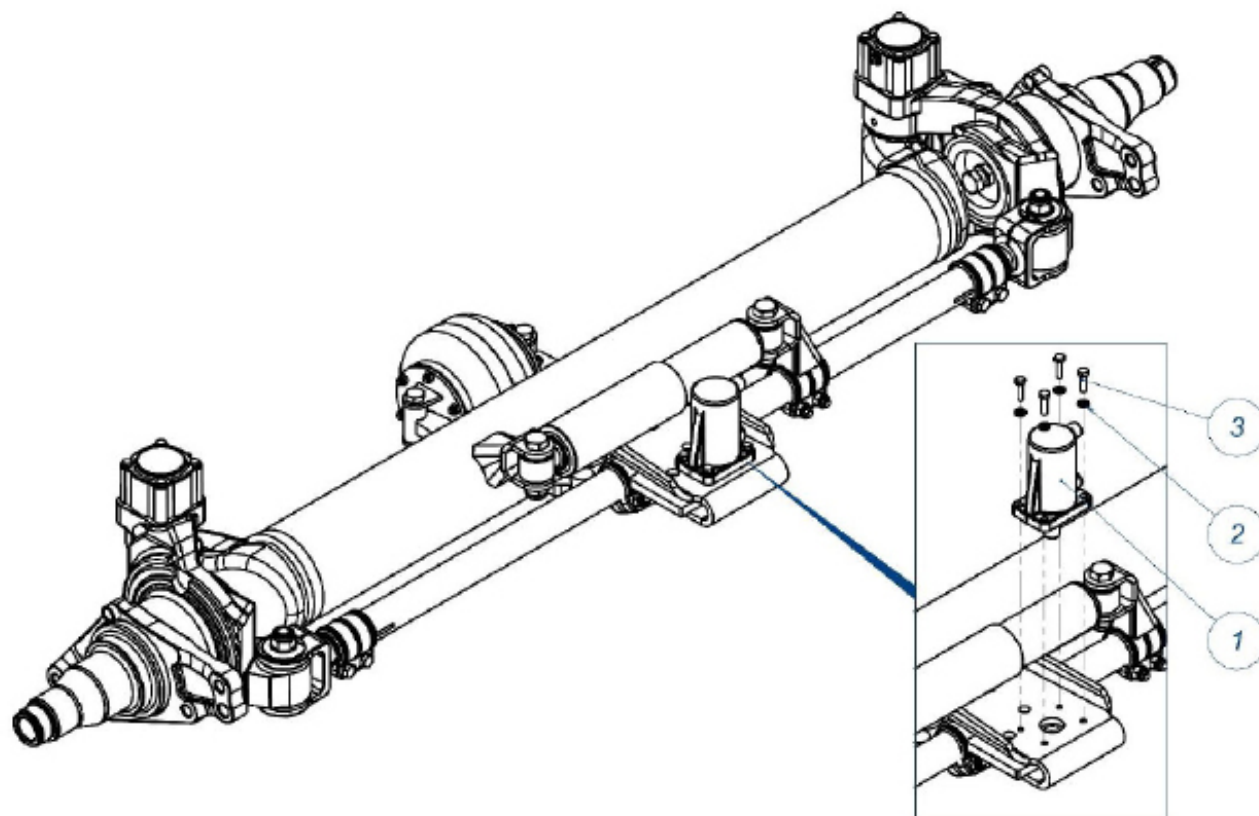


	task	description
1	Remove air bellow	Disconnect the compressed air from air bellow, unscrew the connection. Unscrew nuts (6) and remove bolts (3).
2	Check air bellow	Check air bellow and, if necessary, replace it by unscrewing the nuts (5) and suspension bellow plates (1 and 4). Install suspension bellow plates and check possible air leaks. See page 21 for the tightening torques.
3	Remove steering lock adjusting lever	Unscrew bolt (16) remove plate (10). Remove lever ,check wear of all bushings. If necessary replace the bushings and the lubricating nipples.
4	Install steering lock adjusting lever	Install in sequence the washer (15) , O-ring (14), the lever (8) , the bushing (11), O-ring (13) , the plate (10) , the bolt (9) and the nut (16).Nm Check that levers turn free.



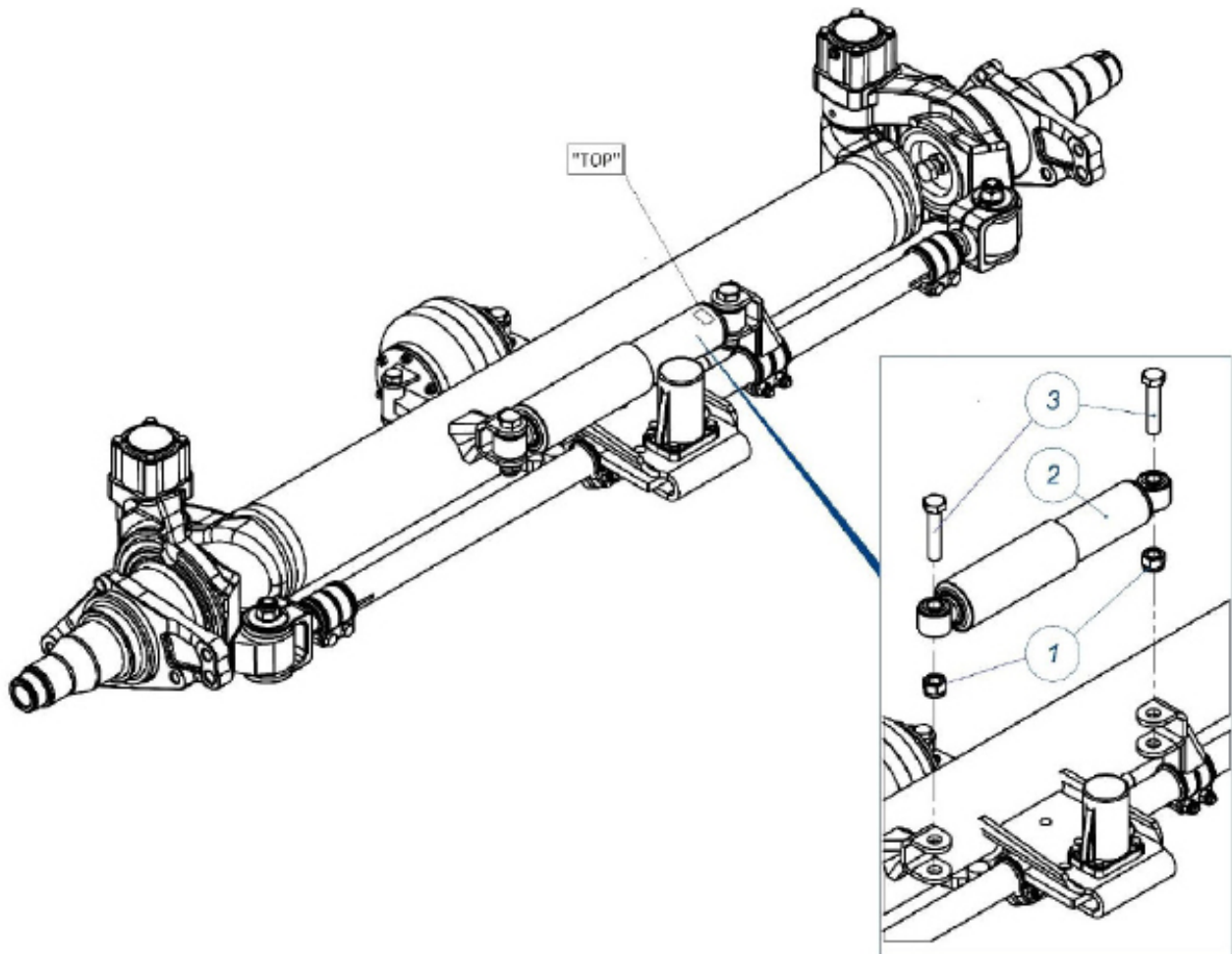
	task	description
5	Install air bellow	<p>Install the air bellow complete with suspension plates on the levers, install the bolts (3) and tighten the nut (6) . See page 21 for the tightening torques.</p> <p>Check if the suspension plates turn free.</p> <p>Connect the compressed-air system back to the suspension plates of the air bellow.</p>
6	Adjusting levers	<p>Lock the axle steering with locking cylinder, pressurize air bellow and adjust levers with bolts (18): levers must be in contact both with bolt and plate. Lock the bolts with nuts (17). See page 21 for the tightening torques</p> 
7	Lubricate bushing of steering blocking lever to axle	See instructions page 10

9 Removal/installation locking cylinder



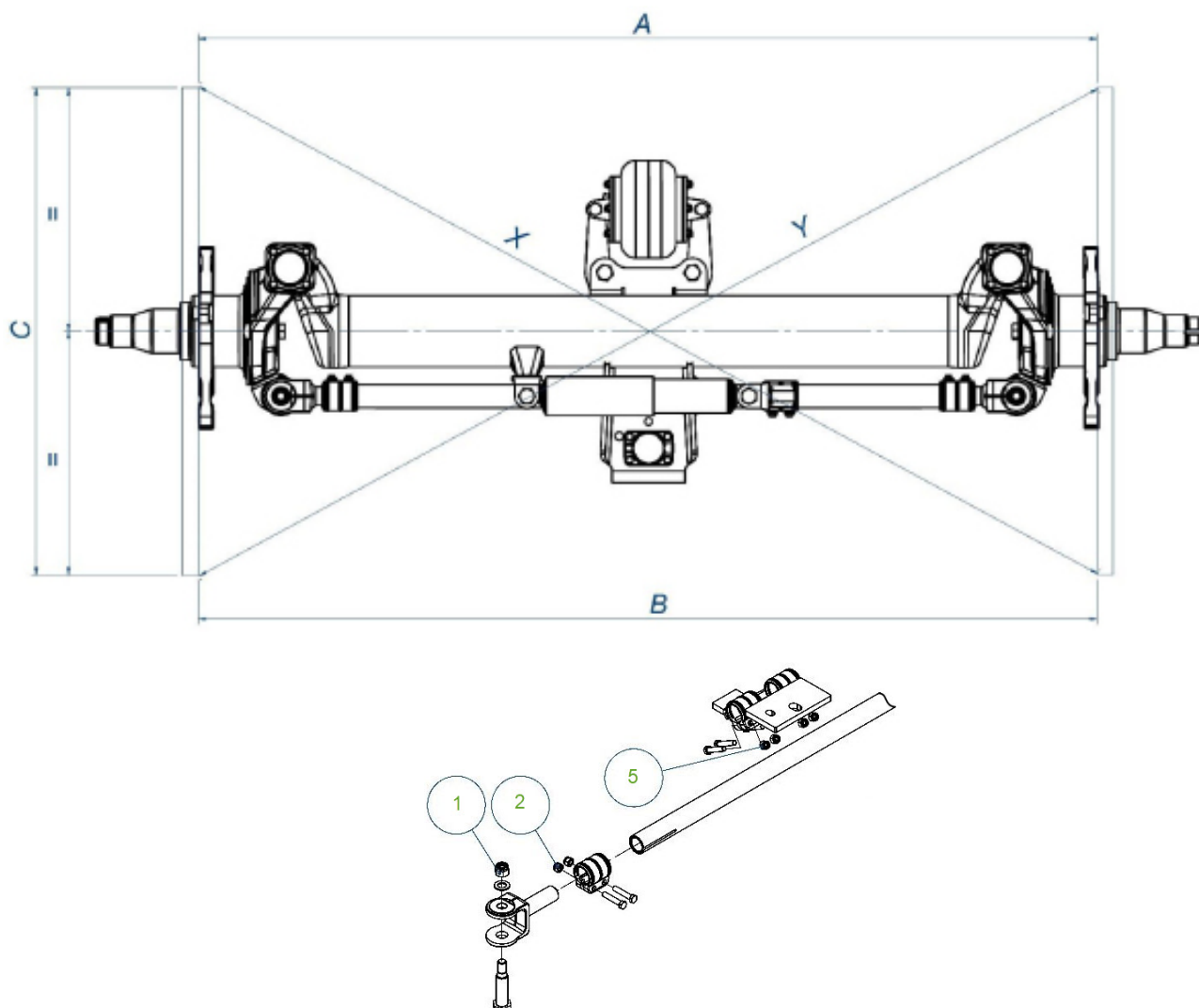
	task	description
1	Remove locking cylinder	Disconnect compressed air from the locking cylinder, unscrew bolt (3) and remove locking cylinder (1) and washer (2) upward
2	Install locking cylinder	Install in reverse order. See page 21 for the tightening torques.

10 Removal/installation shock absorber



	task	description
1	Remove shock absorber	Unscrew the nuts (1) and remove the bolts (3), remove the shock-absorber (2).
2	Install shock absorber	Install the shock-absorber with word "TOP" turned to upper-side of the axle . Screw the bolts. See page 21 for the tightening torques.

11 Check wheel alignment

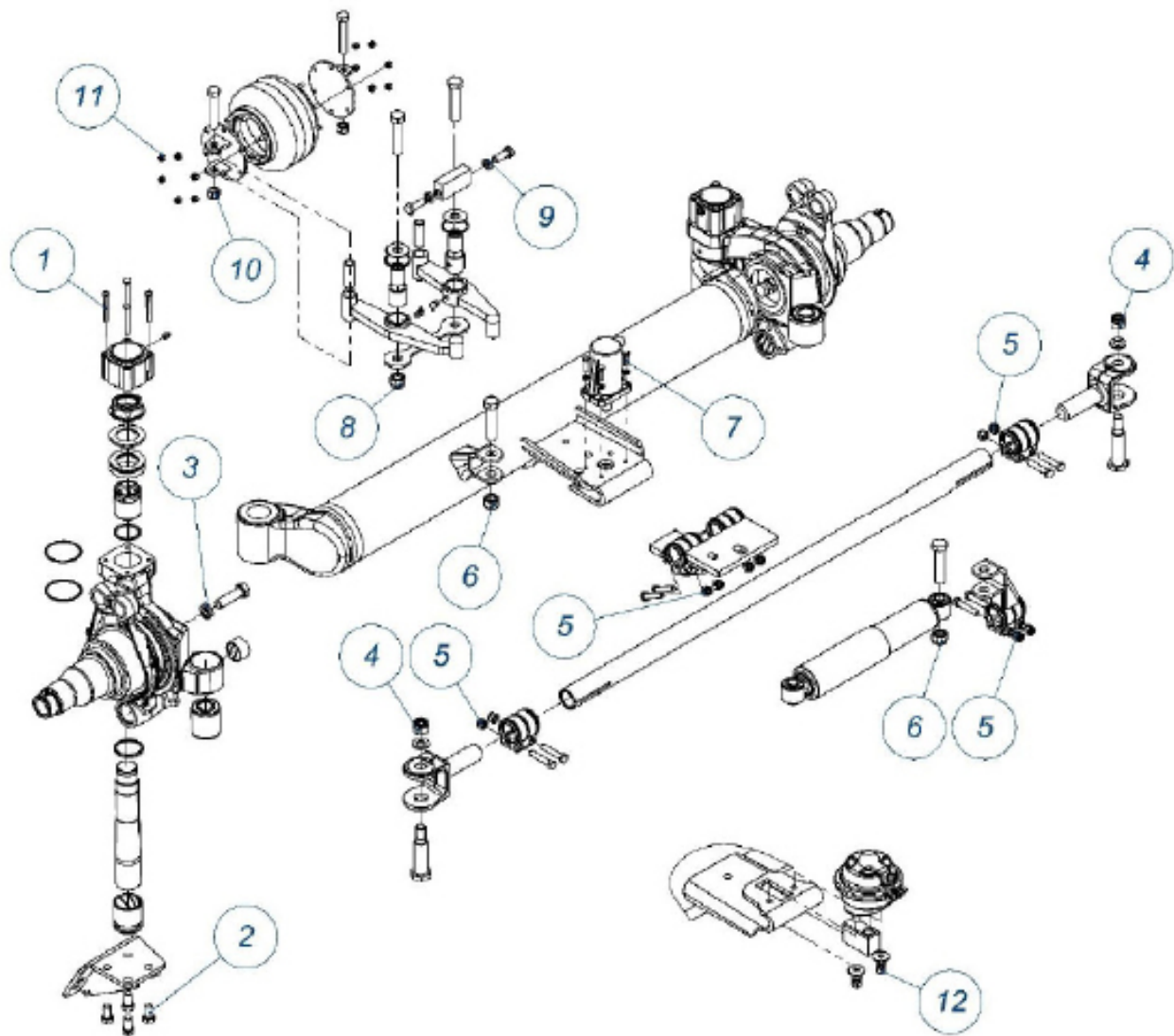


NOTE

-For this operation must be used: two rulers with C=1000mm length. This test must be carried out on a horizontal, level and clean base.

	task	description
1	Check alignment	Only measure, adjust angular alignment and toe of axle when tie rod is blocked. To do this, the steering locking-cylinder must not be pressurized. Position the ruler as shown in the sketch or on the wheel flanges left and right. Diagonal axle dimensions X and Y must be identical, otherwise, for adjusting dimensions, release bolts (5) and move the locking plate. Finally tighten the bolts. (5) See page 21 for the tightening torques.
2	Check toe-in	Position the ruler as shown in the sketch. Total toe-in axle must be $B-A=2/6$ mm, otherwise unscrew nuts (1 and 2), turn tie rod for adjusting toe. Tighten nuts (1 and 2) See page 21 for the tightening torques.

12 Tightening torques



Pos	Description	Thread	Torque setting
1	Knuckle cup screw	M8	20 - 25 Nm
2	Brake chamber screw	M16	130 - 160 Nm
3	Steering adjustment nut	M27 x 2	130 - 160 Nm
4	Track rod pin nut	M20 x 1,5	240 - 300 Nm
5	Track rod clamp screw	M12	70 - 90 Nm
6	Shock absorber screw	M20	240 - 300 Nm
7	Locking cylinder screw	M8	20 - 25 Nm
8	Stabilizer's arm nut	M20	240 - 300 Nm
9	Steering adjustment stabilizer's arm screw	M14 x 1,5	100 - 135 Nm
10	Stabilizer's air bellow bracket nut	M16	-
11	Stabilizer's air bellow nut	M8	20 - 25 Nm
12	Locking cylinder nut	M12	75 - 95 Nm



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