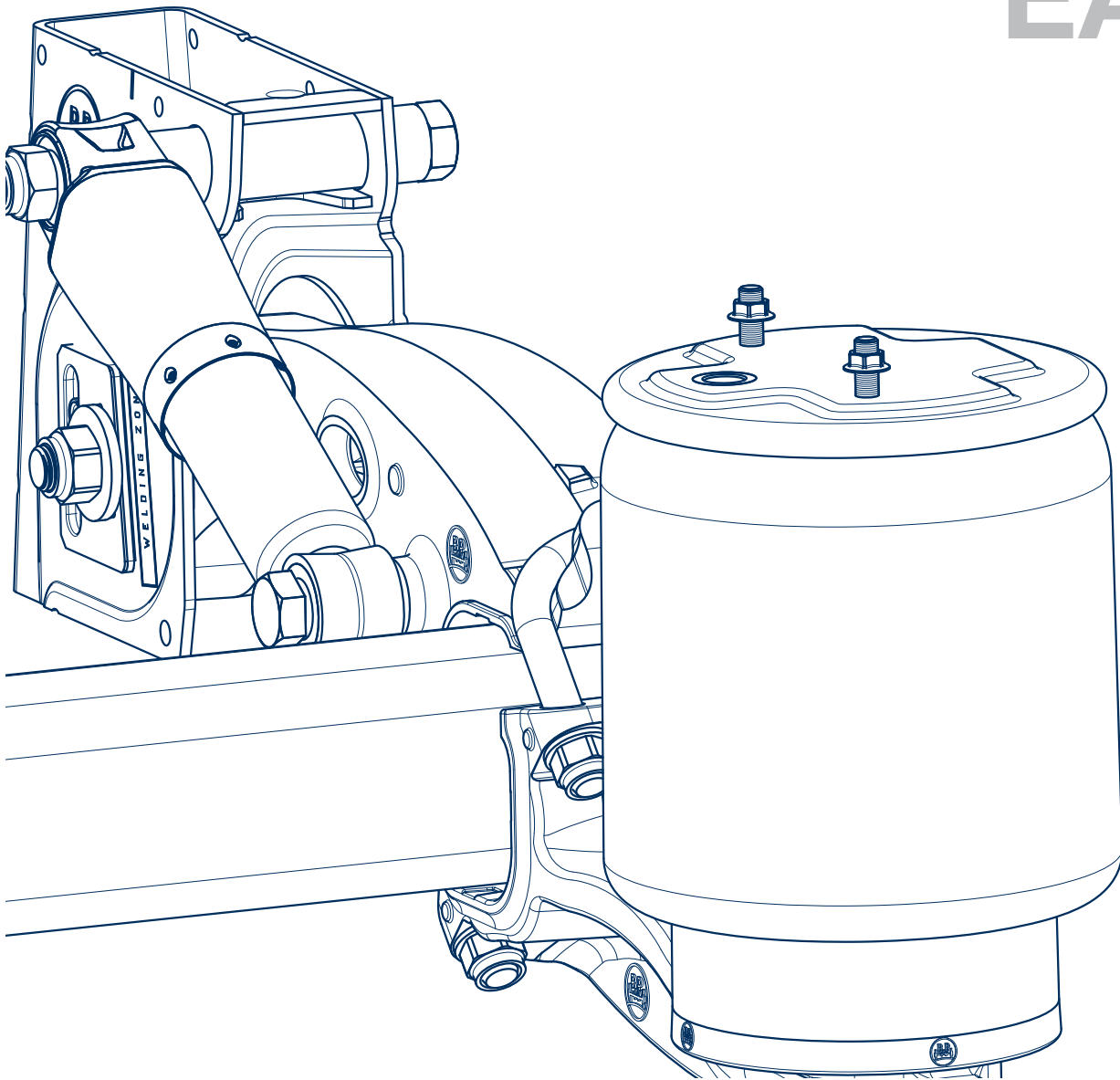


EAC



Workshop manual

BPW air suspensions, series ECO Air COMPACT



Valid: 01.01.2017

Subject to change without notice.

Current versions and additional information can be found online at www.bpw.de.

Contents

◎ 1. Product identification	Page 3
1.1 Explanation of BPW axle type codes (extract)	Page 3
1.2 Explanation of BPW code numbers (extract)	Page 4
◎ 2. Special tools	Page 6
◎ 3. Exploded view / name	Page 8
◎ 4. Tightening torques	Page 11
◎ 5. Safety regulations, safety information	Page 12
5.1 Safety regulations	Page 12
5.2 Safety information	Page 13
◎ 6. Care and maintenance	Page 14
◎ 7. Replacing air bag mount	Page 20
7.1 Removing air bag mount	Page 20
7.2 Installing air bag mount	Page 21
◎ 8. Replacing trailing arm	Page 25
8.1 Removing trailing arm	Page 25
8.2 Installing trailing arm	Page 26
◎ 9. Removing and installing axle	Page 29
9.1 Removing axle	Page 29
9.2 Installing axle	Page 29
◎ 10. Replacing rubber-steel bush in trailing arm	Page 33
10.1 Removing rubber-steel bush	Page 33
10.2 Installing rubber-steel bush	Page 35
◎ 11. Removing and installing air bags	Page 38
11.1 Removing air bag	Page 38
11.2 Installing air bag	Page 40
11.3 Dis-assembling and assembling air bag with central bolted connection	Page 43
11.4 Dis-assembling and assembling air bag with universal plate	Page 44
11.5 Dis-assembling and assembling air bag with split piston	Page 45
◎ 12. Dismantling and assembly of shock absorbers	Page 46
12.1 Replacing bushes in shock absorber	Page 47
◎ 13. Dismantling and assembly of axle lift device	Page 48
13.1 Two side axle lift	Page 48
13.2 Side axle lift device	Page 51
13.3 Central axle lift device	Page 54
◎ 14. Air suspension valve	Page 57
14.1 General	Page 57
14.2 Replacing	Page 57
14.3 Setting	Page 57
◎ 15. Axle alignment check	Page 59
15.1 Conventional axle alignment check	Page 59
15.2 Axle alignment check with laser measuring system	Page 61

- Refer to appropriate workshop manuals for axle repairs

1 Product identification

1.1 Explanation of BPW axle type codes (extract)

Example:

SH	B	F		ACAU	A		9010	VG	30 K	ECO Plus 2														
										Axle series	Brake	Tyre												
SH											SH..	☐	TSB 4309	22,5"										
SKH											SKH..	☐	TSB 3709	19.5" (22.5")										
H											H	☐	SN 420	20" / 22.5" / 24"										
	B											For single wheels, wheels with offset												
	S											For single wheels, wheels without offset												
	Z											For twin wheels												
		F											Wheel studs M 22x1.5 without wheel nuts; order wheel nuts for stud or spigot alignment separately											
		M											For spigot alignment / Alloy wheels											
			H											For hanging brake cylinders										
														For air suspension series		Ride height								
				ACAU											ACAU = Cast link type A, air bag beam type U 205 - 350									
				ACAM											ACAM = Cast link type A, air bag beam type M 245 - 370									
				ACAO											ACAO = Cast link type A, air bag beam type O 335 - 385									
				ACBU											ACBU = Cast link type B, air bag beam type U 260 - 330									
				ACBM											ACBM = Cast link type B, air bag beam type M 300 - 425									
				ACBO											ACBO = Cast link type B, air bag beam type O 330 - 510									
				AC..HD											ECO Air COMPACT HD									
					A											With axle lift device								
						-											Single axle							
						2 /											Tandem axle suspension							
						3 /											Tri-axle suspension							
							9010											Axle load (kg) + quantity of wheel studs per wheel						
								V											Adjustable hanger brackets					
								G											Air bags with split piston					
									30											Air bag Ø 300 mm, for stroke 200 mm (standard)				
									30-1											Air bag Ø 300 mm, for stroke up to 340 mm				
									30 K											Air bag Ø 300 mm, for stroke 150 mm				
									36											Air bag Ø 360 mm, for stroke 200 mm (standard)				
									36-1											Air bag Ø 360 mm, for stroke up to 340 mm				
									36 K											Air bag Ø 360 mm, for stroke 180 mm				
										ECO Plus 2											Trailer axle with ECO Plus 2 Unit			
										ECO Plus 3											Trailer axle with ECO Plus 3 Unit			

1.2 Explanation of BPW axle code numbers (extract)

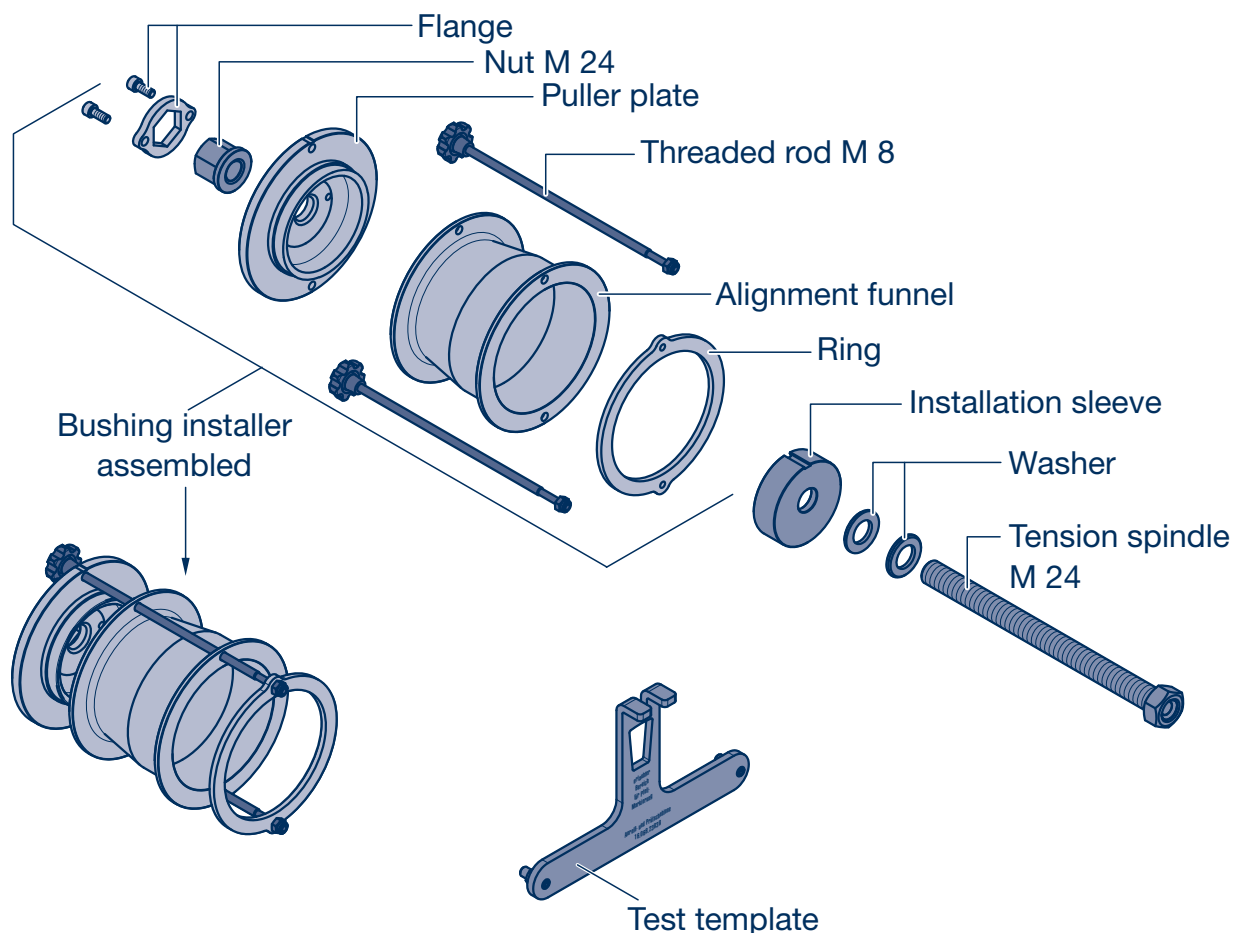
Example:

73.	68.	01.	0004			
				1 + 2 digit: Air suspension module		
71.				Air suspension module, without hanger bracket, without air bags Axle series H / SH		
74.				Air suspension module, without hanger bracket, without air bags Axle series SKH		
72.				Air suspension module, with hanger bracket, without air bags Axle series H / SH		
75.				Air suspension module, with hanger bracket, without air bags Axle series SKH		
73.				Air suspension module, with hanger bracket, with air bags + multi axles Axle series H / SH		
76.				Air suspension module, with hanger bracket, with air bags + multi axles Axle series SKH		
				3 + 4 digit: Axle load and bearing		
				Axle load	Roller bearings	Bearing generation
58.				8000 - 9000 kg	33118 / 33213	ECO Plus 2
68.				8000 - 9000 kg	33118 / 33213	ECO Plus 3
				5 + 6 digit: Designation of cast link and airbag beam		
					Cast link	Airbag beam
01.				ACAU	Typ A	Typ U
02.				ACAM	Typ A	Typ M
03.				ACBM	Typ B	Typ M
04.				ACBO	Typ B	Typ O
05.				ACBU	Typ B	Typ U
06.				ACAO	Typ A	Typ O
				7 to 10 digit: Consecutive number		
				0000 to 9999	Consecutive number 0000 - 9999	

2 Special tools

Installation / removal tool for rubber-steel bushes in cast links

Range of application: Pressing in rubber-steel bushes



BPW number: 99.00.000.9.69

General notes:



Attention!

Impact tools should be avoided wherever possible. They represent a potential risk that the nut will seize on the threaded spindle and both parts will be destroyed!

Once nut has become tight, it must be replaced with a new nut. Nut and spindle thread must be lubricated with grease (e.g. STABURAGS NBU30 PTM).

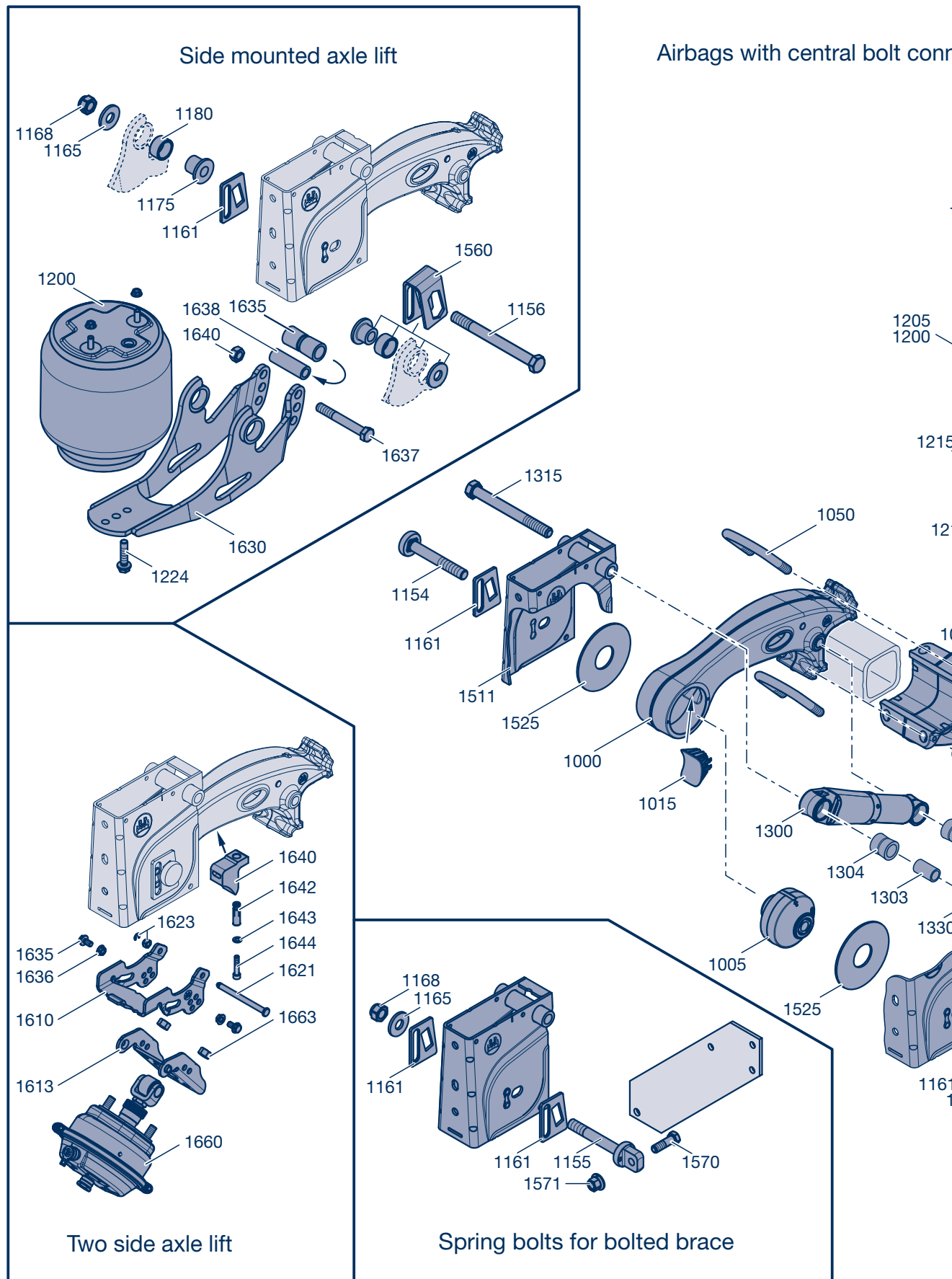
The outer surface of the bush, the drilled bushing hole in the cast suspension arm and the alignment funnel must be sufficiently lubricated with tyre fitting paste as fitting aid.

When aligning the parts, care must be taken that the notches of all parts, the TOP position of the bush and the "Top" marking of the cast suspension arm are all aligned (>> vehicle top) – see chapter 10.



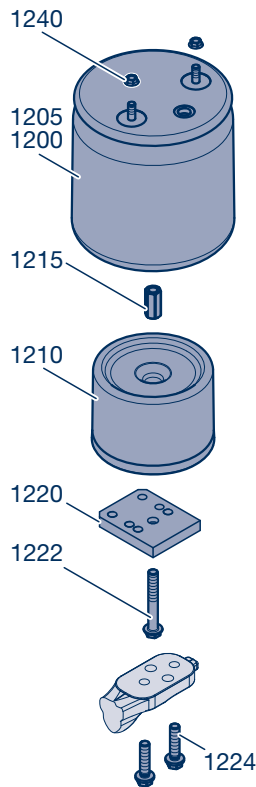
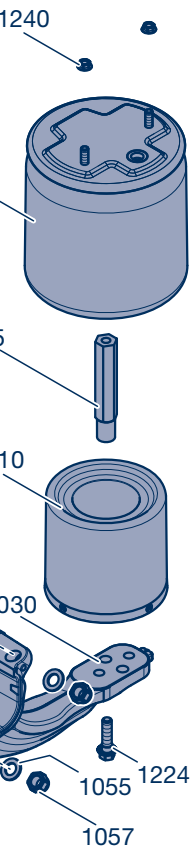


3 Exploded view

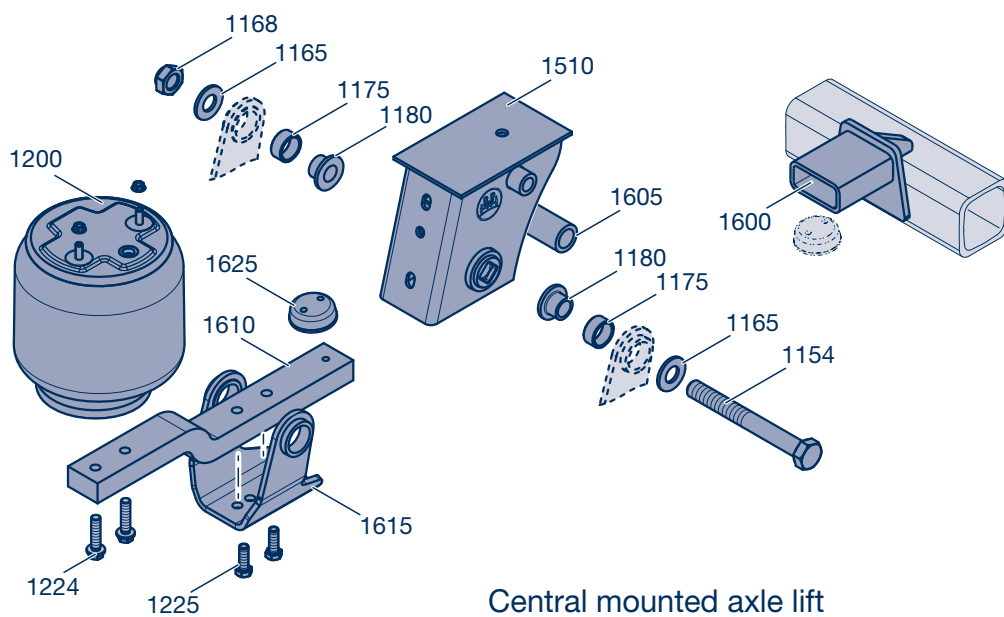
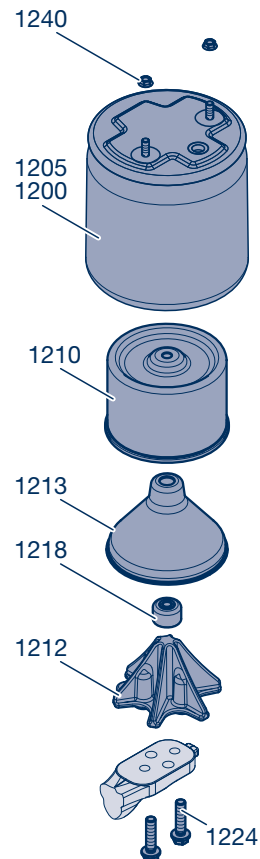


Section

Air bags with universal plate



Kombi Airbag



Central mounted axle lift

Name

Item Name

1000	Cast suspension arm
1005	Bush
1015	Plug
1030	Air bag beam
1050	Spring U-bolt
1055	Disc
1057	Lock nut
1154	Spring bolt
1161	Plate (adjusting plate)
1165	Disc
1168	Lock nut
1200	Air bag assembly
1205	Air bag
1210	Piston
1212	Hanger bracket
1213	Piston
1215	Threaded sleeve
1215	Bolt
1218	Nut
1220	Plate
1222	Locking screw
1224	Locking screw
1240	Lock nut
1300	Shock absorber
1303	Bush
1304	Rubber bump stop
1315	Hexagon screw
1324	Hexagon screw
1330	Lock nut
1511	Hanger bracket, adjustable
1525	Disc

Two side axle lift

1610	Support for two-side axle lift
1613	Shaped plate
1621	Bolt
1623	Locking disc (until end of 2015)
1623	Lock nut (from 2016)
1635	Locking screw
1636	Lock nut
1640	Shaped part
1642	Dowel
1643	Disc
1644	Cylinder head screw
1660	Diaphragm cylinder for axle lift
1663	Hexagon nut

Item Name

Side mounted axle lift

1156	Hexagon screw
1161	Plate (adjusting plate)
1165	Disc
1168	Lock nut
1175	Bush
1180	Bush
1200	Air bag assembly
1224	Locking screw
1560	Adjusting plate with anti-rotation device
1630	Lever arm
1635	Bush
1637	Hexagon screw
1638	Tube
1640	Lock nut

Central mounted axle lift

1154	Hexagon screw
1165	Disc
1168	Lock nut
1175	Bush
1180	Bush
1200	Air bag assembly
1224	Locking screw
1225	Hexagon screw
1510	Hanger bracket
1600	Support
1605	Tube
1610	Lever arm
1625	Support
1635	Bump stop

Spring bolts for bolted brace

1155	Spring bolt
1570	Hexagon screw
1571	Hexagon nut

Tightening torque 4

Pos.	Description	Thread / Spanner size	Tightening torque
1057	Locking nut of U-bolts	M 20 / SW 30	M = 420 Nm
1168	Locking nut of spring pivot bolt or hexagon bolt on axle lift device	M 24 / SW 36	M = 650 Nm (605 - 715 Nm)
1215	Screw connection threaded sleeve on air bag	M 16 / SW 24	M = 130 Nm
	Screw connection bolt on air bag	M 16	M = 130 Nm
1218	Lower central nut on Kombi Airbag	M 16 / SW 19	M = 130 Nm
1222	Lower central screw on the air bag piston	M 16 / SW 22	M = 230 Nm
1224	Bottom securing bolt of air bags Central bolt	M 16 / SW 22	M = 230 Nm - 300 Nm M = 300 Nm
1225	Mounting bolts for bracket for central axle lift device	M 16 / SW 24	M = 230 Nm
1240	Top locking screws of air bags	M 12 / SW 17	M = 66 Nm
1324 1330	Locking nut and hexagon screw for shock absorber	M 24 / SW 36	M = 420 Nm (390 - 460 Nm)
1571	Bolted connection, gusset plate on spring bolts	M 18 x 1.5 / SW 27	M = 420 Nm (390 - 460 Nm)
1623	Locknut of connecting bolt (two sided lift)	M 10 / SW 16	M = 38 Nm
1636	Bolted connection for shaped plate on two-side axle lift bracket	M 12 / SW 17	M = 75 Nm
1640	Attachment roller for side axle lift device	M 20 / SW 30	M = 350 Nm (325 - 385 Nm)
1644	Fixing bolts for shaped part for two-side axle lift	M 10 / SW 8	M = 50 Nm
1663	Securing nuts of diaphragm cylinder for axle lift	M 16 x 1.5 / SW 24	M = 190 Nm (180 - 210 Nm)

5 Safety regulations, safety information

5.1 Safety regulations

- All work must be performed by trained mechanics at competent repair facilities or authorised specialist companies who have access to all relevant tools and have acquired the knowledge required for this work. Anyone who performs maintenance and repair work must be trained in automotive mechanics and already have experience in repairing trailers and semi-trailers. Anyone who performs brake work must be trained in brake systems.
 - Comply with local safety regulations.
 - The relevant operation and service regulations as well as safety regulations of the vehicle manufacturer and of the manufacturers of other vehicle parts must be adhered to.
 - The vehicle must be prevented from moving during repair work. Please observe the relevant safety regulations for repair work on commercial vehicles, in particular the safety regulations for jacking up and securing the vehicle.
 - The cast suspension arms, air bag beams, spring U-bolts, air bags and plastic hoses must be protected against sparks and weld splashes during all welding work.
 - The earth terminal must under no circumstances be attached to the cast suspension arms, air bag beams, spring U-bolts or hubs.
 - No welding at cast suspension arms or air bag beams!
 - It is not permitted for the hanger brackets to be heated for straightening work!
 - During repair work, make sure that the brake is not operated inadvertently. The brake must be released.
 - Do not perform repair work unless wearing protective clothing (gloves, safety boots, safety goggles, etc.) and using the recommended tools.
 - Only use recommended tools.
 - A second mechanic must provide assistance when working with heavy components (cast links, airbag beam, brake discs, brake drums or brake removal/installation).
 - All air lines and components must be depressurised before being removed.
 - Following each repair, perform a function check or a test drive in order to make sure that the brakes and suspensions are functioning correctly. New brake linings only have maximum effect after a few braking actions. Avoid hard braking.
 - All exchanged components must be reused or disposed in accordance with the applicable environmental regulations, laws and directives.
 - The remaining thickness of the brake lining and the condition of the brake disc or brake drum must be visually inspected at regular intervals with respect to the way in which the vehicle is used (see BPW maintenance instructions).
 - Tighten all fixings to the recommended tightening torque.
-

5.2 Safety information

This workshop manual contains different types of safety instructions, each of which is designated an icon and a key word. The key word describes the severity of the potential danger.



Warning!

Possible potential danger of serious or fatal injury (severe injury or death).

Caution!

Possible dangerous situation (slight injury or damage to property).



Repair Guide!

Risk of damage to property or consequential damage if this information is not observed.



Note!

Application hints and especially useful information.



Mandatory!

Do not use an impact wrench, doing so would cause considerable damage!

It is essential that all maintenance work is carried out in accordance with the prescribed intervals in order to maintain the safe operation and roadworthiness of the trailer. The relevant operation and service regulations of the vehicle manufacturer and of the manufacturers of other vehicle parts must also be adhered to.

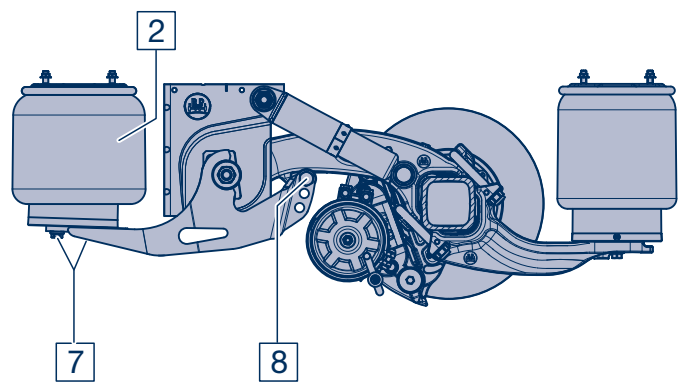
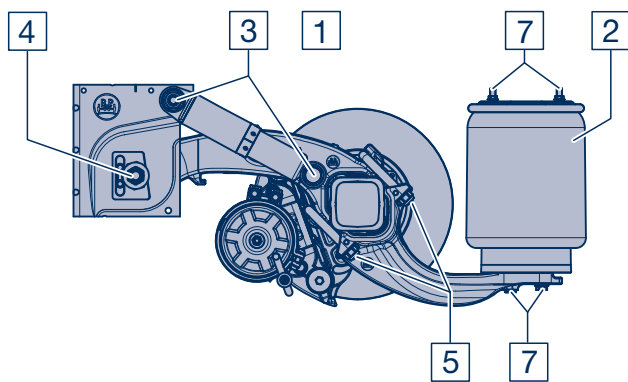
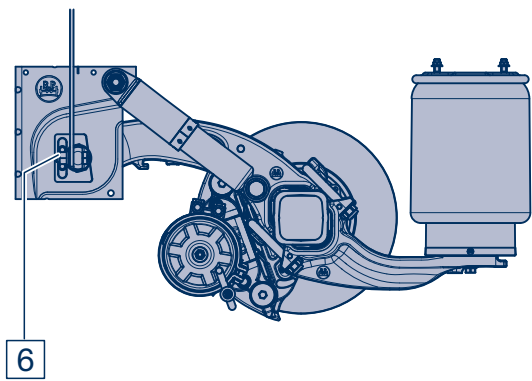
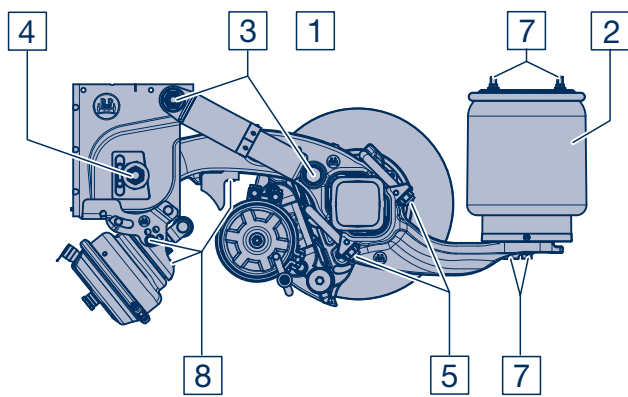
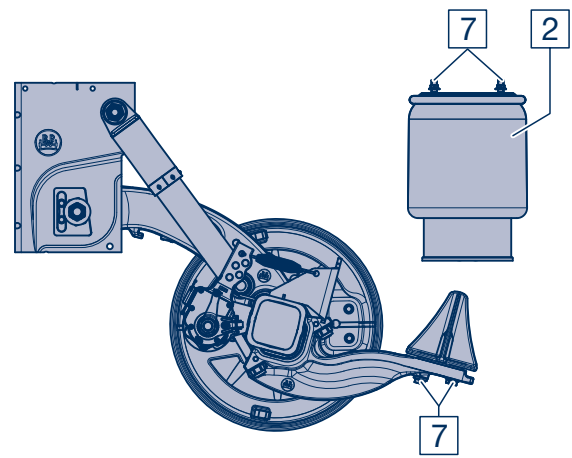
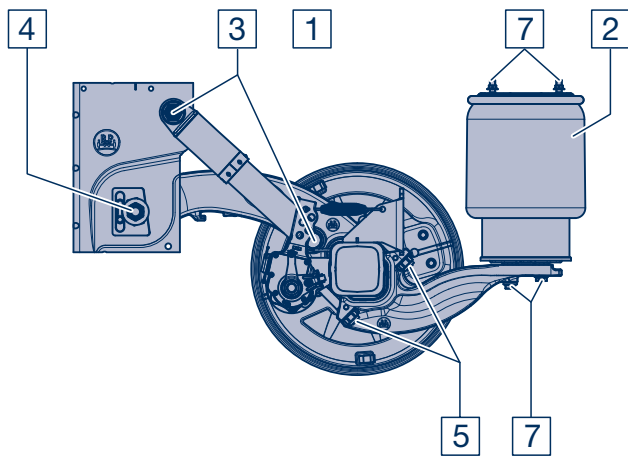
Rectification of any defects which are discovered or replacement of worn parts should be carried out by a BPW Service Centre or BPW Direct Service Partner unless the vehicle owner has the facilities, equipment and workshop manuals and possesses an official certificate to perform interim inspections or special brake inspections.

When installing spare parts, it is strongly recommended that only original BPW components are used. Parts approved by BPW for trailer axles and suspensions regularly undergo special test procedures. BPW accepts product responsibility for them.

However, BPW cannot assess every single third-party product as to whether it can be used for BPW trailer axles and suspensions without any risk to safety. This applies even if such products have already been tested by an accredited test authority.

The warranty becomes null and void if spare parts other than original BPW parts are used.

6 Care and Maintenance



Maintenance Work and Visual Inspection

Overview

For detailed description see pages 16 to 19

			Visual checks during the warranty period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months, thereafter annually
1	Check air suspension levelling valves for condition, seal-tightness and general tightness.		1
2	Check condition of air bags.		2
-	Visual inspection, check all component parts and welding seams for damage and wear.		-
3	Check shock absorber fastening for tightness. Tightening torque with a torque wrench: M 24 (SW 36) M = 420 Nm (390 - 460 Nm)		3
4	Check spring bolts for tightness. Tightening torque with a torque wrench: M 24 (SW 36) M = 650 Nm (605 - 715 Nm)		4
5	Check axle clamping for tightness. Tightening torque with a torque wrench: M 20 (SW 30) M = 420 Nm		5
6	Check the spring bolt to gusset plate connection for tightness. Tightening torques with a torque wrench: M 18 x 1.5 (SW 27) M = 420 Nm (390 - 460 Nm)		6
7	Check air bag fastening for tightness. Tightening torques with a torque wrench: M 12 (SW 17) M = 66 Nm M 16 (SW 22) M = 230 Nm - 300 Nm Centre screw M 16 (SW 22) M = 300 Nm		7
8	Check axle lift for tightness. Tightening torques with a torque wrench: Supporting arm M 20 (SW 30) M = 350 Nm (325 - 385 Nm) Diaphragm cylinder M 16 (SW 24) M = 190 Nm (180 - 210 Nm) Hexagon bolt M 12 (SW 17) M = 75 Nm Lock nut M 10 (SW 16) M = 38 Nm Cylinder cap screw M 10 (SW 8) M = 50 Nm		8

Note: Components that have damages due to improper mounting are to be exchanged after a review by a BPW Service Centre.

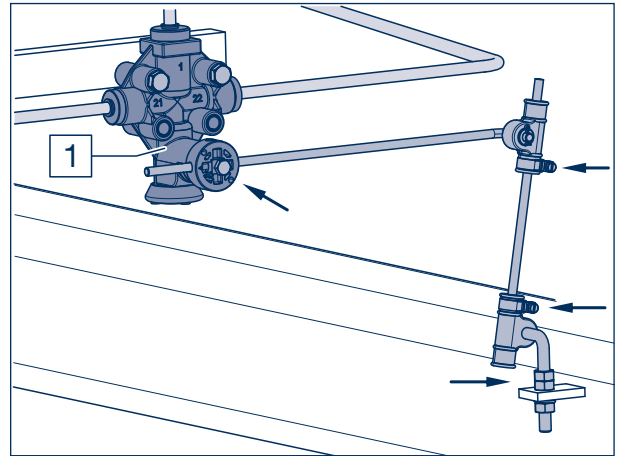
6 Care and Maintenance

1 Air installation circuit

– Service intervals as shown on page 15 –

Check air installation valves and line connections for firm seating, damage and seal tightness. Check valve linkage and fastenings (arrows) for damage and tightness.

The length of the valve lever and permissible angular positions for the valve linkage are shown in the illustration on page 57.



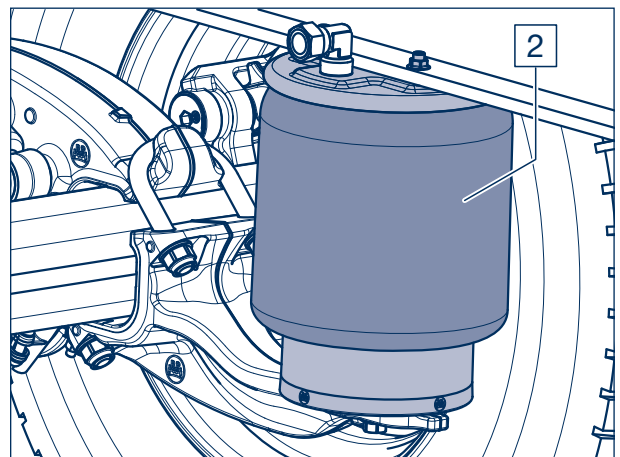
2 Air bags

– Service intervals as shown on page 15 –

Check air bags for external damage (surface cracking, abrasion, crease formation, trapped foreign bodies etc.). Replace air bags in the event of damage.



Warning:
DANGER OF INJURY!
 No welding should be carried out on steel parts of air bags and pressure vessel!
 The air suspension should only be filled with compressed air when mounted.



- Visual inspection

– Service intervals as shown on page 15 –

Check all component parts and welding seams for wear and damage.

3 Shock absorber fastening

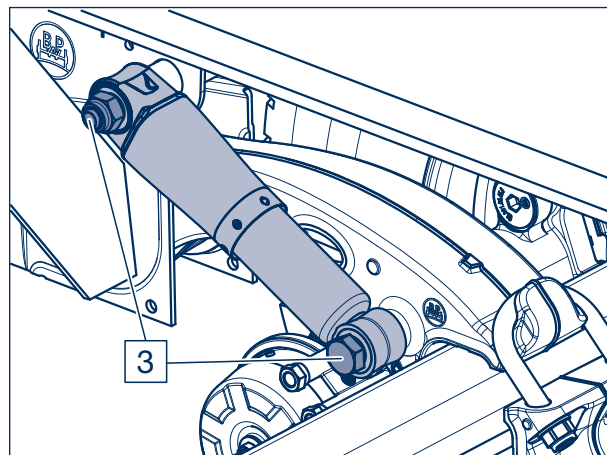
– Service intervals as shown on page 15 –

Check lower and upper shock absorber fastening for tightness.

Check condition and wear of the rubber bush and replace where appropriate.

Check shock absorbers for oil leakage. In cases of distinct traces of oil, the shock absorber must be replaced. A light mist of oil is acceptable!

Tightening torques with a torque wrench:
M 24 (SW 36) M = **420 Nm** (390 - 460 Nm)



4 Spring bolts

– Service intervals as shown on page 15 –

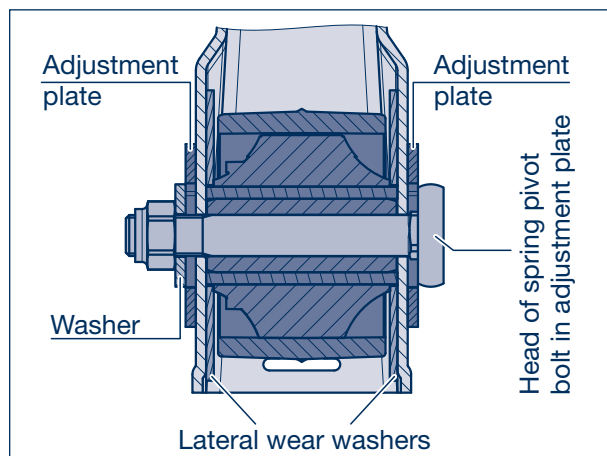
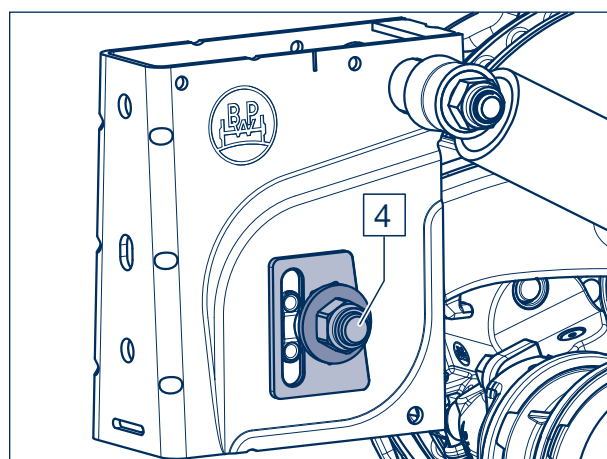
Check bushes; move vehicle back and forth slightly with brakes applied or move spring eye with assembly lever with brakes released. No play should be present in the cast link eye when doing so (wear limits on page 33).

If the fastening is loose the spring bolt may be damaged.

- Check the lateral wear washers in the hanger bracket.
- Check the M 24 lock nut on the spring bolt for tightness.

Tightening torque with a torque wrench:
M 24 (SW 36) M = **650 Nm** (605 - 715 Nm)

The life expectancy of the bearing depends on the tightness of the spring bolt or the inner bush.



6 Care and Maintenance

5 Axle clamping

– Service intervals as shown on page 15 –

Check lock nuts of spring U-bolts for tightness.
If loose, tighten nuts diagonally in several steps.

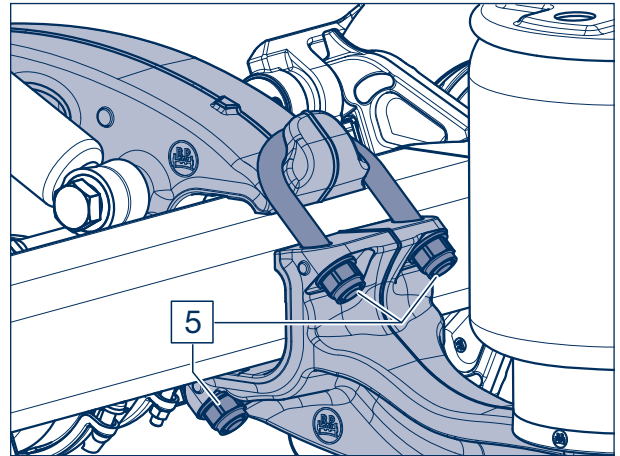
Tightening torques with a torque wrench:
M 20 (SW 30) M = **420 Nm**

When mounting new spring mounting kit components, tighten the M 20 locknuts to a torque of:

M = 420 Nm + 90° angle tightening.



Repair guide!
No welding should be performed
on the cast link and airbag beam!



6 Bolted connection, gusset plate spring bolts

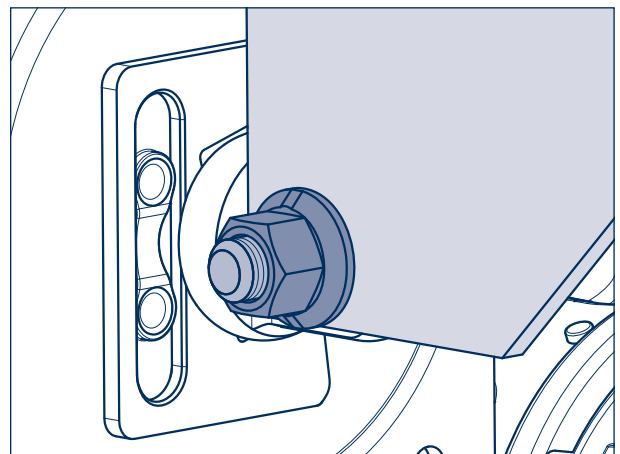
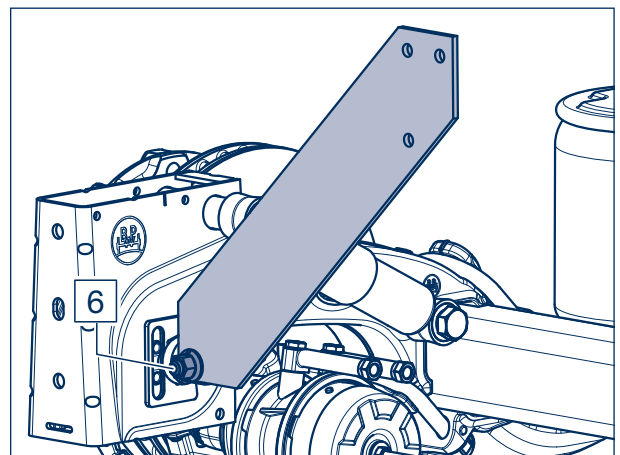
– Service intervals as shown on page 15 –

Check the mounting bolts of the gusset plates on the spring bolts are firmly tightened, and retighten with a torque wrench if necessary.

Tightening torque:
M 18 x 1.5 (SW 27) M = **420 Nm** (390 - 460 Nm)

Installing or renewing the spring bolt:

1. Unscrew or install the spring bolt.
2. Loosely pre-mount the gusset plate with at least three M 16 bolts at the top on the cross-member and one M 18 bolt at the bottom on the spring bolt and tighten further until contact is made.
3. Set the track.
4. Tighten the spring bolt to the prescribed tightening torque.
5. Tighten the connecting bolt on the gusset plates spring bolt and then tighten the upper connecting bolt to the prescribed tightening torques.



7 Air bag fastenings

– Service intervals as shown on page 15 –

Check air bag fixing bolts or nuts for tightness.

Tightening torques with a torque wrench:

Upper attachment

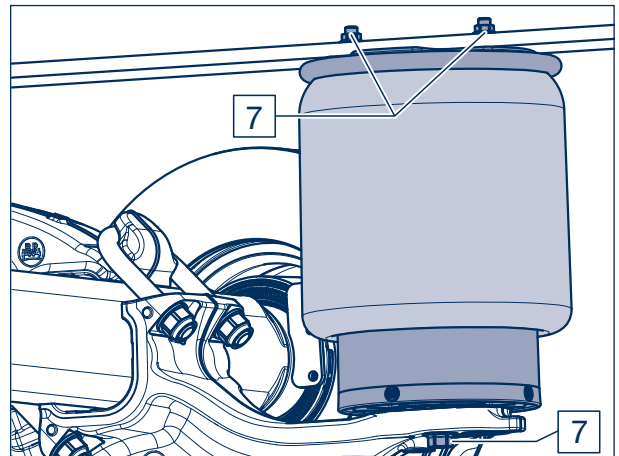
M 12 (SW 17) M = 66 Nm

Lower attachment - 2 screws:

M 16 (SW 22) M = 230 - 300 Nm

Lower attachment - centre screw:

M 16 (SW 22) M = 300 Nm



8 Axle lift

– Service intervals as shown on page 15 –

Side mounted axle lift:

Check for tight fitting of the M 20 lock nut of the roller mounting on the lifting arm, if necessary tighten with a torque wrench.

Tightening torque:

M 20 M = **350 Nm** (325 - 385 Nm)

Two-sided lift:

- a) Check the lock nuts on the diaphragm cylinder to make sure they are tight. Tighten with a torque wrench if necessary.

Tightening torque:

M 16 (SW 24) M = **190 Nm** (180 - 210 Nm)

- b) Check for tight seating of the bump stop fixing screws on the trailing arms.

Tightening torque:

M 10 (SW 8) M = 50 Nm

- c) Check for tight seating of the bracket fixing screws on the shaped plate.

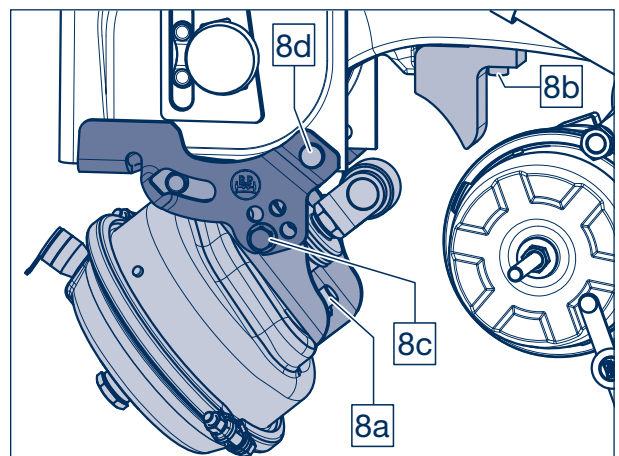
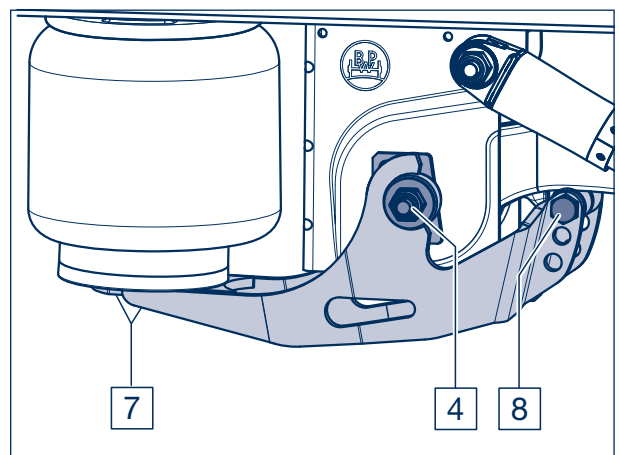
Tightening torque:

M 12 (SW 17) M = 75 Nm

- d) Check for the correct seating of the bolt circlip on the rear attachment support of the air suspension hanger brackets.

For versions from 2016, check for tight seating of lock nut.

M 10 (SW 16) M = 38 Nm




7 Replacing air bag mount

7.1 Removing air bag mount

- [1] Secure vehicle to prevent rolling away.
Release service brake and parking brake.
- [2] Raise vehicle, inflate air bags to maximum height by setting lever for rotary disc valve / change-over valve on air suspension to „Lift” and then to „Stop”.

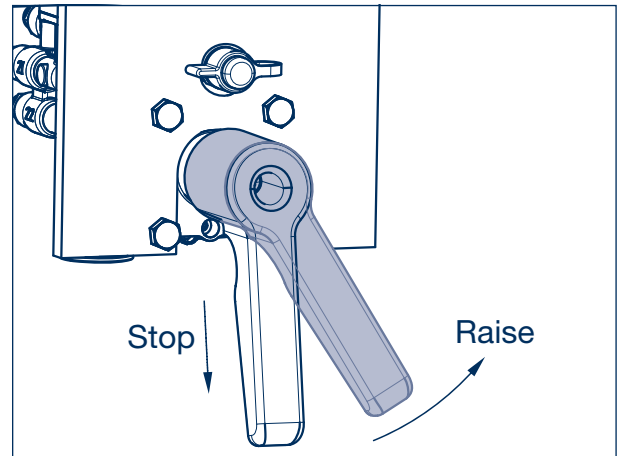
On air suspension systems without rotary disc valve / change-over valve, unscrew nut (picture 2/2) on linkage (picture 2/1) for air spring valve on axle and actuate the lever on the air suspension levelling valve until air bags have reached maximum height.

 If air suspension system is defective use forklift or winches.

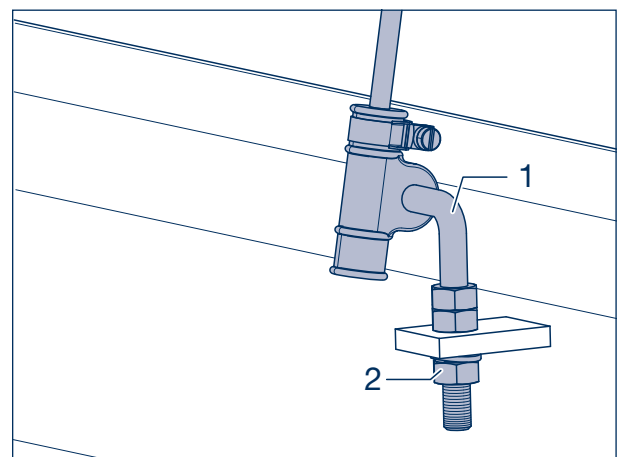
- [3] Support frame in this position to prevent accidents.
- [4] Release air from air bags by setting rotary disc valve / change-over valve on air suspension to „Lower”.

On air suspension systems without rotary disc valve / change-over valve, actuate valve lever on air suspension levelling valve until air has escaped from air bags.

- [5] Lift axle slightly with vehicle jack and remove wheel, if required.



Picture 1



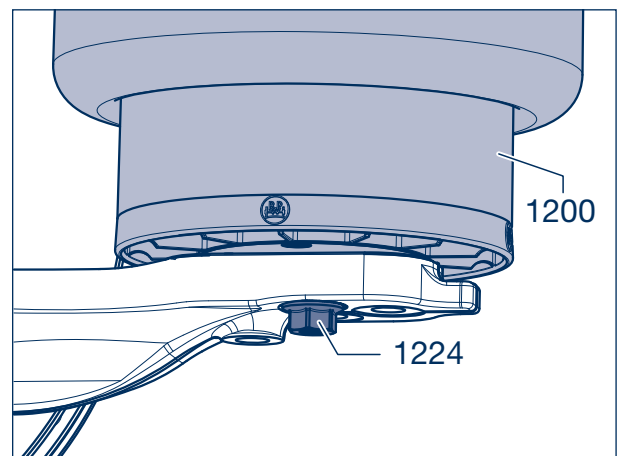
Picture 2



Repair guide!

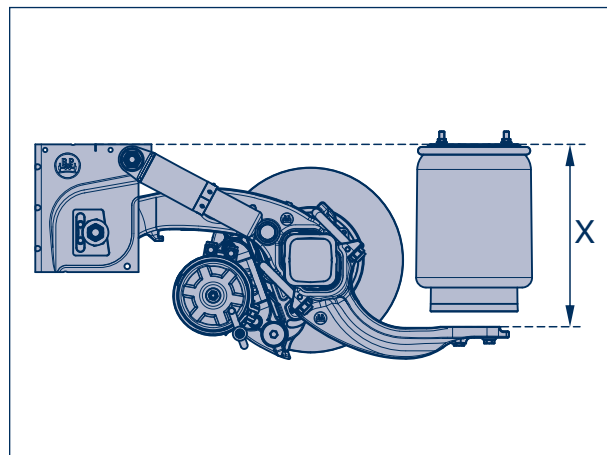
If it is necessary to replace the air bag mount, always replace one complete axle side. This ensures that it is not necessary to align the axle after installation!

- [6] Remove bottom locking bolt(s) (1224, SW 22), depending on design of air bag (1200).



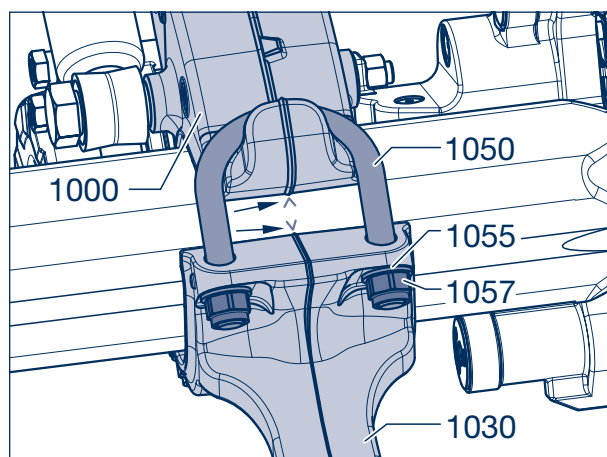
Picture 3

- [7] Measure and note distance from top of air bag mount to bottom of frame.



Picture 4

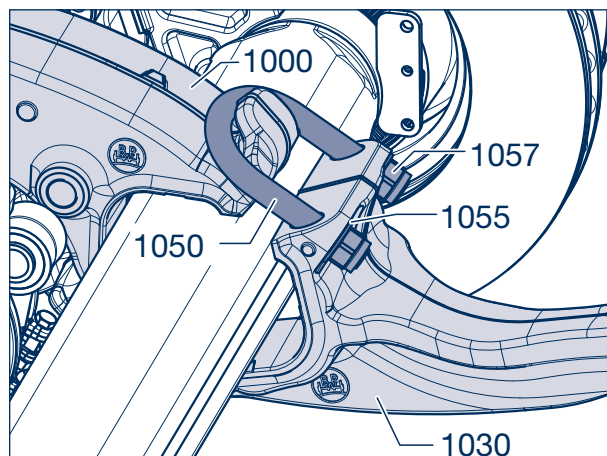
- [8] Mark spring centre position of trailing arm (1000) and air bag mount (1030) onto the axle beam using a coloured marker (mould parting line, arrows).
- [9] Secure air bag mount to prevent falling down.
- [10] Remove lock nuts (1057, SW 30) from U-bolts (1050) and remove washers (1055).
- [11] Remove upper and lower U-bolt (1050).
- [12] Remove air bag mount.



Picture 5

7.2 Installing air bag mount

- [13] Pre-assemble top U-bolt (1050) on air bag mount (1030).
- [14] Position new washers (1055) and install new lock nuts (1057) hand tight.
- [15] Hook air bag mount with U-bolt mounted in to bracket on trailing arm (1000).



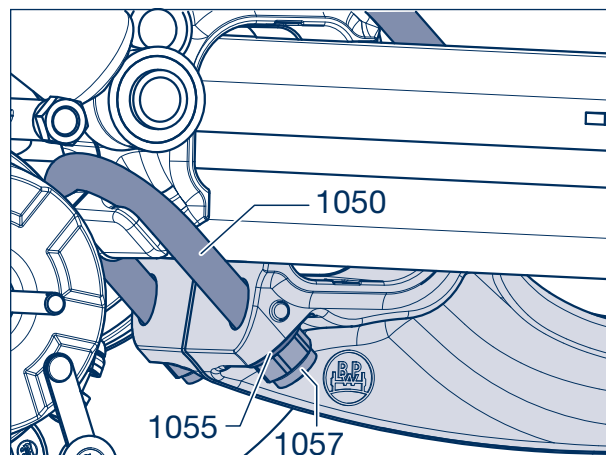
Picture 6

7 Replacing air bag mount

- [16] Install new bottom U-bolt (1050), position new washers (1055) and install new lock nuts (1057).

**Repair guide!**

The thread of the U-bolts must not be greased.

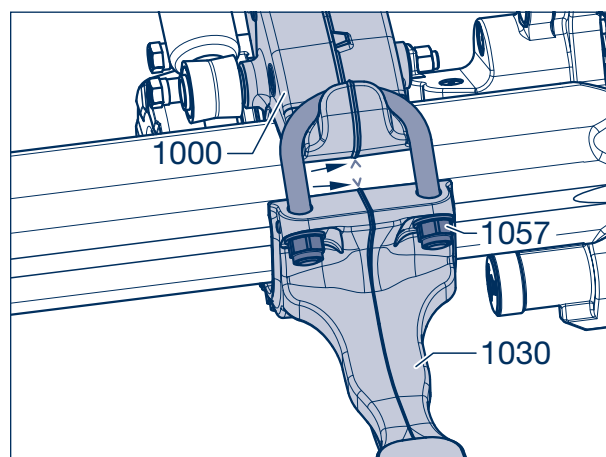


Picture 7

- [17] Align trailing arms (1000) and air bag mount (1030) with spring centre markings (arrows).
- [18] Lightly tighten lock nuts (1057, SW 30) - on each U-bolt - until all components make uniform contact.

**Repair guide!**

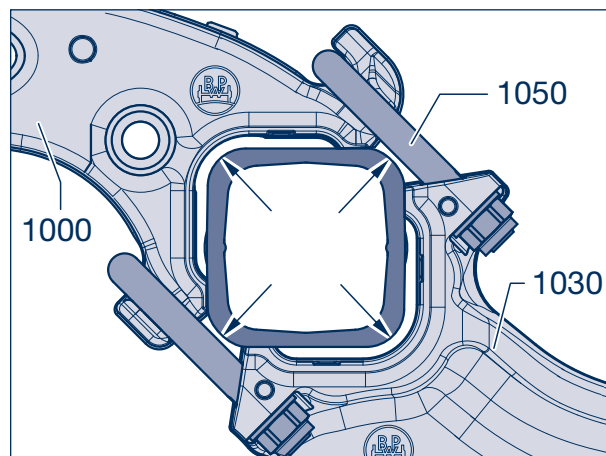
Never tighten lock nuts on one side only to prevent unequal tension.



Picture 8

**Repair guide!**

During assembly, pay attention to clearance between the U-bolts (1050) and cast parts (1000, 1030) and the 4 axle beam radii. Centre if required.



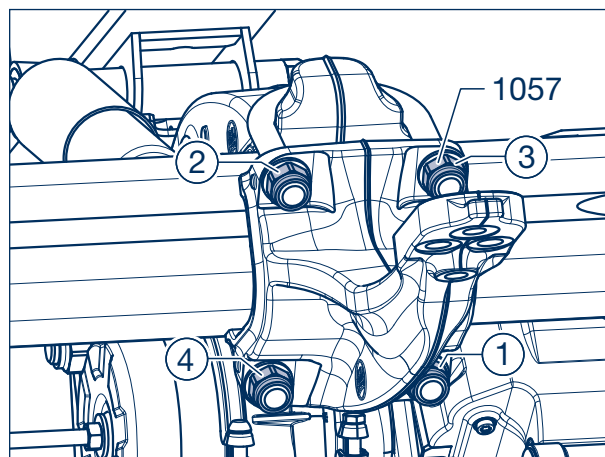
Picture 9

- [19] Tighten lock nuts (1057, SW 30) to torque of 200 Nm diagonally in sequence 1, 2, 3, 4 using torque wrench.

While tightening always ensure that the clearance between the U-bolts and axle beam radii, as well as the position of the cast parts (trailing arms and air bag mount) is maintained on the axle beam (coloured marking spring centre, picture 8).

- [20] Measure distance X (picture 11). This must coincide with the value noted in work step [7]. Tolerance ± 1 mm.

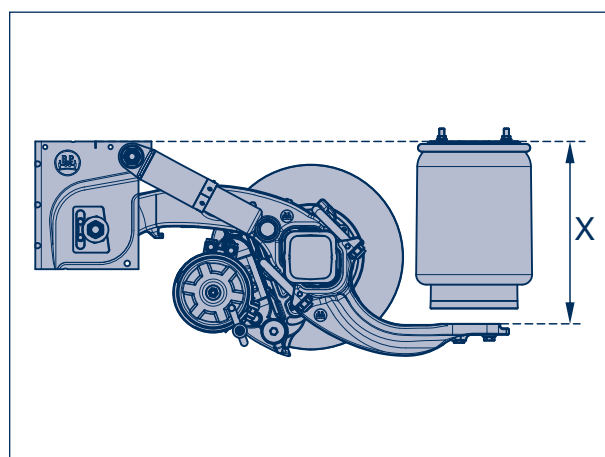
If necessary loosen U-bolt slightly, correct position and retighten.



Picture 10

- [21] Tighten all lock nuts to torque of 350 Nm and then to 420 Nm.

- [22] Finally tighten all lock nuts by turning them an additional 90°.



Picture 11

- [23] Clean contact surfaces on air bag and air bag mount (1030).

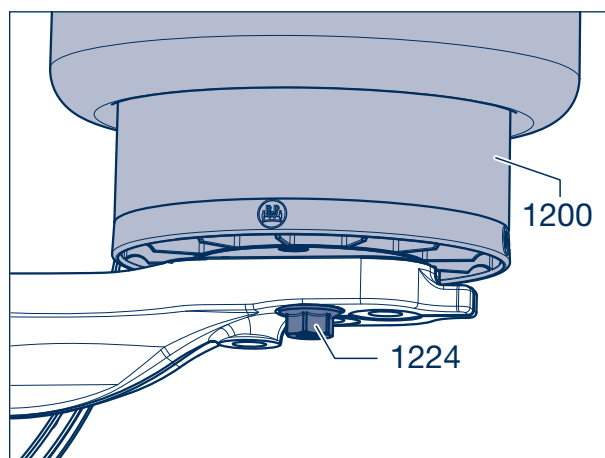
- [24] Install bottom air bag mount. Install locking bolt(s) (1224, SW 22) (depending on version of air bellows) and tighten to specified tightening torque.

M 16 (SW 22) M = 230 - 300 Nm

Bottom mount with central bolt:

M 16 (SW 22) M = 300 Nm

-  If the air bag has been removed completely, see Installing air bags, Chapter 11.2.



Picture 12

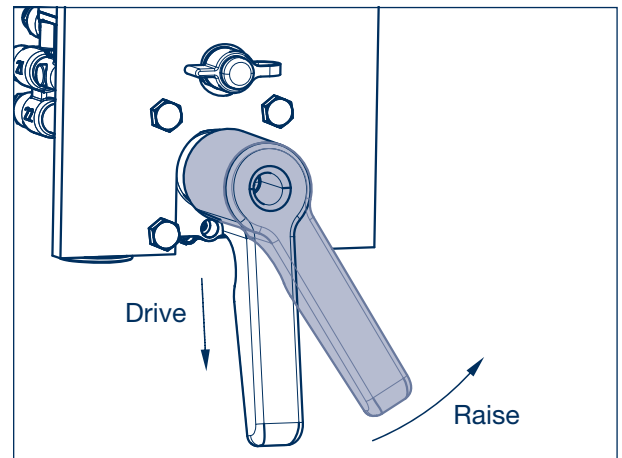
7 Replacing air bag mount

[25] Lower axle and remove vehicle jack.

[26] Inflate air bags by setting rotary disc valve / change-over valve lever for air suspension to „Lift”.

On air suspension systems without rotary disc valve / change-over valve, actuate valve lever on air suspension valve until air bags are filled with air.

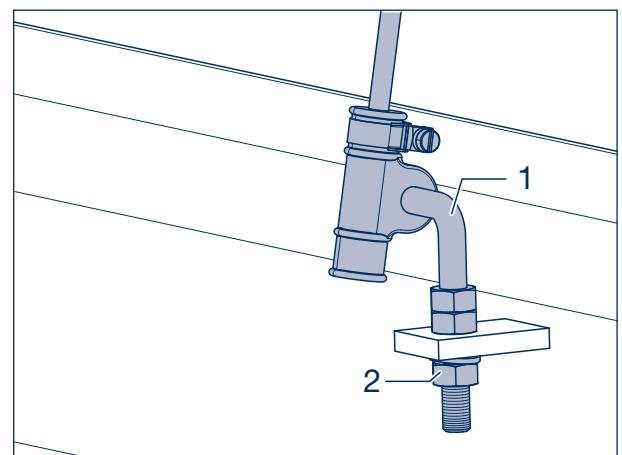
[27] Remove vehicle supports.



Picture 13

[28] Lower vehicle, deflate air bags to driving position by setting rotary disc valve / change-over valve lever on air suspension to „Drive”.

[29] On air suspension systems without rotary disc valve / change-over valve, screw nut (2) for air suspension valve linkage (1) on to axle. The vehicle is automatically re-set to the ride height.



Picture 14

Replacing trailing arm 8

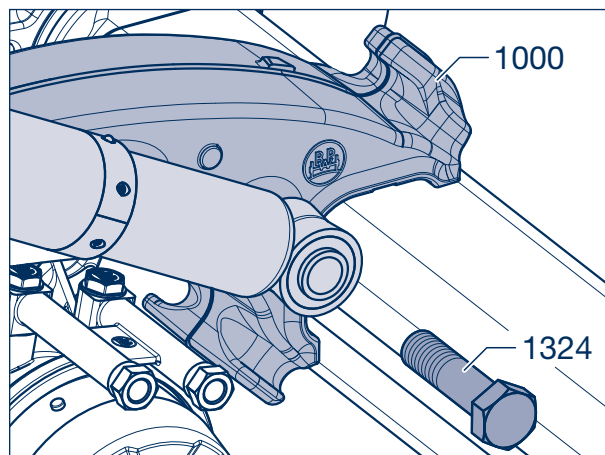
8.1 Removing trailing arm



Repair guide!

If it is necessary to replace the trailing arm, always replace one complete axle side.

- [1] Remove air bag mount, see Chapter 7.1.
- [2] Remove bolt (1324, SW 36) for bottom shock absorber mount on trailing arm (1000).



Picture 1

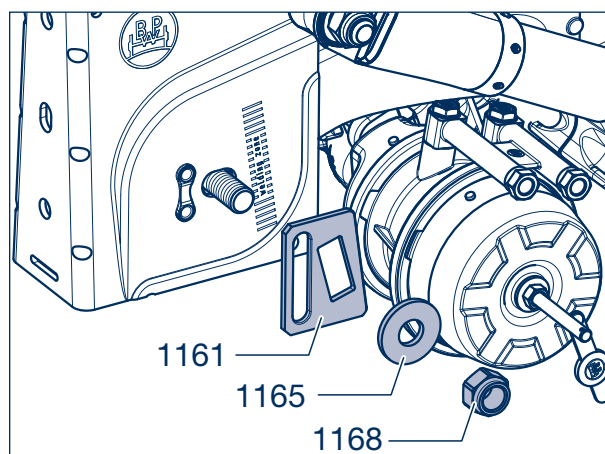
- [3] Remove lock nut (1168, SW 36) from the spring bolt (1154).
- [4] Remove washer (1165) and adjusting plate (1161).

☞ When brace is bolted on, it is necessary to remove the gusset plate.



Caution! RISK OF INJURY!

When removing, ensure that the trailing arm (1000) is secured against falling down. Use hoist or get help from a second person.

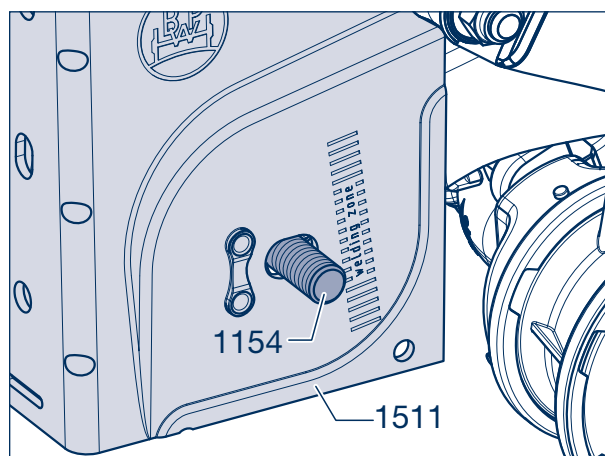


Picture 2

- [5] Drive spring bolts (1154) out of support (1511) and trailing arm bush (1005).

☞ See Chapter 13 for side mounted axle lift or two-side axle lift.

- [6] The trailing arm (1000) can then be removed from the support and the axle beam; lower axle slightly, if necessary.

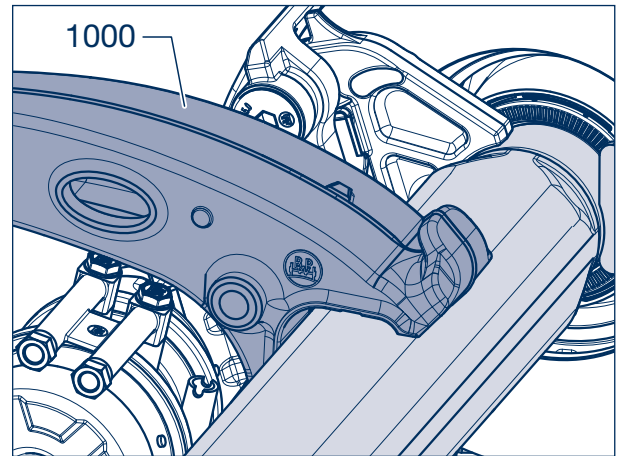


Picture 3

8 Replacing trailing arm

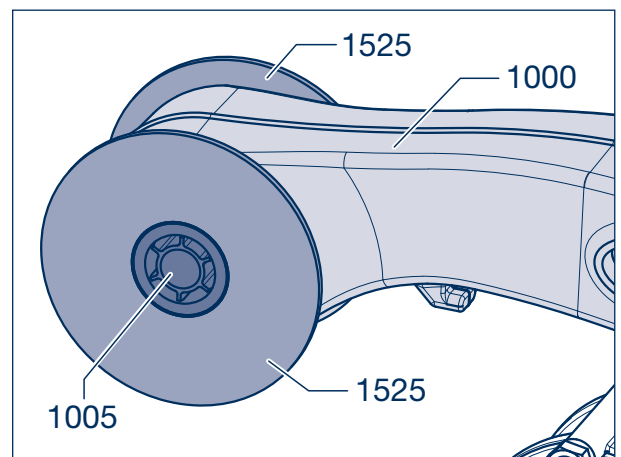
8.2 Installing trailing arm

- [7] Remove dirt from contact surfaces on axle beam, trailing arm and air bag mount.
- [8] Position trailing arm (1000) on axle beam.



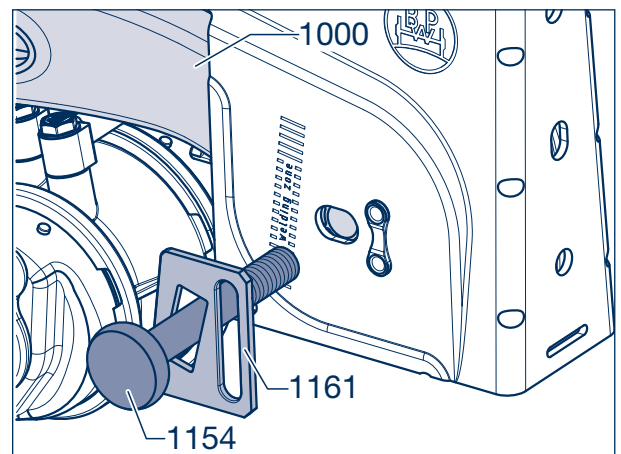
Picture 4

- [9] Position wear washers (1525) for the trailing arm (1000) on both sides of bush (1005).



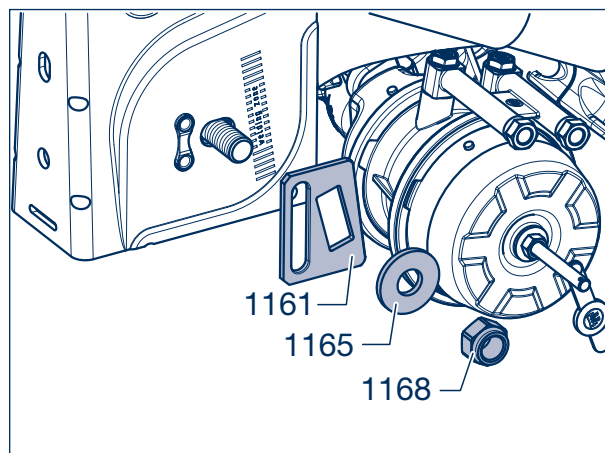
Picture 5

- [10] Position adjusting plate (1161) in correct position on spring bolt (1154).
 - [11] Insert trailing arm (1000) with wear washers (1525) in to support. Lightly grease new spring bolts (1154) and install from outside to inside.
- 👉 On version with bolted brace, install spring bolts (1155) from inside to outside.



Picture 6

- [12] Position inner adjusting plates (1161) in correct position, install disc (1165) and assemble a new lock nut (1168, SW 36) loosely.



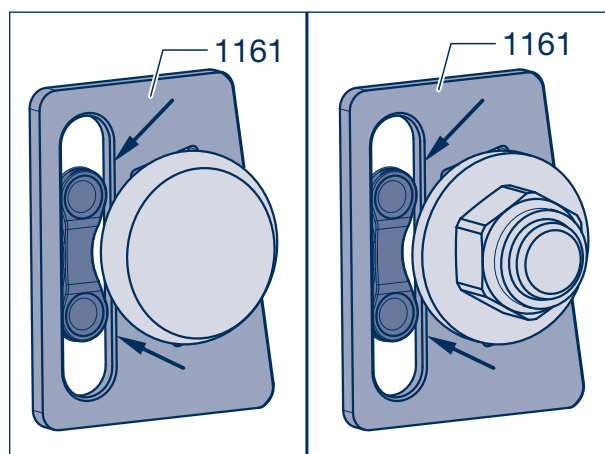
Picture 7



Repair guide!
Pay particular attention to the correct position of the adjusting plate (1161) on the anti-rotation lock (arrows) of the air suspension hanger brackets.

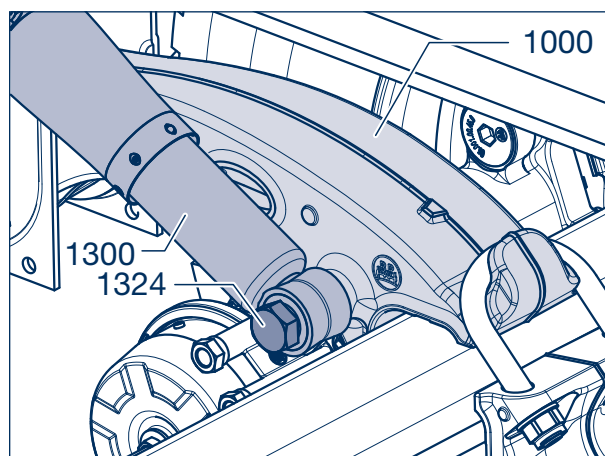
The square on the spring bolt head (anti-rotation lock) must sit in the slot of the adjusting plate.

Tighten lock nut only after axle alignment check (see Chapter 15).



Picture 8

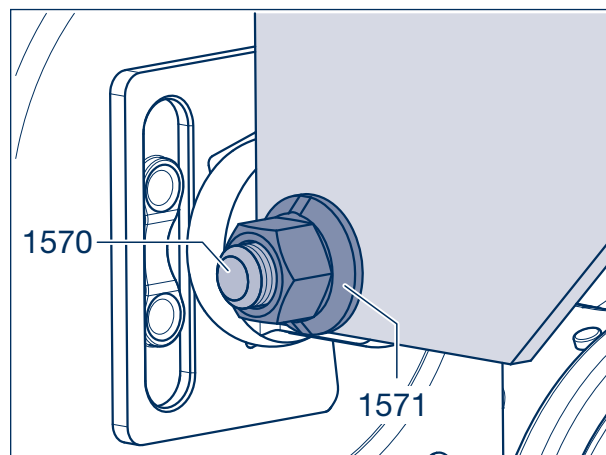
- [13] Install bottom shock absorber eye on trailing arm (1000). Tighten bolt (1324, SW 36) to specified torque of **420 Nm** (390 - 460 Nm).



Picture 9

8 Replacing trailing arm

- [14] On version with bolted brace, fasten gusset plate to top of cross-member with at least three M 16 bolts.
- [15] Install bolt (1570, M 18 x 1.5) at bottom of spring bolt and assemble nut (1571, SW 27).
- [16] Tighten bolt to specified torque of **420 Nm** (390 - 460 Nm).
- [17] Install bellows mount, see Chapter 7.2.

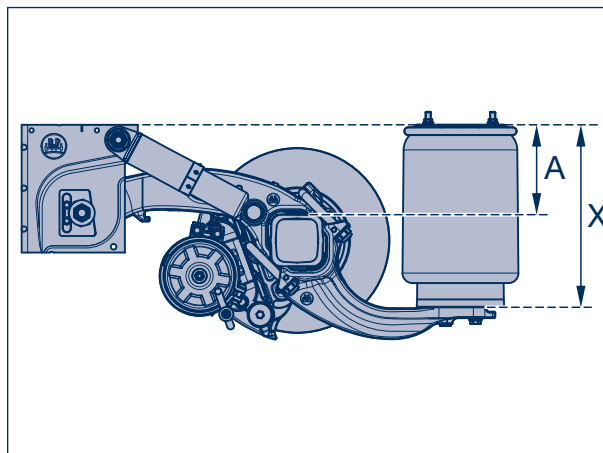


Picture 10

Removing and installing axle 9

9.1 Removing axle

- [1] Secure vehicle to prevent rolling away. Release service brake and parking brake.
- [2] Measure and note distances (A) and (X) from top of axle beam and top of air bag mount to bottom of frame.
- [3] Remove both air bag mounts, see Chapter 7.1.
- [4] Remove air hoses from brake cylinder. Remove parking brake cables if fitted.
- [5] Disconnect all cable connections to axle (brake pad wear sensor, ABS, etc.).
- [6] Carefully lower and remove the axle.



Picture 1

9.2 Installing axle

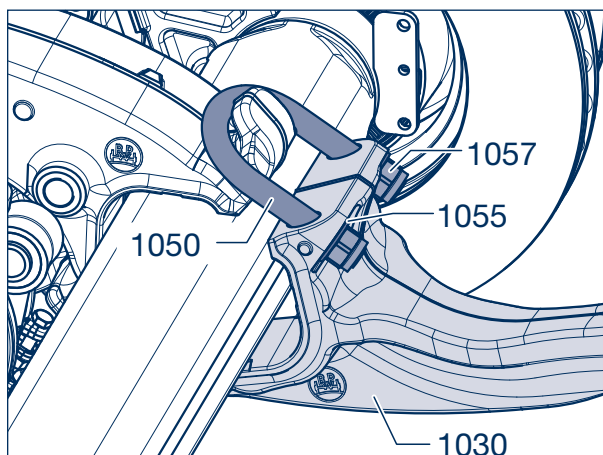
- ✎ Before installing the new axle, mark the spring centre position position of the airbag mount (1030) and trailing arm (1000) onto the axle beam with a coloured marker.
- [7] Position axle on vehicle jack (low-lift platform truck) to prevent accidents, slide below frame and raise until top of axle beam reaches position (A) measured in work step [2] and is in contact with trailing arm on both sides.
 - [8] Pre-assemble top U-bolts (1050) on air bag mount (1030).



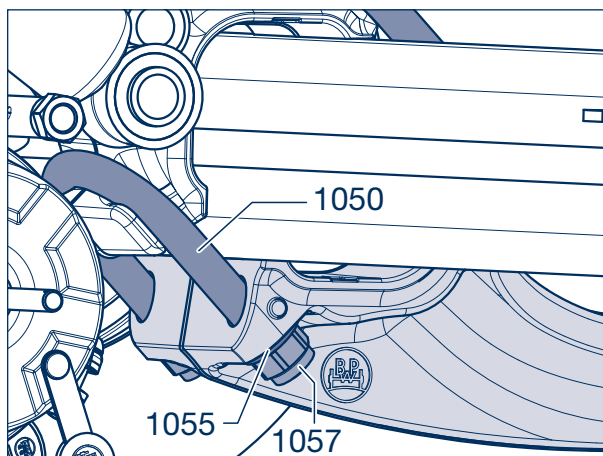
Repair guide!

The thread of the U-bolts must not be greased.

- [9] Install new washers (1055) and assemble new lock nuts (1057) hand tight.
- [10] Hook air bag mount with U-bolt mounted into bracket on trailing arm (1000).
- [11] Install new bottom U-bolt (1050), position new washers (1055) and assemble new lock nuts (1057).



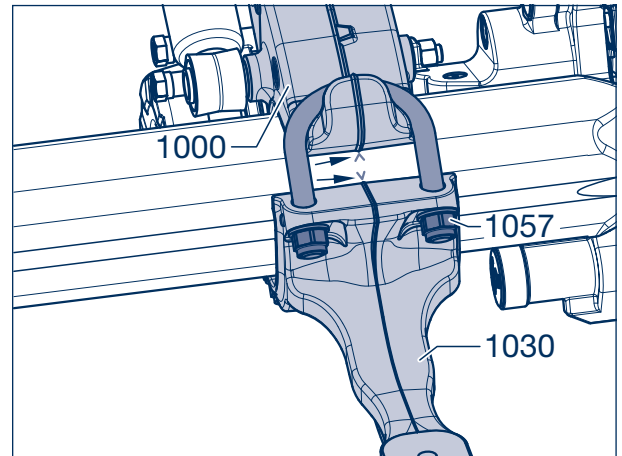
Picture 2



Picture 3

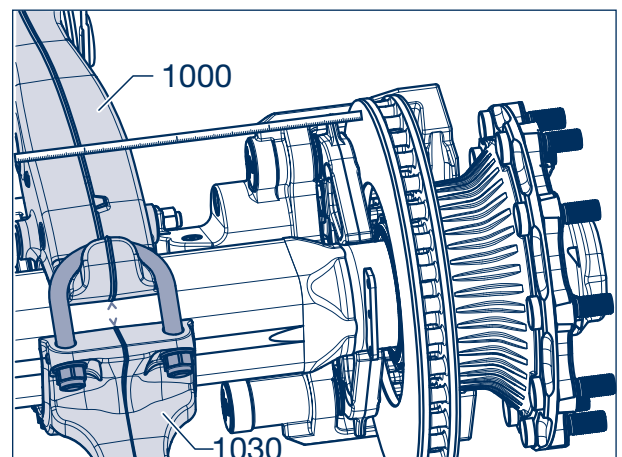
9 Removing and installing axle

- [12] Align trailing arms (1000) and air bag mount (1030) with spring centre markings (arrows).
- [13] Lightly tighten lock nuts (1057, SW 30) - on each U-bolt - until all components make uniform contact.



Picture 4

- [14] Check position of trailing arm (1000) and bellows mount (1030). Measure distance from centre of cast part (mould parting line) to brake drum / brake disc, equalise distances, if necessary.
Permissible tolerance: ± 2 mm

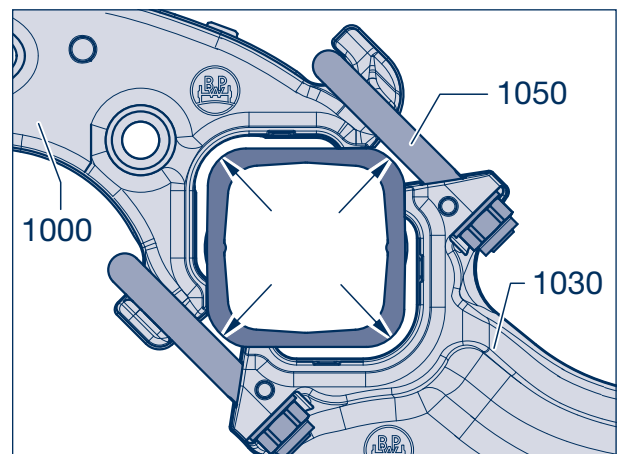


Picture 5



Repair guide!

During assembly pay attention to clearance between the U-bolts (1050) and cast parts (1000, 1030) and the 4 axle beam radii. Centre if required.



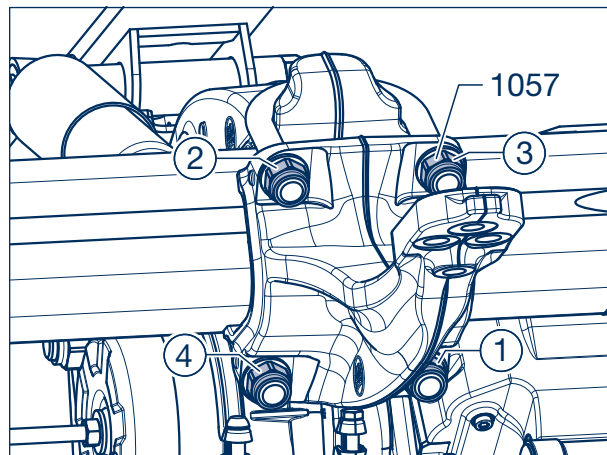
Picture 6

- [15] Tighten lock nuts (1057, SW 30) to torque of 200 Nm diagonally sequence 1, 2, 3, 4 using torque wrench.

While tightening always ensure that the clearance between the U-bolts and axle beam radii, as well as the position of the cast parts (trailing arms and bellows mount) is maintained on the axle beam (coloured marking, picture 8).

- [16] Measure distance X (picture 8). This must coincide with the value noted in work step [2]. Tolerance +/- 1 mm.

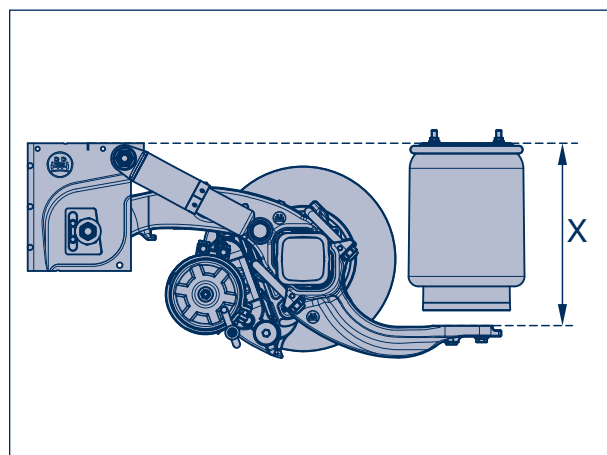
If necessary loosen U-bolt slightly, correct position and retighten.



Picture 7

- [17] Tighten all lock nuts to torque of 350 Nm and then to 420 Nm.

- [18] Finally tighten all lock nuts by turning an additional 90°.



Picture 8

- [19] Clean contact surfaces on air bellows and bellows mount (1030).

- [20] Install bottom air bag mount. Install locking bolt(s) (1224, SW 22) (depending on version of air bellows) and tighten to specified tightening torque.

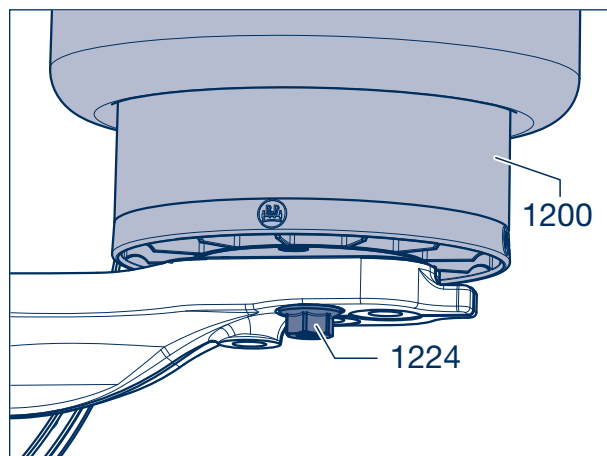
Bottom mount with two bolts:

M 16 (SW 22) M = 230 - 300 Nm

Bottom mount with central bolt:

M 16 (SW 22) M = 300 Nm

-  If the air bag has been removed completely, see Installing air bags, Chapter 11.2.

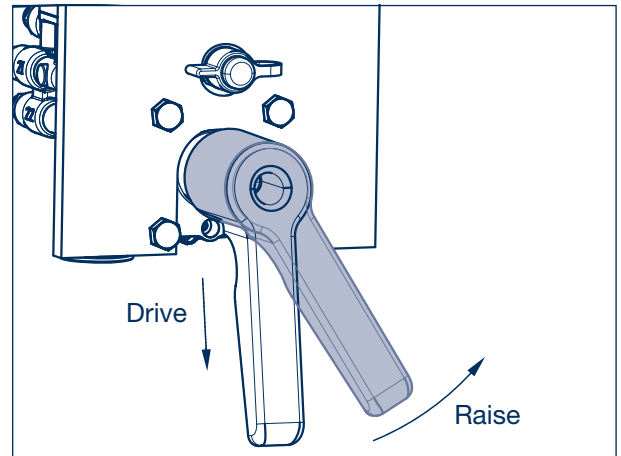


Picture 9

9 Replacing axle

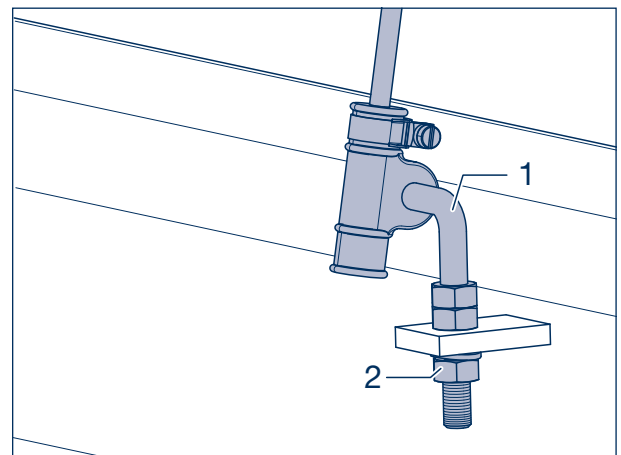
- [21] Lower axle and remove vehicle jack.
- [22] Inflate air bags by setting rotary disc valve / change-over valve lever for air suspension to „Lift”.

On air suspension systems without rotary disc valve / change-over valve, actuate the lever on the air suspension levelling valve until air bags are filled with air.
- [23] Remove vehicle supports.



Picture 10

- [24] Lower vehicle, deflate air bags to driving position by setting rotary disc valve / change-over valve lever on air suspension to „Drive”.
- [25] On air suspension systems without rotary disc valve / change-over valve, screw nut (2) for air suspension valve linkage (1) on to axle. The vehicle is automatically reset to the ride height.

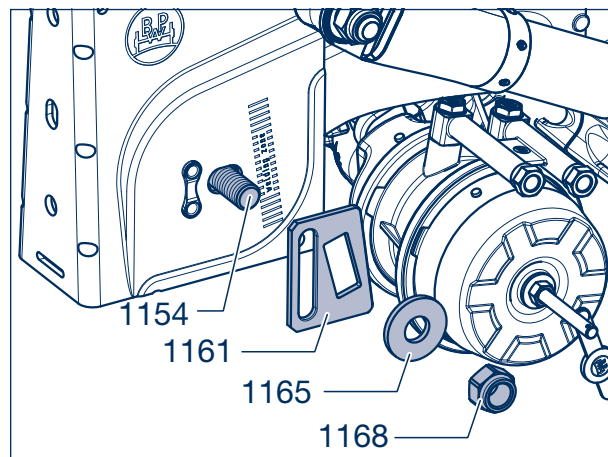
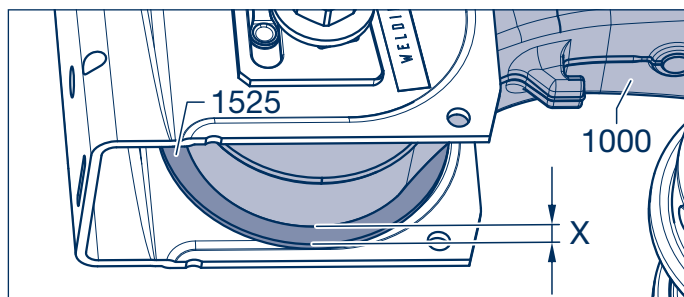


Picture 11

Replacing rubber-steel bush in trailing arm 10

10.1 Removing rubber-steel bush

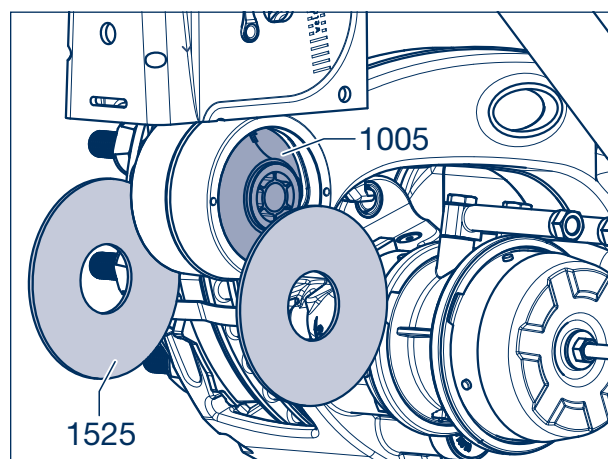
Check the rubber-steel bush (1005) for wear. To do this, measure the distance from the bottom edge of the plastic wearing plate (1525) to the trailing arm (1000) on a fully laden vehicle. The bush must be replaced in case of a measurement of > 30 mm.



Picture 1

It is not necessary to detach the trailing arm (1000) from the axle to replace the rubber-steel bush (1005).

- [1] Support axle to prevent accidents.
- [2] Remove lock nut (1168, SW 36) from the spring bolt (1154).
- [3] Remove washer (1165) and adjusting plate (1161).
- [4] Drive spring bolts (1154) out of support (1511) and trailing arm bush (1005).
- [5] Press trailing arm eye out of support; lower axle slightly if necessary.
- [6] Remove wear washers (1525) from rubber-steel bush.



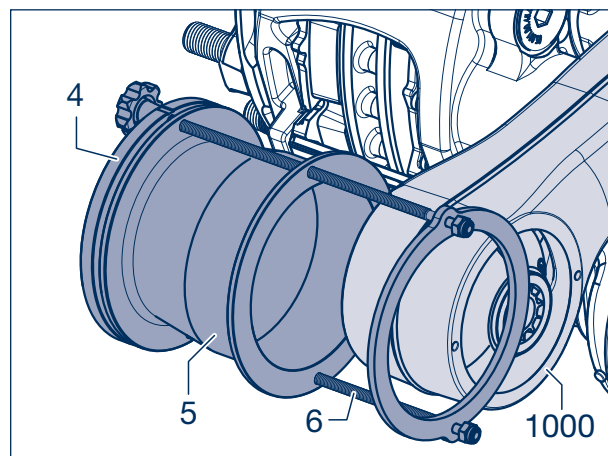
Picture 2



Repair guide!

It is not necessary to disassemble the insert/removal tool (BPW No.: 99.00.000.9.69), see page 6.

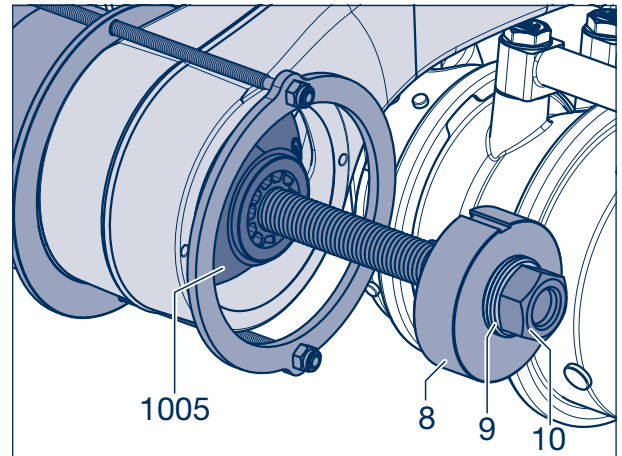
- [7] The threaded rods (6) must be loosened far enough so that the assembly can be slipped over the head of the cast suspension arm (1000) from the front.
- [8] Tighten the threaded rods slightly so that the alignment funnel (5) is resting on the smaller centring diameter of the puller plate (4).



Picture 3

10 Replacing rubber-steel bush in trailing arm

- [9] Generously coat the tension rod (10) and nut (1, SW 36) with heavy-duty lubricating and mounting grease (e.g. STABURAGS NBU30 PTM).
- [10] Insert the discs (9) and the cable mounts (8) onto the tension rod.
- [11] Screw the preassembled tension rod in the nut (1, SW 36) until it makes contact with the rubber-steel bush (1005).



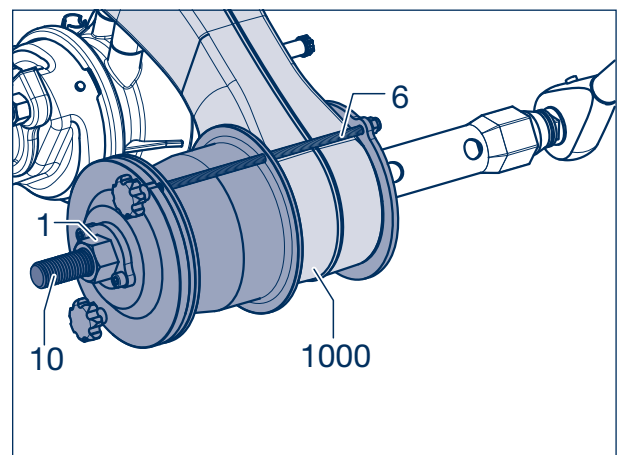
Picture 4



Attention!

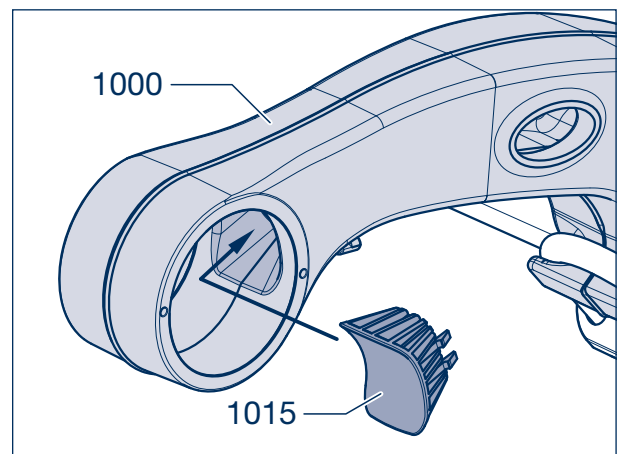
Do not use impact wrench. Use of an impact wrench reduces the life expectancy of the spindle considerably; it is even possible for the threaded parts to fail!

- [12] Pull the rubber-steel bush (1005) over the tension rod (10) out of the trailing arm (1000).
- [13] Unscrew the assembled tension rod (10), loosen threaded rods (6) and remove device with rubber-steel bush.



Picture 5

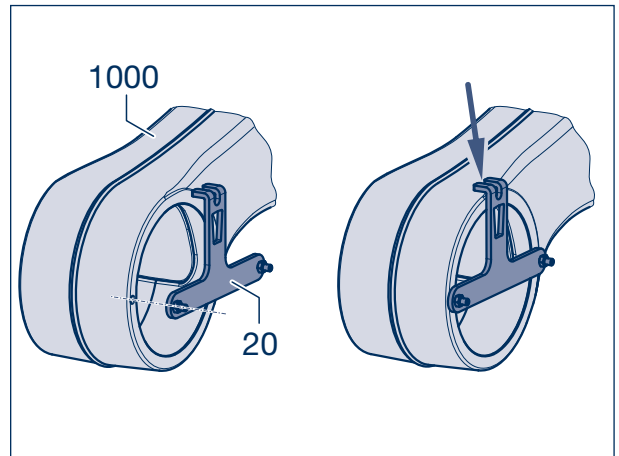
- [14] Remove plugs (1015) from trailing arm (1000) with screwdriver, if necessary with aid of hammer.
- [15] Clean contact surfaces in trailing arm.
- [16] Clip in new plugs.



Picture 6

10.2 Installing rubber-steel bush

- [17] Position the mask (20) laterally on the trailing arm (1000). To do this, use the two short protruding pin ends in the two indentations in the face of the trailing arm.
- [18] Using a suitable pin, attach the 'top' marking inside the fork of the mask (arrow) onto the trailing arm.



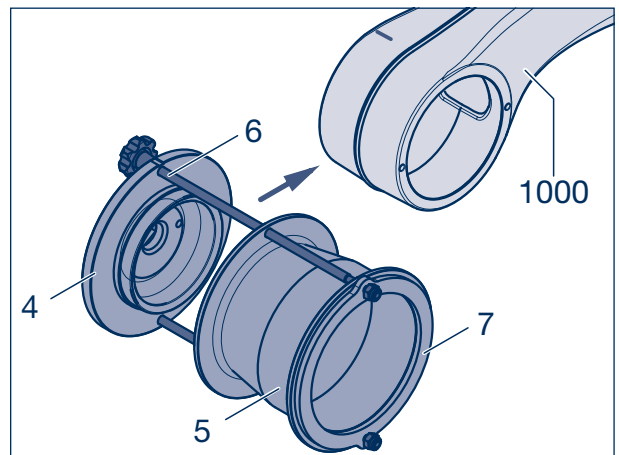
Picture 7



Repair guide!

To aid the mounting of the rubber-steel bush (1005), the lateral surface, the hole in the trailing arm (1000) and the inside of the alignment funnel (5) must be coated with tyre fitting paste.

- [19] The threaded rods (6) must be loosened far enough so that the assembly can be slipped over the head of the trailing arm (1000) from the front. Alignment funnel (5) sits snugly at the ring (7).
- [20] Mount the installation device so that the centring of the puller plate (4) is positioned in the trailing arm eye.
- [21] Tighten the threaded rods (6) slightly.
- [22] Generously coat the tension rod (10) and nut (1, SW 36, see Fig. 5) with a heavy-duty lubricating and mounting grease (e.g. STABURAGS NBU30 PTM).
- [23] Insert the discs (9) and the cable mounts (8) onto the tension rod.
- [24] Insert the rubber-steel bush (1005) in the alignment funnel (5) with the arrow pointing up.

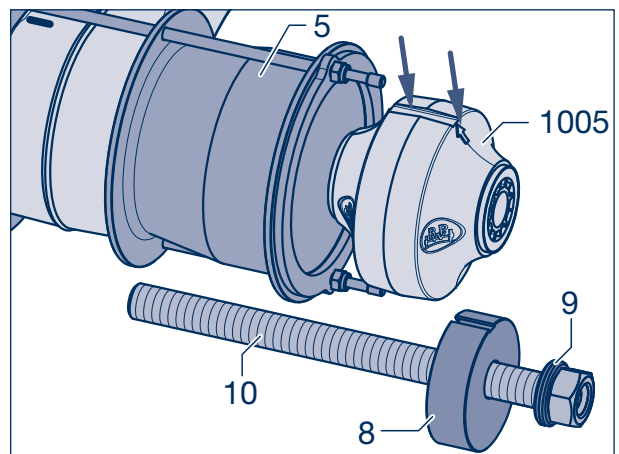


Picture 8



Repair guide!

If there are sprue nubs on the rubber-steel bush, they must be mounted so that they are pointing towards the alignment funnel.



Picture 9

10 Replacing rubber-steel bush in trailing arm

- [25] Screw the preassembled tension rod in the nut (1, SW 36) until it makes contact with the rubber-steel bush (1005).

Alignment



Repair guide!

When aligning the bushing installer to the cast suspension arm, all the relevant parts markings must point upwards and be aligned.

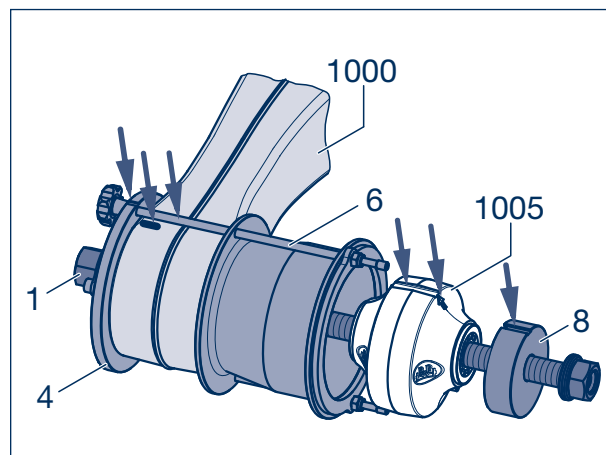
- red groove of the puller plate (4)
- rod (6) over the manually applied marking on the cast suspension arm (see working step [18])
- marking rubber steel bush (1005) upwards (1005)
- red groove of the installation sleeve (8)



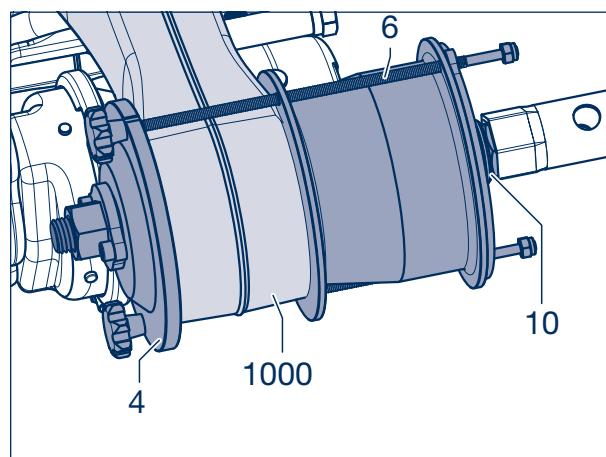
Attention!

Do not use impact wrench. Use of an impact wrench reduces the life expectancy of the spindle considerably; it is even possible for the threaded parts to fail!

- [26] Set tight the rubber-steel bush (1005) over the tension rod (10, SW 36) in the trailing arm (1000) until it makes contact with the puller plate (4). When setting tight, the device can centre slightly in a radial direction if the threaded rods (6) are not tightened too much.




Picture 10

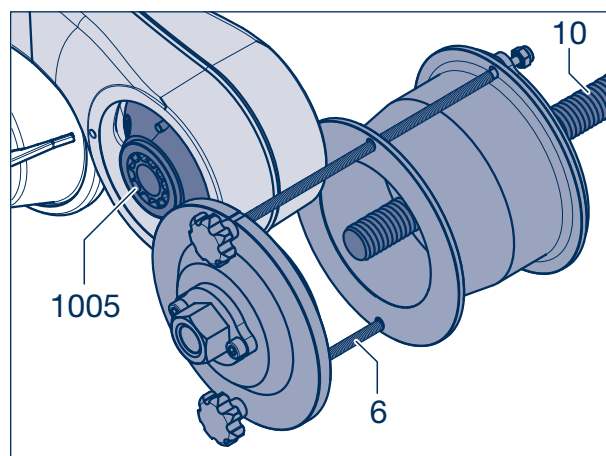


Picture 11

- [27] Unscrew the assembled tension rod (10), loosen threaded rods (6) and remove device.

- [28] Check the fit of the rubber-steel bush (1005).

-  If the bush sits mis-aligned or off -centre in the eye of the cast suspension arm, it can be readjusted, using a long bar. To do this, insert the bar through the opening in the bush and lever the bush into the required position. The adjustment process must be finished within approx. 10 minutes to ensure the tyre fitting paste is not dried yet.

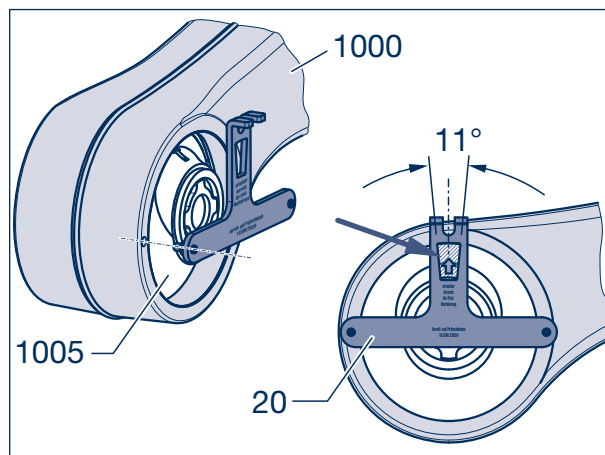


Picture 12

- [29] Check the angular position of the rubber-steel bush (1005). To do this, place the mask (20) on the bushing countersink and position the two long protruding pin ends in the two indentations in the face of the trailing arm.

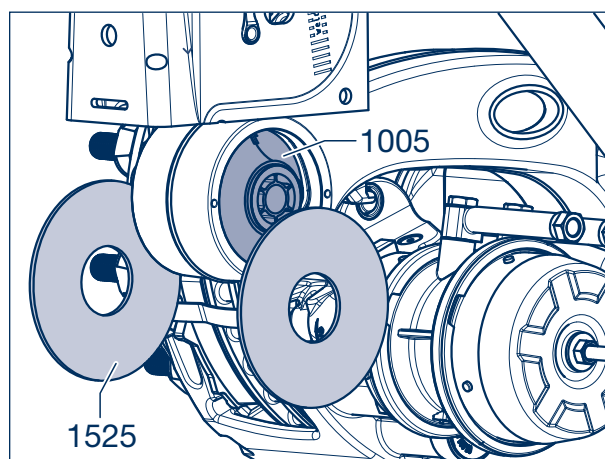
The position is correct if the marking of the bush ('up' arrow) can be seen within the notch (arrow) (permissible angular tolerance: $\pm 5.5^\circ$).

Where appropriate, remove the bush and set tight again.



Picture 13

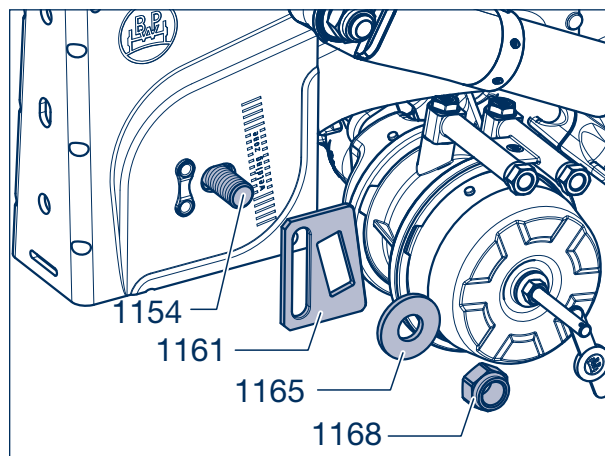
- [30] Install wear washer (1525) on rubber-steel bush.



Picture 14

- [31] Install trailing arm in support.

- [32] Install spring bolt (1154, SW 36), see Chapter 8, work step 10 - 12.

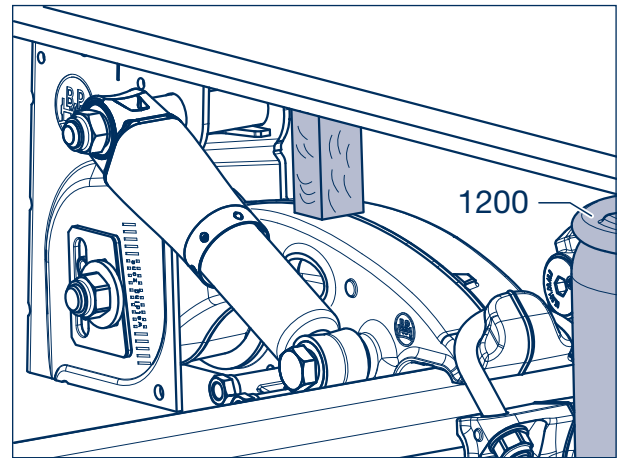


Picture 15

11 Removing and installing air bags

11.1 Removing air bags

- [1] Inflate air bags (1200) as far as possible with rotary disc valve / change-over valve.
- [2] Support vehicle to prevent accidents, e.g. place suitable spacer between vehicle frame and trailing arm.
- [3] Deflate air bags.

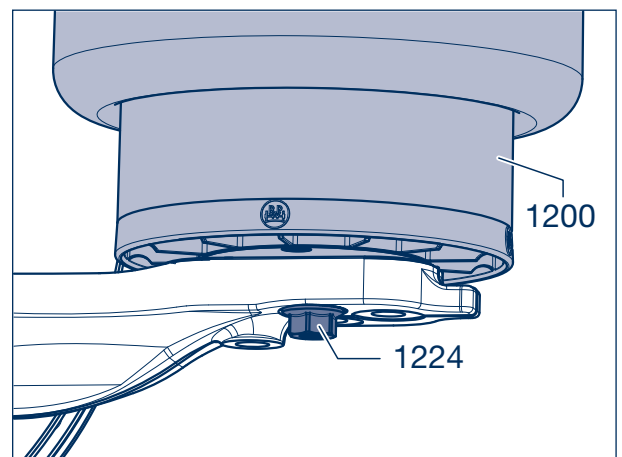


Picture 1

Air bags with central bolt connection

- [4] Unscrew locking bolt (1224, SW 22).

➡ Continue with work step [5].



Picture 2

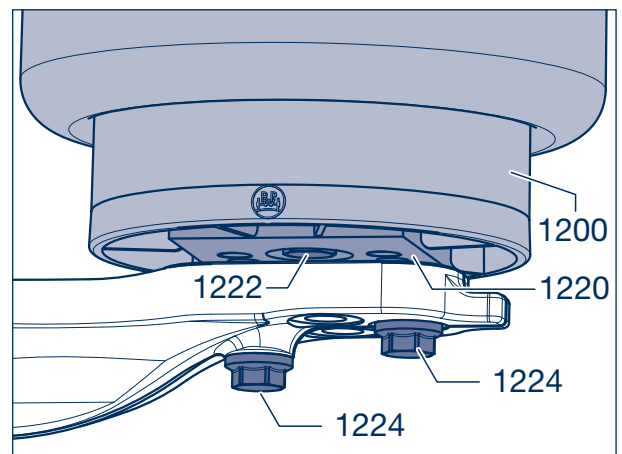
Air bags with universal plate

- [4] If the air bags (1200) are to be dis-assembled after removal, loosen centre hex. head bolt (1222, SW 22) to facilitate disassembly.

Remove locking screws (1224, SW 22).

➡ If the hex. head bolt (1222) is located above the trailing arm, it can be loosened only after removal of the air bags.

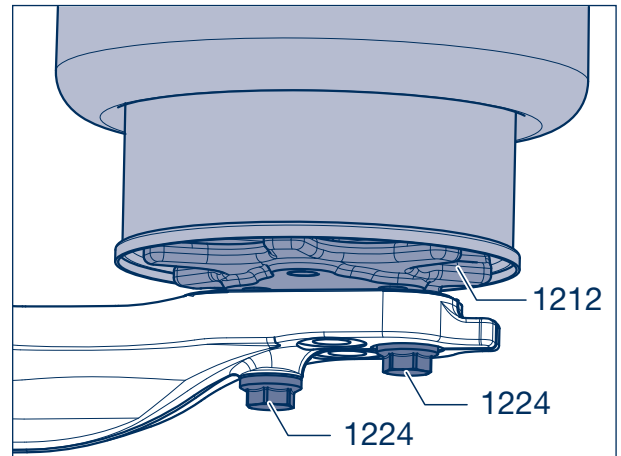
➡ Continue with work step [5].



Picture 3

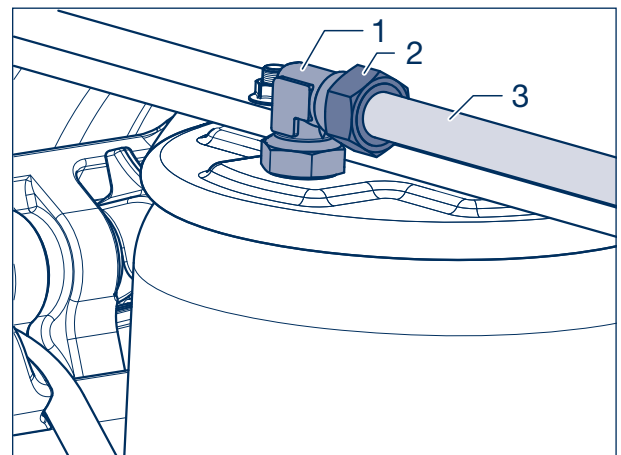
Air bags with split piston

- [4] Remove locking bolts (1224, SW 22). Remove support (1212) from air bag mount (1030).



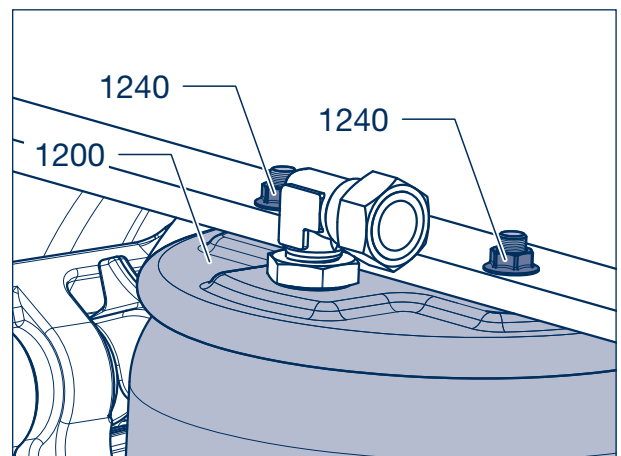
Picture 4

- [5] Unscrew union nut (2) from fitting (1) and detach air hose (3) from fitting.



Picture 5

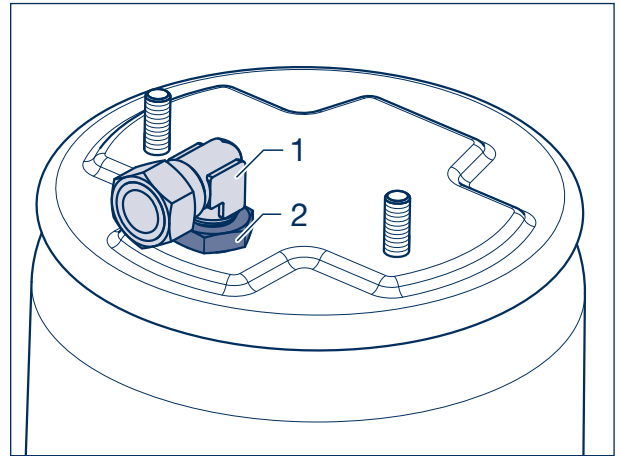
- [6] Remove both lock nuts (1240, SW 17) from air bag top fixing.
- [7] Remove air bag (1200).



Picture 6

11 Removing and installing air bags

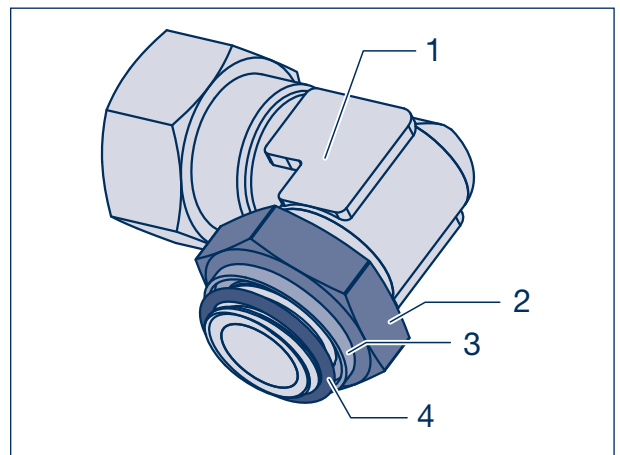
- [8] If necessary loosen counter nut (2) on fitting (1) and unscrew fitting from air bag (1200).



Picture 7

11.2 Installing air bags

- [9] Slide pressure ring (3) over threads on fitting (1) with smooth surface forward then install new O-ring (4).
- [10] Assemble fitting into air bags, do not tighten the lock nut (2) yet.



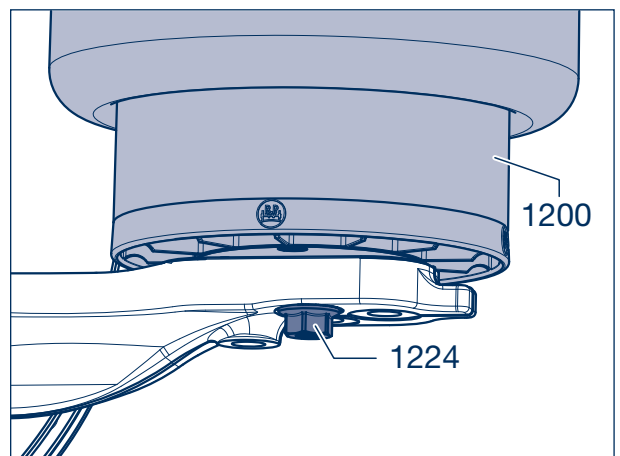
Picture 8

- [11] Clean contact surfaces on air bag and air bag mount (1030).

Air bags with central bolt connection

- [12] Position air bag (1200) on air bag mount (1030).
- [13] Screw in M 16 locking bolt (1224, SW 22) and tighten to specified torque of $M = 300 \text{ Nm}$.

 Continue with work step [14].



Picture 9

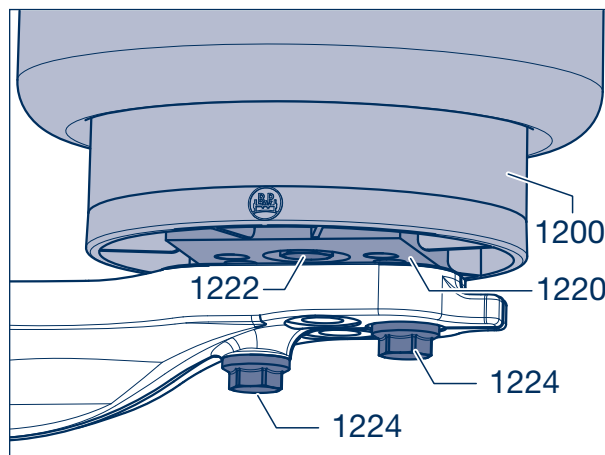
Air bag with universal plate

[12] Position air bag (1200) on air bag mount (1030).

[13] Assemble M 16 locking bolt (1224, SW 22) and tighten to specified torque of $M = 230 - 300 \text{ Nm}$.

👉 If the hex. head bolt (1222, SW 22) is loosened during dis-assembly, check to ensure it is tightened to specified torque of $M = 230 \text{ Nm}$.

👉 Continue with work step [14].

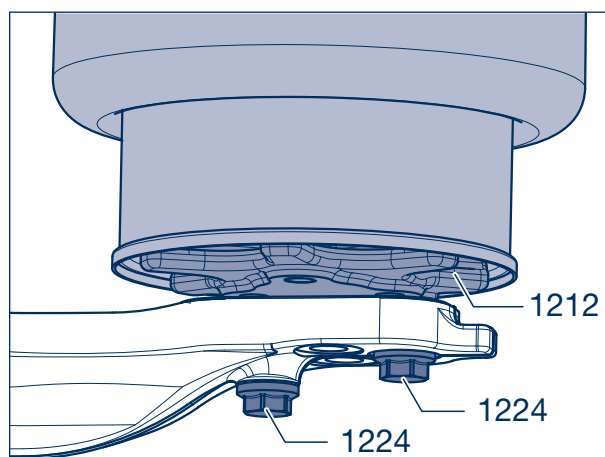


Picture 10

Air bag with split piston

[12] Place support (1212) in correct position on spring bolt (1030).

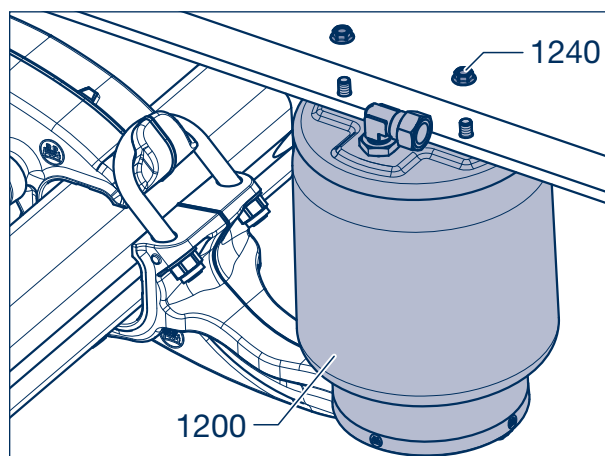
[13] Assemble M 16 locking bolt (1224, SW 22) and tighten to specified torque of $M = 230 - 300 \text{ Nm}$.



Picture 11

[14] Inflate air bags (1200) slightly, while simultaneously inserting the two bolts for the top plate into the holes provided for this purpose on the vehicle frame.

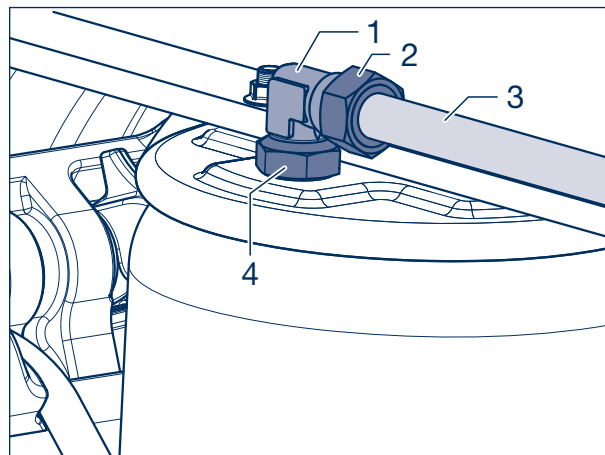
[15] Assemble the two lock nuts (1240, SW 17) on to the bolts and tighten to specified torque of 66 Nm .



Picture 12

11 Removing and installing air bags

- [16] Assemble union nut (2) for air hose (3) on to fitting (1), then tighten lock nut (4).
- [17] Check compressed air system for leakage and functionality.

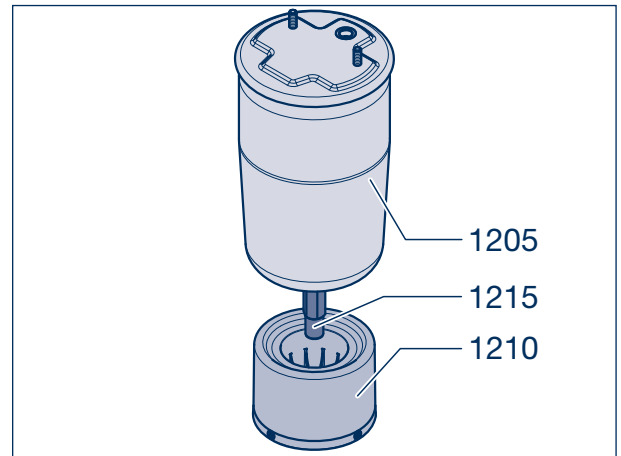


Picture 13

11.3 Dis-assembling and assembling air bags with central bolt connection

Disassembly

- [1] Remove air bag, see Chapter 11.1.
- [2] Feed compressed air in to the port for air connection until air bags (1205) are completely extended.
- [3] Pull plastic piston (1210) off of bolt (1215).

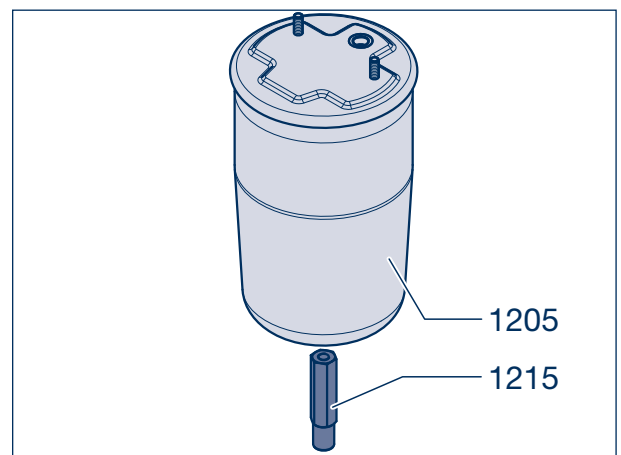


Picture 14

- [4] Remove bolt (1215, SW 32) off the air bag.

Assembly

- [5] Tighten bolts (1215, SW 32) on air bag (1205) to torque of 130 Nm.
- [6] Install plastic piston (1210) on bolt (1215).



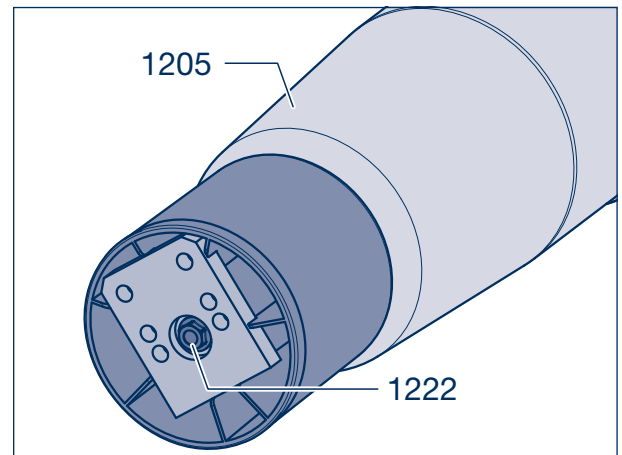
Picture 15

11 Removing and installing air bags

11.4 Dis-assembling and assembling air bags with universal plate

Dis-assembly

- [1] Remove air bag see Chapter 11.1.
- [2] Feed compressed air in to the port for air connection until air bag (1205) is completely extended.
- [3] Remove locking bolt (1222, SW 22) with impact wrench.

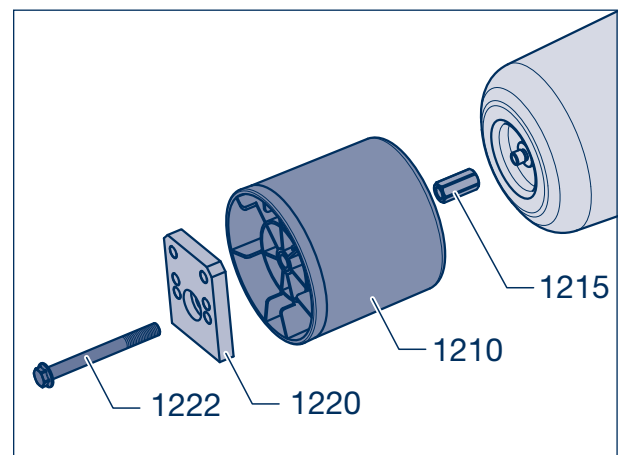


Picture 16

- [4] Remove washer (1220) and plastic piston (1210).
- [5] Remove threaded sleeve (1215, SW 24).

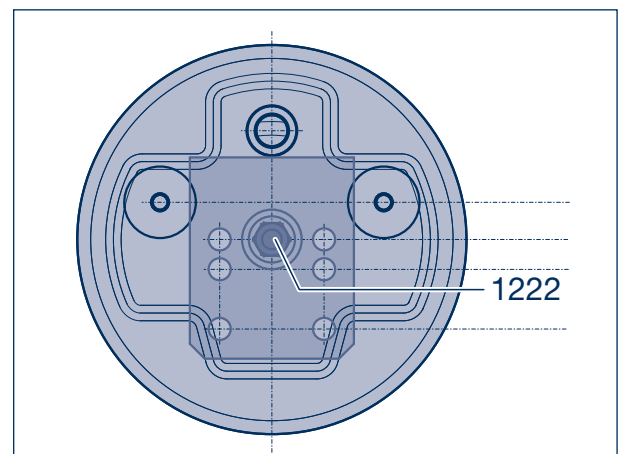
Assembly

- [6] Tighten threaded sleeve (1215, SW 24) on air bag (1205) to torque of 130 Nm.



Picture 17

- [7] Position plate (1220) in plastic piston (1210) and tighten locking bolt (1222, SW 22) on to threaded sleeve (1215) loosely.
- [8] Align mounting points with one another so that air bag is not turned to wrong position after installation.
- [9] Tighten locking bolt (1222, SW 22) to specified torque of 230 - 300 Nm.

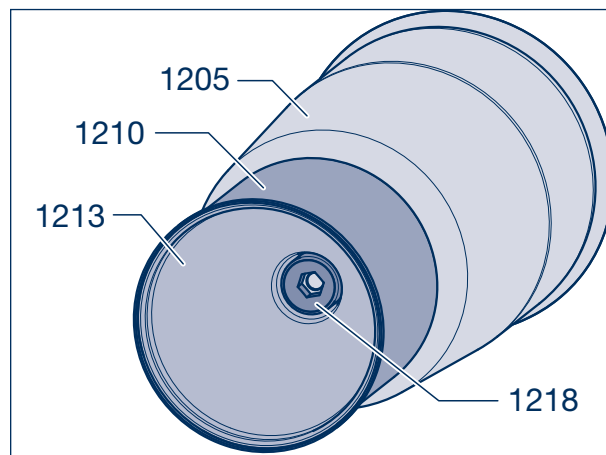


Picture 18

11.5 Dis-assembling and assembling air bags with split piston

Dis-assembly

- [1] Remove air bag , see Chapter 11.1.
- [2] Feed compressed air in to the port for air connection until air bag (1205) is completely extended.
- [3] Loosen nut with hexagonal recess (1218, SW 19) using impact wrench and unscrew.

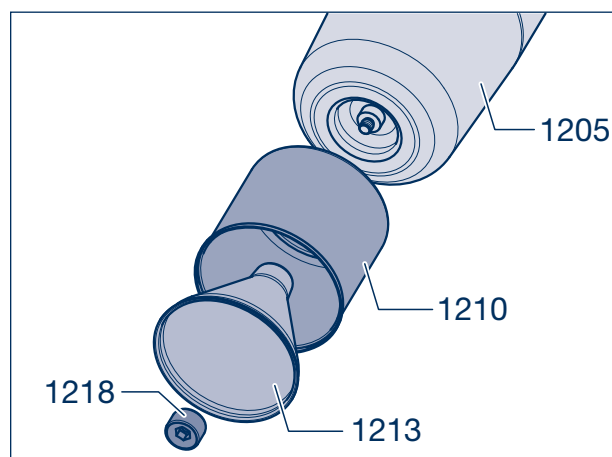


Picture 19

- [4] It is then possible to remove the two pistons (1210, 1213).

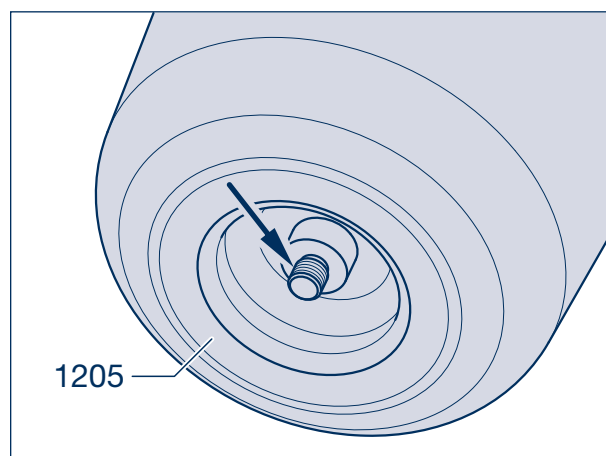
Assembly

- [5] Install piston (1213) in piston (1210).



Picture 20

- [6] Coat threads (arrow) on air bag (1205) with thread-locking adhesive, e.g. Loctite.
- [7] Assemble the pistons on to air bellows with nut (1218, SW 19).
Tightening torque: $M = 130 \text{ Nm}$

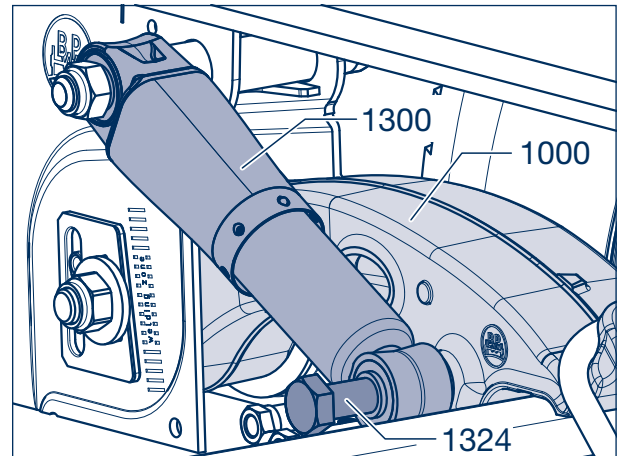


Picture 21

12 Dismantling and assembly of shock absorber

Removal

- [1] Support axle and vehicle to prevent accidents.
- [2] Remove locking bolt (1324, SW 36) from bottom shock absorber mount on trailing arm (1000).
- [3] Remove lock nut (1330, SW 36) from hex. head bolt (1315) on top shock absorber mount.
- [4] Secure shock absorber (1300) from falling down and pull hex. head bolt (1315) out of support.



Picture 1

Installing

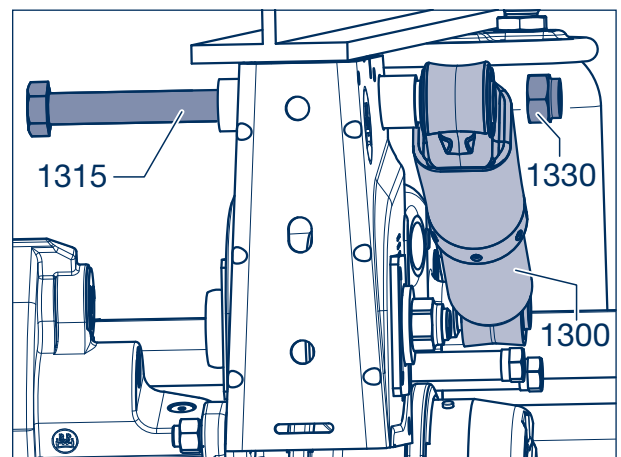


Repair guide!

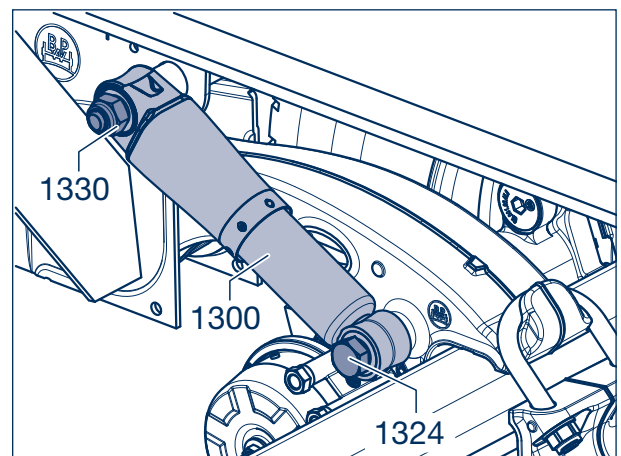
- Always replace shock absorbers in pairs, i.e. all shock absorbers on one axle.

- Install shock absorbers with cover pointing upward.

- [5] Coat hex. head bolt (1315) for shock absorber mount lightly with grease (thread and bearing points).
- [6] Insert hex. head bolt (1315) into air suspension hanger bracket tube (1511). Attach shock absorber (1300).
- [7] Assemble lock nut (1330, SW 36) loosely.
- [8] Install shock absorber (1300) on trailing arm (1000) using hexagon bolt (1324, SW 36).
- [9] Tighten hex. head bolt (1324) and lock nut (1330) to specified torque of **420 Nm** (390 - 460 Nm).



Picture 2



Picture 3

12.1 Replacing bushes in shock absorber

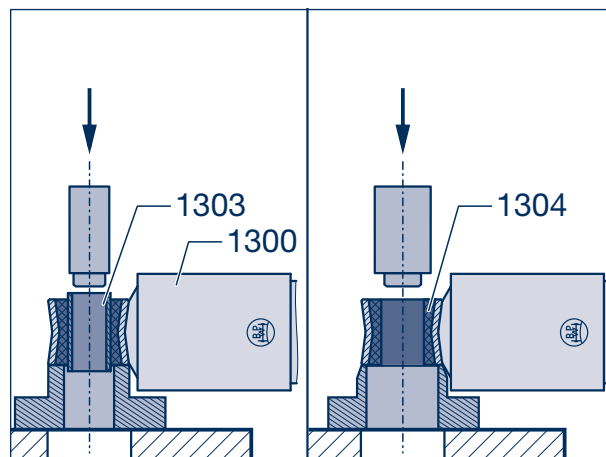
Removal

- [1] Remove shock absorber (1300).
- [2] Align shock absorber eye beneath press and press out steel bush (1303) with suitable tool.
- [3] Then press out rubber bush (1304).



Repair guide!

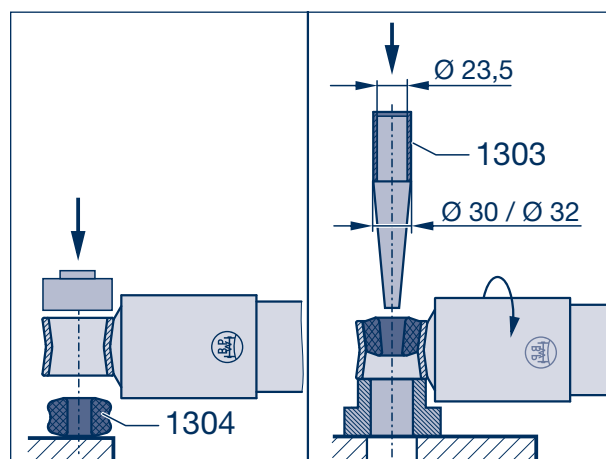
When pressing out, do not damage shock absorber or shock absorber eye.



Picture 4

Installation

- [4] Coat rubber bush (1304) and steel bush (1303) with 50% soap solution.
- [5] Press rubber bush in to stop in shock absorber eye.
- [6] Position steel bush (1303) on a suitable mandrel.
- [7] Turn shock absorber 180°. Press in steel bush with drift punch.

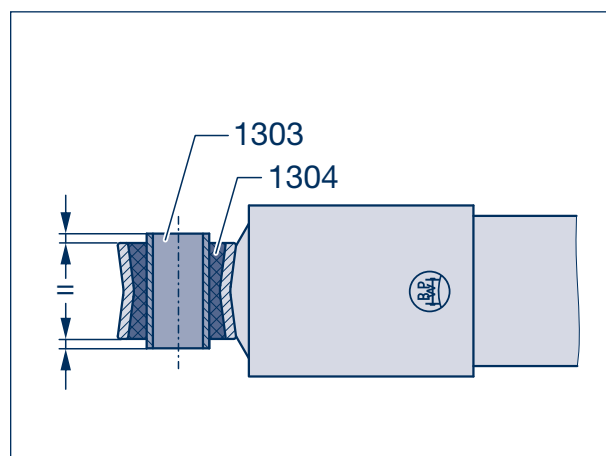


Picture 5



Repair guide!

After replacing the rubber and steel bushes (1303, 1304) the protrusion on both sides of the shock absorber eye must be equal.



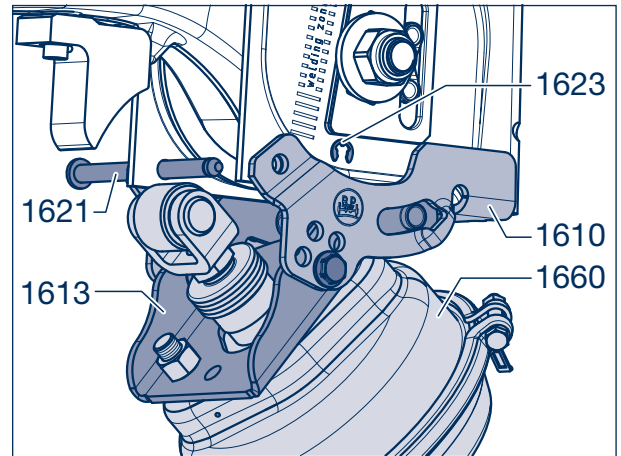
Picture 6

13 Dismantling and assembly of axle lift device

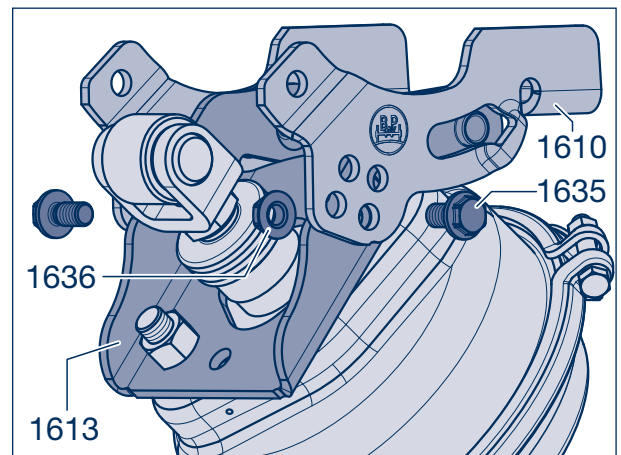
13.1 Two-side axle lift

Removal

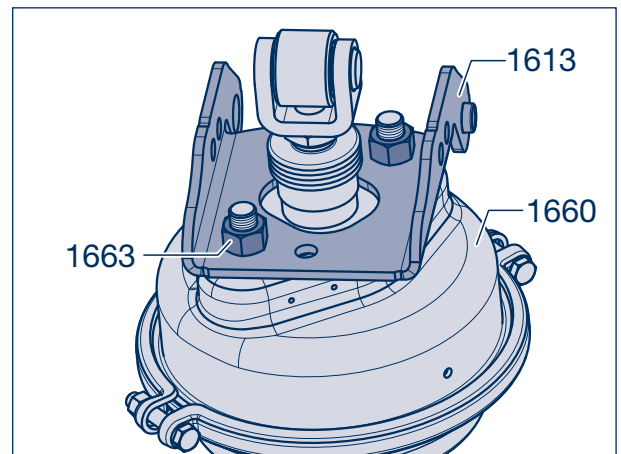
- [1] Support axle to prevent accidents and deflate air suspension.
- [2] Remove the locking washer (1623; until end of 2015) or the lock nut M 10 (1623 / SW 16; from 2016) from the location pin (1621).
- [3] Install bracket (1610) with shaped plate (1613) and secure lifting cylinder (1660) against falling down, remove positioning pin.
- [4] Pull complete unit out of holder in air suspension hanger bracket and remove.
- [5] If necessary remove lock nuts (1636, SW 17) from locking bolts (1635) and remove axle lift (1055). Note position of locking bolt.
- [6] If necessary, remove lift cylinder (1660), by removing the two lock nuts (1663, SW 24) from the stud bolts for the lift cylinder.



Picture 1



Picture 2



Picture 3

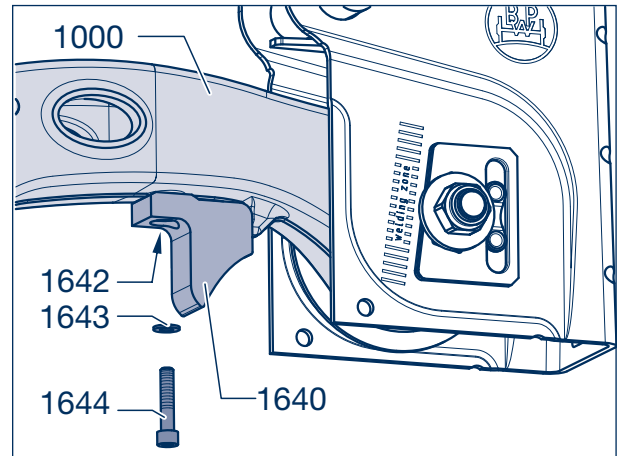
- [7] If necessary, remove cylinder cap screw (1644, SW 8) with washer (1643) out of shaped part (1640) or trailing arm (1000).



Repair guide!


If a TSB 3709 or TSB 4309 disc brake with spring brake cylinder is installed on the axle, it is necessary to remove it in order to remove the shaped part.

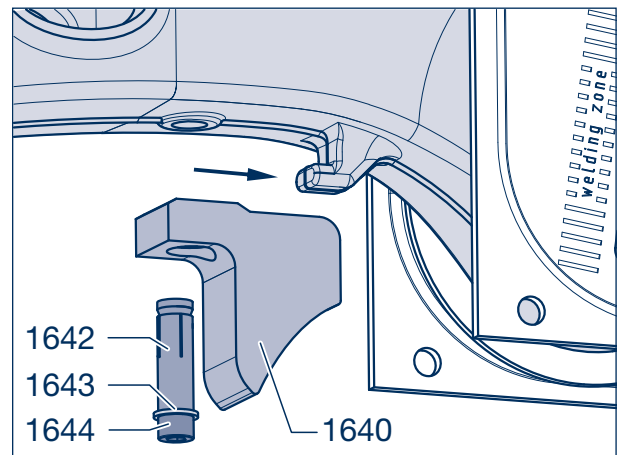
- [8] Tap or drill out upper anchor bolt flange (1642) and drive anchor bolt out through shaped part and trailing arm with drift punch.
- [9] Pull shaped part off trailing arm seat and remove.



Picture 4

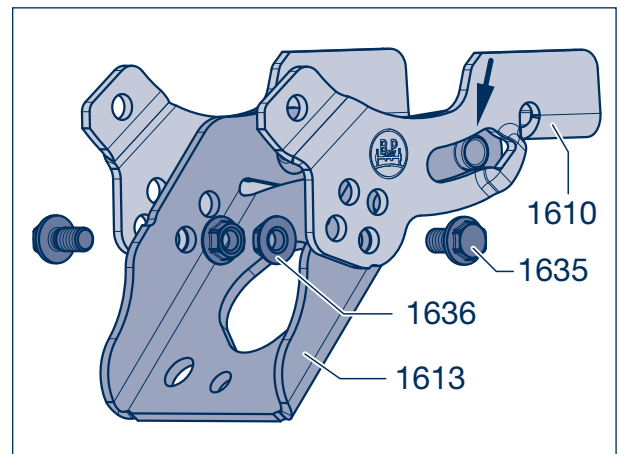
Installation

-  Clean all parts, check for wear and damage, replace, if necessary.
- [10] If removed, position shaped part (1640) on mount on trailing arm (arrow).
- [11] Install cylinder cap screw (1644, SW 8) with washer (1643) in to new anchor bolt (1642).
- [12] Drive fitting in to holes in shaped part (1640) and trailing arm (1000) with hammer.
- [13] Tighten cylinder cap screw to specified torque of 50 Nm.



Picture 5

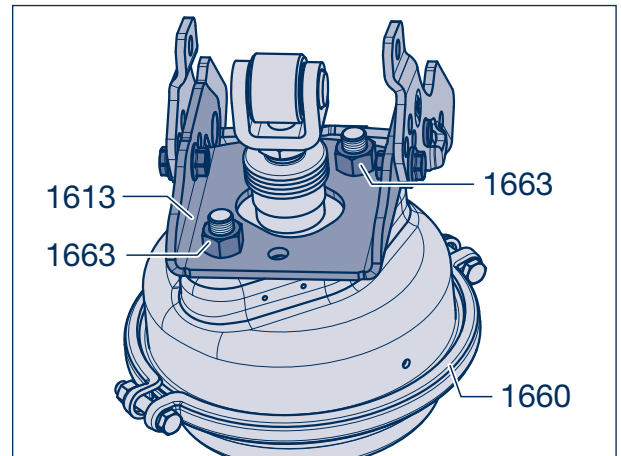
- [14] If removed, position shaped plate (1613) in adapters on two-side axle lift bracket (1610, arrow).
- [15] Bolt bracket and shaped plate to position noted in work step [5] using locking bolts (1635) and lock nuts (1636, SW 17).
Tightening torque: 75 Nm



Picture 6

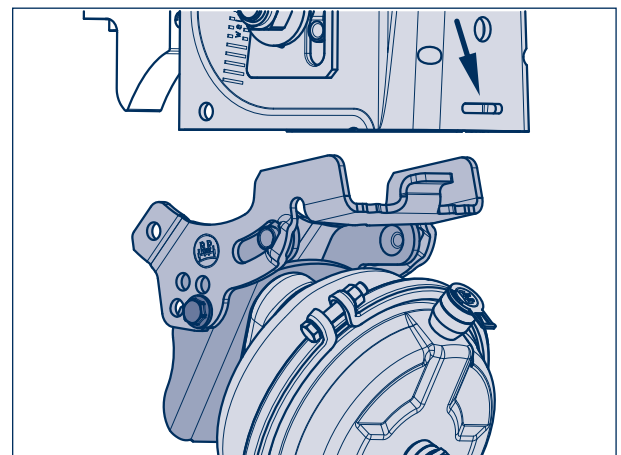
13 Dismantling and assembly of axle lift device

- [16] Install lift cylinder (1660) on bracket (1613) using lock nuts (1663, SW 24) and tighten to torque of $M = 190 \text{ Nm}$ (180 - 210 Nm).



Picture 7

- [17] Position preassembled axle lift in recess (arrow) in air suspension hanger bracket.



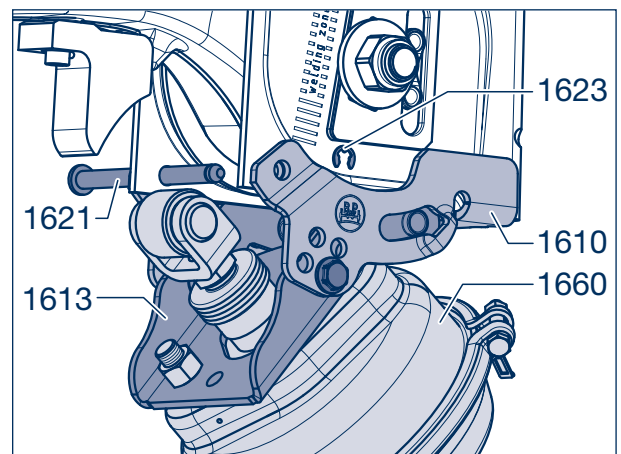
Picture 8

- [18] Raise axle lift. Fasten rear part of axle lift to air suspension hanger bracket with positioning pin (1621).
- [19] Attach the locking washer (1623; until end of 2015) or screw on the lock nut (1623 / SW 16; from 2016) and tighten to a torque of 38 Nm.



Repair guide!
Ensure the correct fit of the locking washer in the groove!

- [20] Where applicable, reinstall disc brake cylinder, if removed previously.

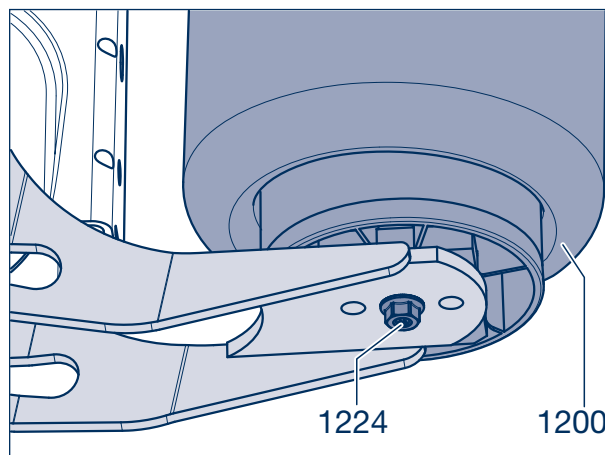


Picture 9

13.2 Sidemounted axle lift

Removal

- [1] Support axle to prevent accidents and deflate air suspension.
- [2] Unscrew bottom locking screws or central bolt (1224, SW 22) for lift bags (1200).



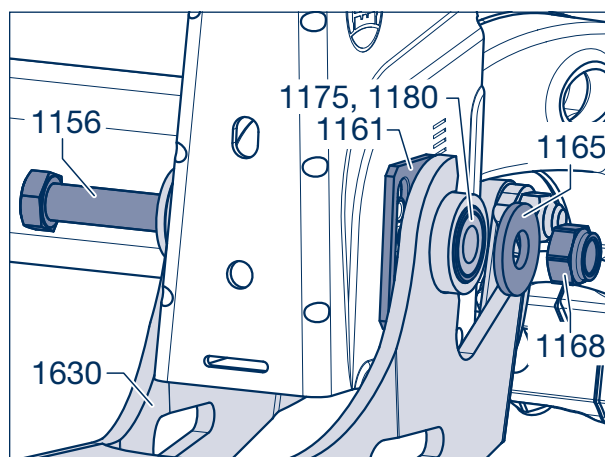
Picture 10

- [3] Remove lock nut (1168, SW 36) from spring bolt (1156).
- [4] Remove washer (1165).
- [5] Secure lift arm (1630) against falling down and drive out spring bolt.



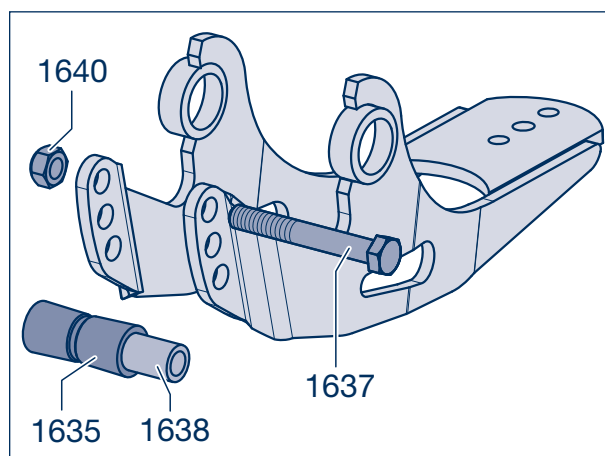
Caution! RISK OF INJURY
Use hoist or have second person help
remove lift arm.

- [6] Remove lift arm with bushes (1175, 1180), as well as adjusting plates (1161, 1560).



Picture 11


- [7] Remove lock nut (1640, SW 30) from hex. head bolt (1637). Note position of bolt.
- [8] Take out hex. head bolt and remove bush (1635) with tube (1638).

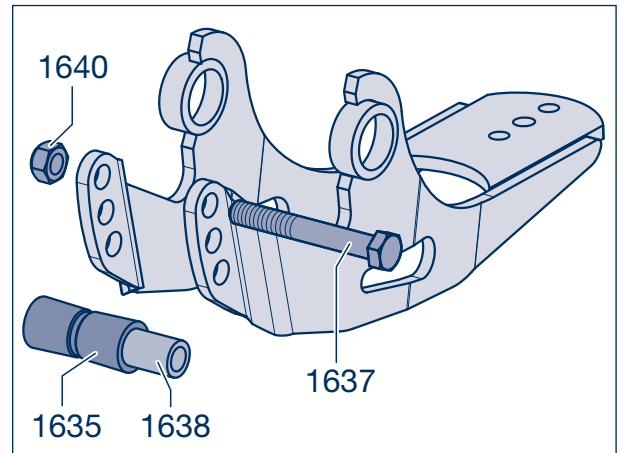


Picture 12

13 Dismantling and assembly of axle lift device

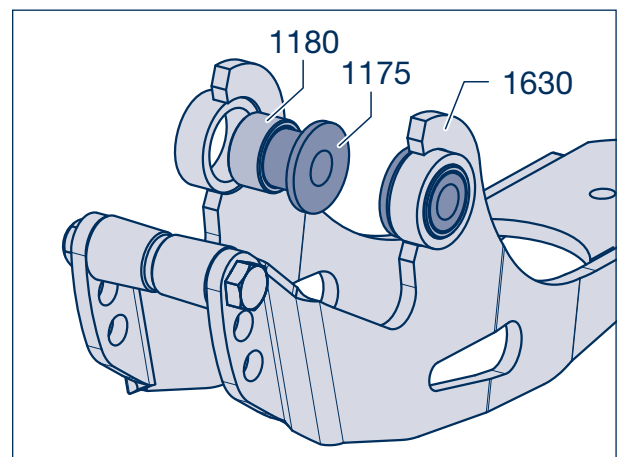
Installation

-  Clean all parts, check for wear and damage, replace, if necessary.
- [9] Position bush (1635) on tube (1638).
- [10] Use tube to install bush in lift arm (1630) (position noted in work step [7]).
- [11] Install hex. head bolt (1637).
- [12] Install locking screw (1640, SW 30) and tighten to specified torque of $M = 350 \text{ Nm}$ (325 - 385 Nm).



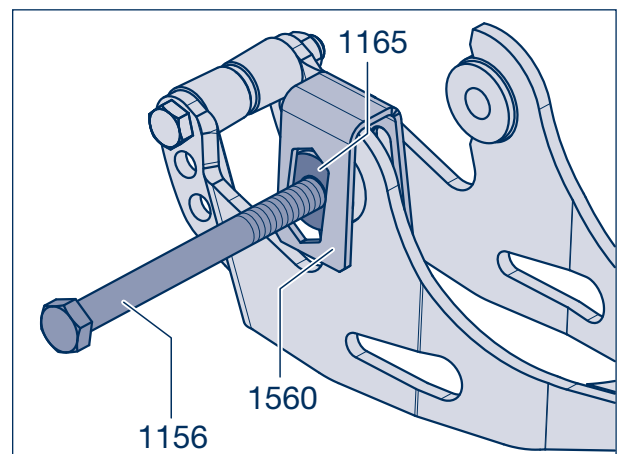
Picture 13

- [13] Position bush (1180) on stepped bush (1175).
- [14] Insert pre-assembled bushes in to lift arm (1630) from inside to outside.



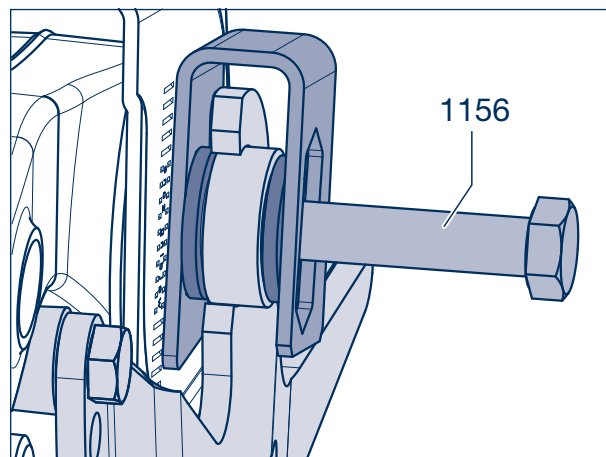
Picture 14

- [15] Attach adjusting plate with anti-rotation lock (1560), position washer (1165) and insert new, lightly greased spring bolt (1156).



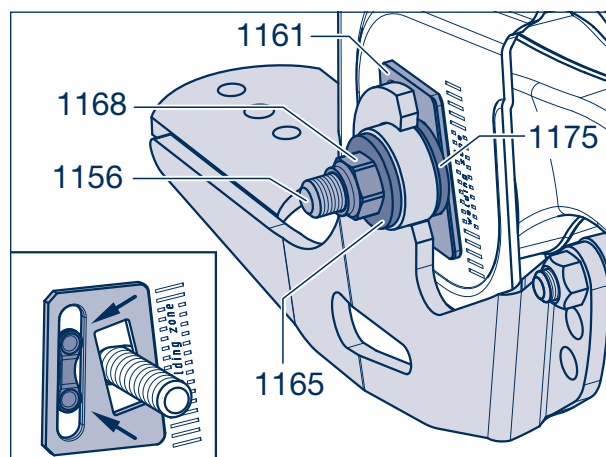
Picture 15

- [16] Raise pre-assembled axle lift device until bushes and holes for spring bolts (1156) are aligned.
- [17] Drive spring bolts in to end of air suspension hanger bracket. Ensure that wear washers (1525) are installed on bush (1005) in trailing arm (1000) (see picture 12, Page 36).



Picture 16

- [18] Install adjusting plate (1161) in correct position between air suspension hanger bracket (1511) and stepped bush (1175).
- [19] Completely insert spring bolt (1156).
- [20] Attach washer (1165), fit new lock nut (1168).
- [21] Insert spring bolt to stop.
- [22] Ensure that adjusting plate is correctly seated on anti-rotation lock (arrow) on air suspension hanger bracket.
- [23] Tighten lock nut to specified torque of **650 Nm** (605 - 715 Nm).

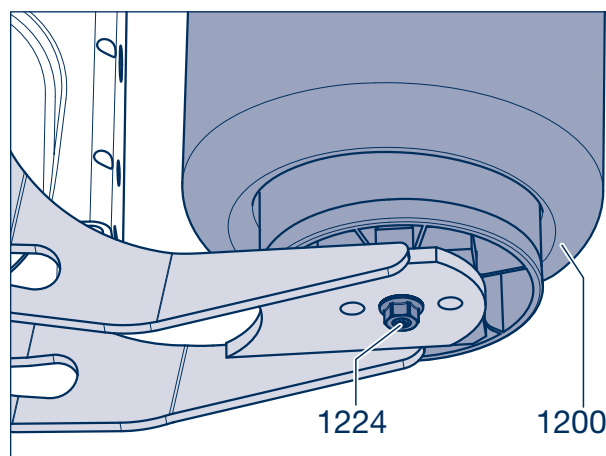


Picture 17

- [24] Fasten axle lift to lift air bags (1200) with locking screws or central bolt (1224, SW 22).

Tightening torques:

Locking screws:	230 - 300 Nm
Central bolt:	300 Nm



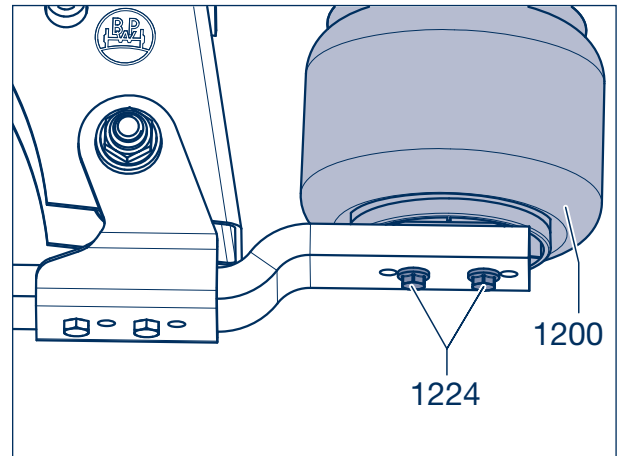
Picture 18

13 Dismantling and assembly of axle lift device

13.3 Central axle lift device

Removal

- [1] Deflate air suspension.
- [2] Unscrew bottom locking bolts (1224, SW 22) for lift bag (1200), if necessary, also remove lift bag.



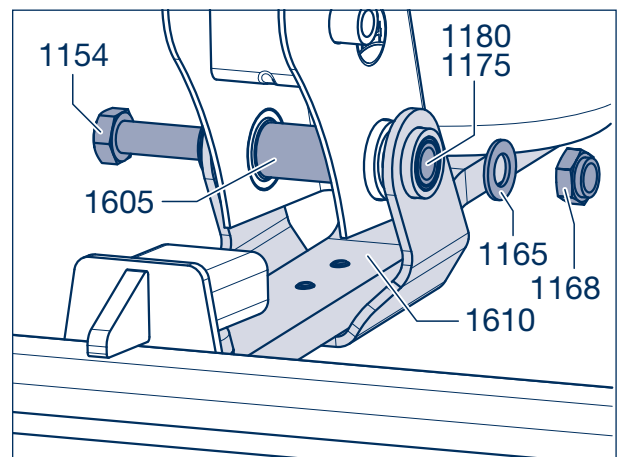
Picture 19

- [3] Remove lock nut (1168, SW 36) from hex. head bolt (1154).
- [4] Remove washer (1165).
- [5] Secure lift arm (1605) and tube (1605) against falling down and drive out hex. head bolt.



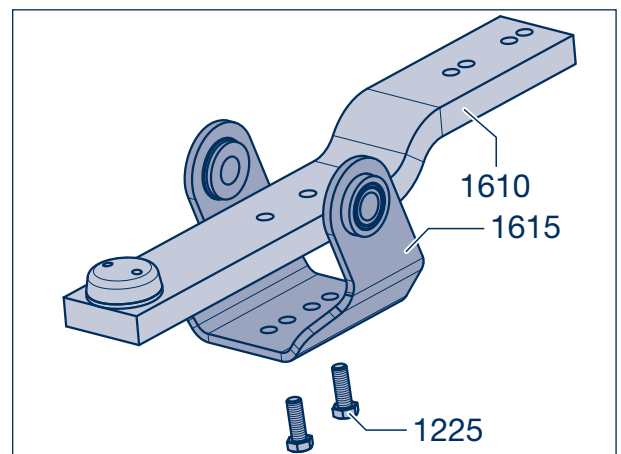
Caution! RISK OF INJURY
Use hoist or have second person help remove lift arm.

- [6] Remove lift arm with bushes (1175, 1180) and tube.



Picture 20

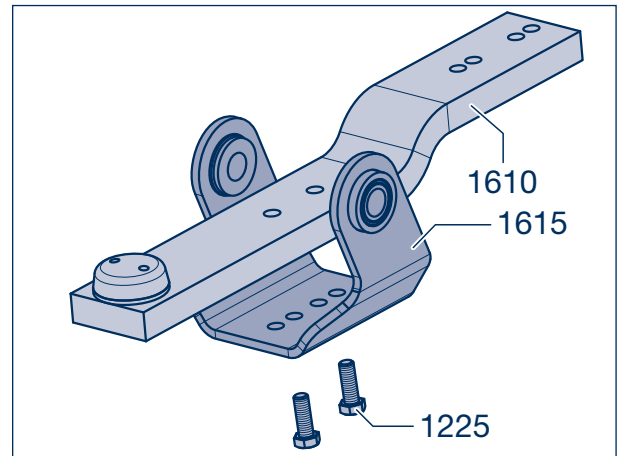
- [7] Remove hex. head bolts (1225, SW 24) out of lift arm (1610) and remove bracket (1615).



Picture 21

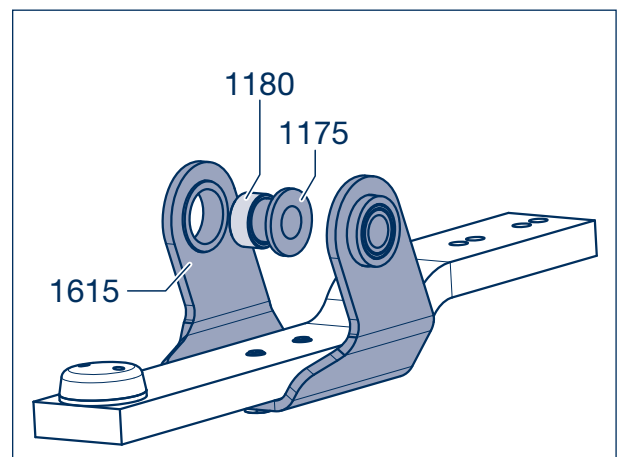
Installation

- ☞ Clean all parts, check for wear and damage, replace, if necessary.
- [8] Install lift arm (1610) and bracket (1615) using two hex. head bolts (1225, SW 24) and tighten to specified torque of 230 Nm.



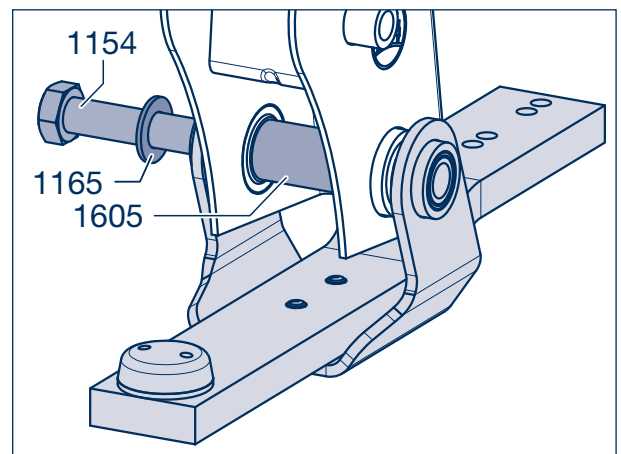
Picture 22

- [9] Position bush (1180) on stepped bush (1175).
- [10] Insert pre-assembled bushes into bracket (1615) from inside to outside.



Picture 23

- [11] Grease spring bolt (1154) lightly.
- [12] Place washer (1165) on spring bolt.
- [13] Raise preassembled axle lift device until bushes and holes in support (1510) are aligned.
- [14] Insert spring bolt in to bush in support, position tube (1605) and press spring bolt all the way in.

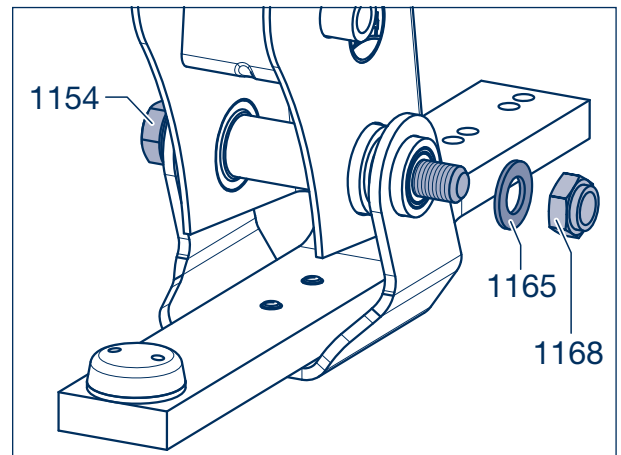


Picture 24

13 Dismantling and assembly of axle lift device

[15] Attach washer (1165), screw on new lock nut (1168).

[16] Tighten lock nut to specified torque of **650 Nm** (605 - 715 Nm).



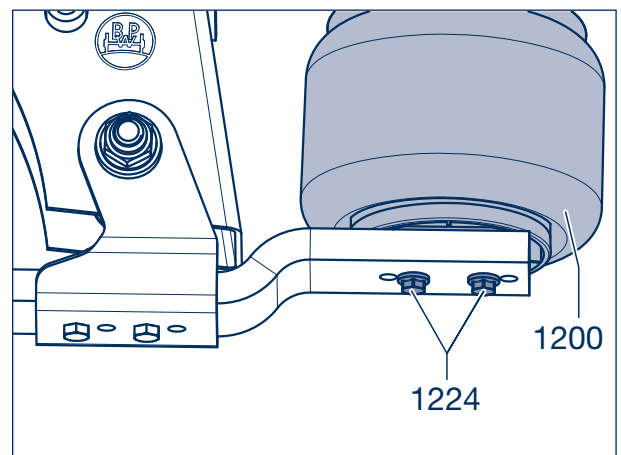
Picture 25

[17] Fasten axle lift to lift bag (1200) with locking bolts (1224, SW 22).

Tightening torque: 230 - 300 Nm

Top mounting nuts (1240, SW 17):

Tightening torque: 66 Nm



Picture 26

Air suspension valve 14

14.1 General

The air suspension valve controls the air bag pressure as a function of vehicle load and keeps the ground clearance at the same level no matter the load condition.

It is attached to the chassis frame by bolts and connected to the axle by a pivot linkage arrangement. The pivot link is located in the middle of the axle, on three-axle units at the centre axle, on two-axle units on the rear axle. In special cases (e.g. axle lift device, large vehicle slope) the air suspension valve may also be connected to the front or rear axle. In exceptional cases two air suspension valves may be fitted.

14.2 Replacing

- [1] Release air from air suspension system.
- [2] Unscrew union nuts of the compressed air lines from the connections at the air suspension valve.
- [3] Unscrew nut from the pivot link at the axle.




Repair guide!

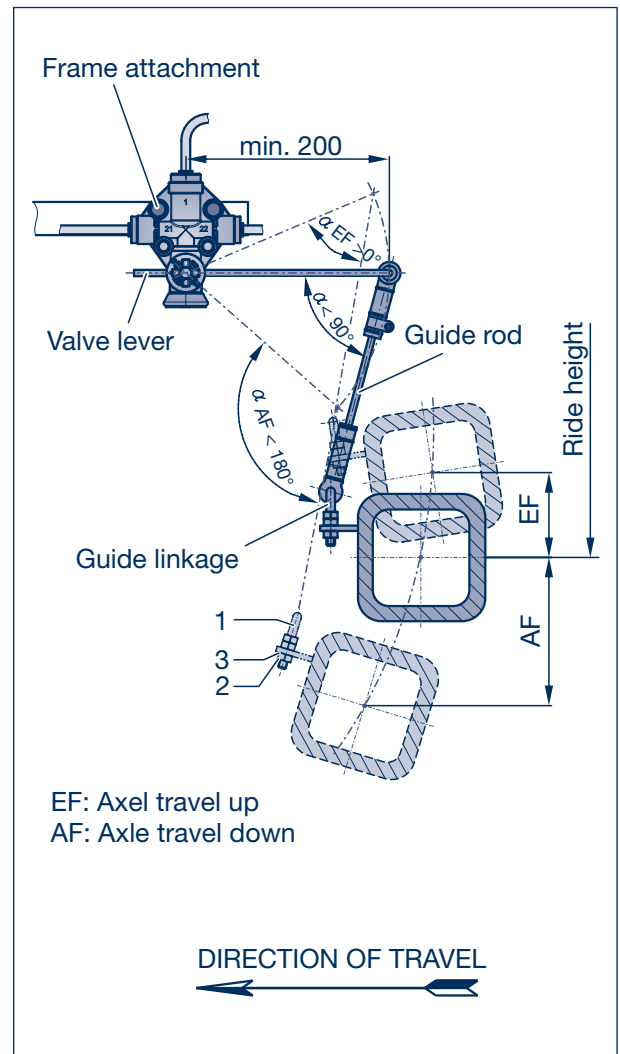
Do not fit and secure nut (2) complete with spring washer (3) until after having adjusted the air suspension valve.

- [4] Unscrew securing bolts of the air suspension valve, remove valve.
- [5] The valve is refitted on in the reverse order. Following this, check compressed air system for leaks.

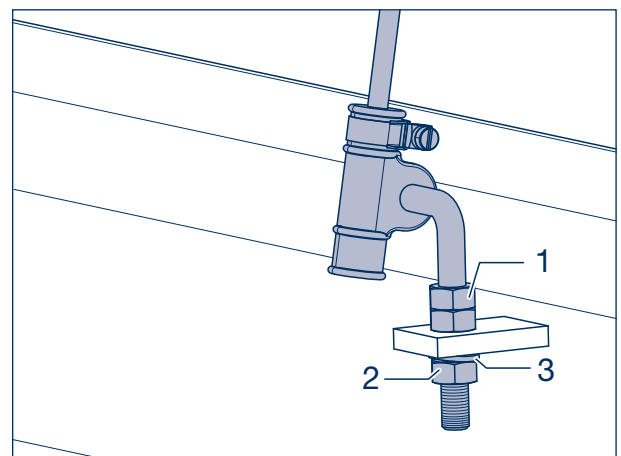
14.3 Setting

 The ride height is set by adjusting the link rod in the rubber joints and then fixing this position with the lock nuts (1). The vehicle must be standing on a level ground when this setting is made. If only one air suspension valve is fitted, the setting can be performed when the vehicle is laden or unladen. If two air suspension valves are fitted, adjustment must be made unladen.

- [1] Fill up compressed air reservoir. Unscrew nut (2) complete with spring washer (3).
- [2] To check operation, move valve lever down slightly. This must cause air to flow through the vent cap to atmosphere. If, however, this causes air to flow into the air bags, the valve shaft must be turned through 180 degrees. The valve lever must be switched over for this purpose.



Picture 1



Picture 2

14 Air suspension valve

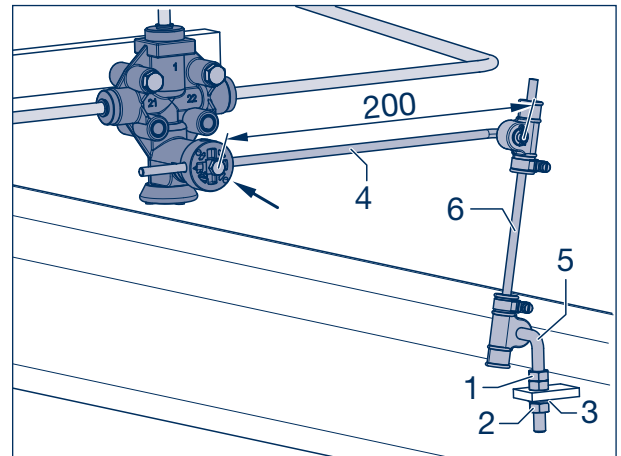
- [3] Check the length of the valve lever; it must be at least 200 mm; if necessary, alter accordingly after slackening the clamping screw (arrow) and re-tighten clamping screw.



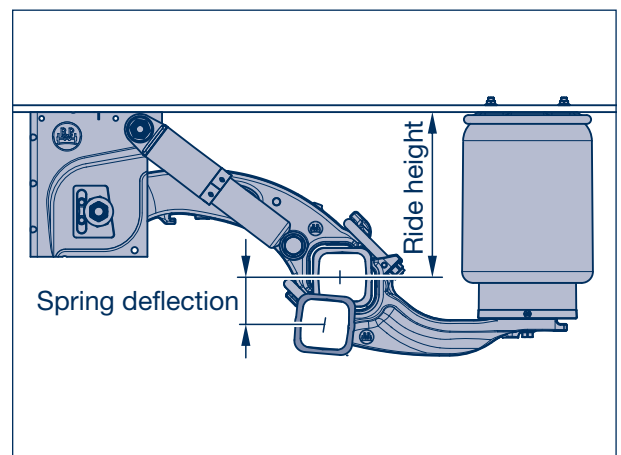
Repair guide!

The angles stated (picture 1) must be maintained to avoid the valve linkage going over centre.

- [4] Press valve lever down and hold in this position until the vehicle has fully lowered.
- [5] Slowly push valve lever up and hold until a single-axle vehicle has been raised by at least 60 mm, two- and three-axle vehicles by at least 70 mm and vehicles with axle lift device by at least 100 mm.
- [6] After these setting heights have been reached, the air suspension valve lever must be moved into the horizontal position (picture 1).
- ☞ This adjustment achieves the minimum ride height.
- [7] Insert guide linkage (5) into the fastening lug on the axle beam. Screw on nut (2) with spring washer (3).
- [8] Connect valve lever and guide linkage with one another via the guide rod (6). After fitting the valve, lever must be located in the horizontal position. If necessary, re-adjust the double nut (1) correspondingly and tighten the nut (3). Fasten the guide rod by tightening the screws on the band clamps.



Picture 3



Picture 4

Spring deflection

Single axles:	60 mm
Tandem / Triaxle:	70 mm
with axle lift	100 mm

Axle alignment check 15



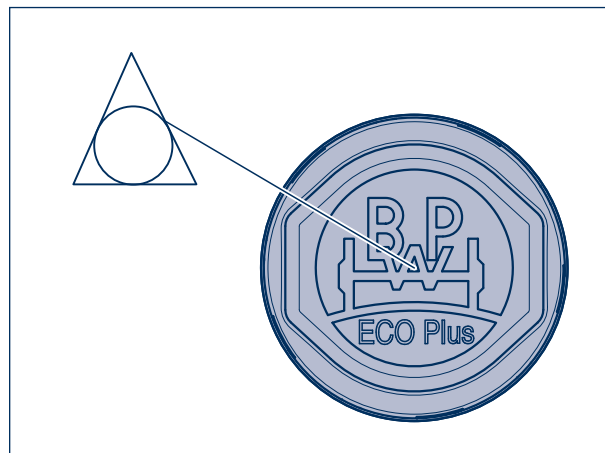
Repair guide:

In the case of suspensions with a self-steered axle engage the steering lock. Zero position of the steering pivot is absolutely essential.



Note:

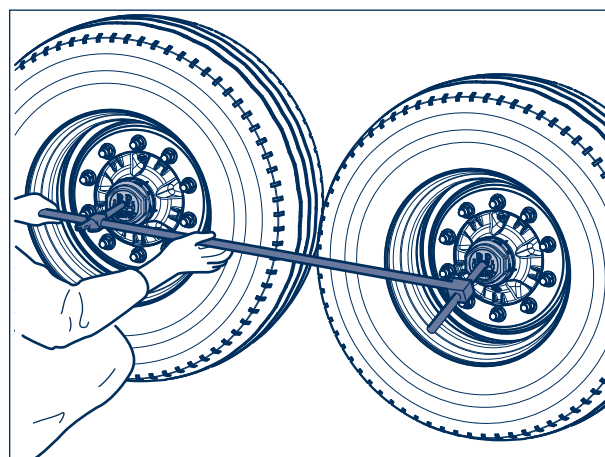
The triangle in the BPW logo is concentric with the axle.



Picture 1

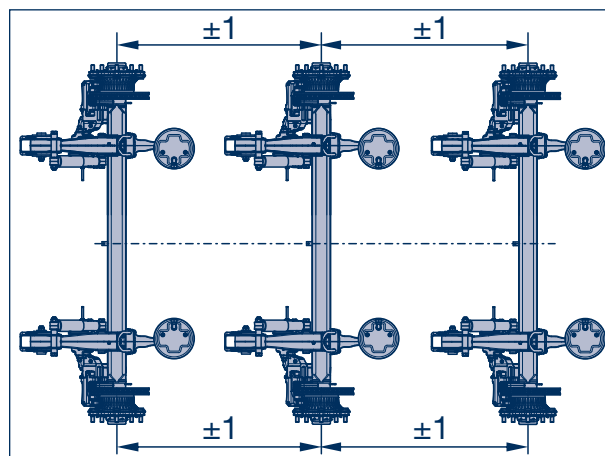
15.1 Conventional axle alignment check on the vehicle

- [1] Measure distance from reference axle to axle to be aligned on both sides with centre points in triangle on hub caps, per. tolerance ± 1 mm.



Picture 2

- [2] If the tolerance is exceeded, the axle must be aligned under the vehicle.



Picture 3

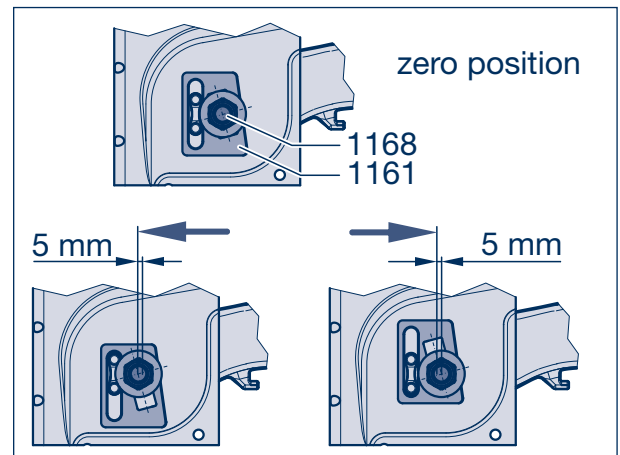
15 Axle alignment check

- [3] Lift vehicle frame to normal height and support.
- [4] Exhaust air bags (1200).
- [5] Loosen lock nut (1168, SW 36) on spring bolt (1154) slightly.
- [6] Move adjusting plates (1161) on both sides up or down, depending on required adjustment direction, by tapping lightly with hammer.



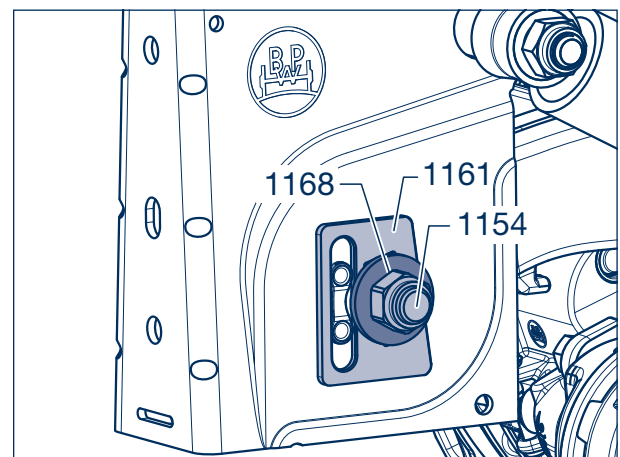
Repair guide:

Ensure that the inner and outer adjusting plates on each support are adjusted symmetrically.



Picture 4

- [7] After correction, screw in locking screw (1168) on spring bolt (1154) and tighten to specified torque of $M = 650 \text{ Nm}$ (605 - 715 Nm).



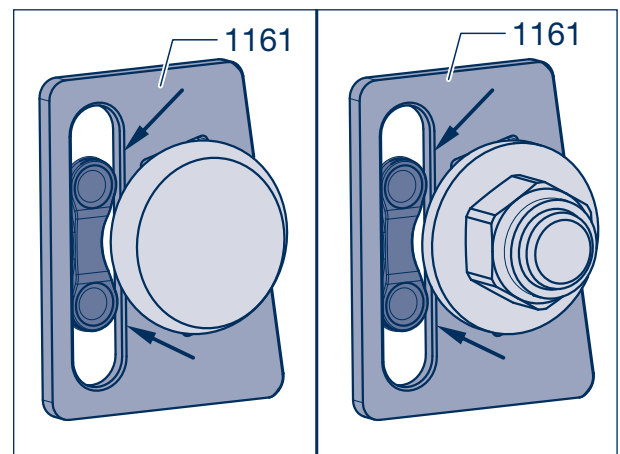
Picture 5



Repair guide!

Pay particular attention to the correct position of the adjusting plate (1161) on the anti-rotation lock (arrows) of the air suspension hanger brackets.

The square on the spring bolt head (anti-rotation lock) must sit in the slot of the adjusting plate.



Picture 6

15.2 Axle alignment check with laser measurement devices

- [1] Set up the laser in accordance with the manufacturer's instructions. Make sure the axle is positioned horizontally, in order to avoid camber values falsifying the measuring results.

Calculating the toe values:

$$\text{Toe} = \frac{A1 - B1 \text{ (mm)}}{A \text{ (m)}} \quad \begin{array}{l} \text{Positive value} = \text{Toe-in} \\ \text{Negative value} = \text{Toe-out} \end{array}$$

- [2] Take the measurement on both sides and add the measurements together. The total of the values is the toe-in/toe-out value of the axle and must be within the permitted tolerance range.

Permitted toe tolerance range per axle:

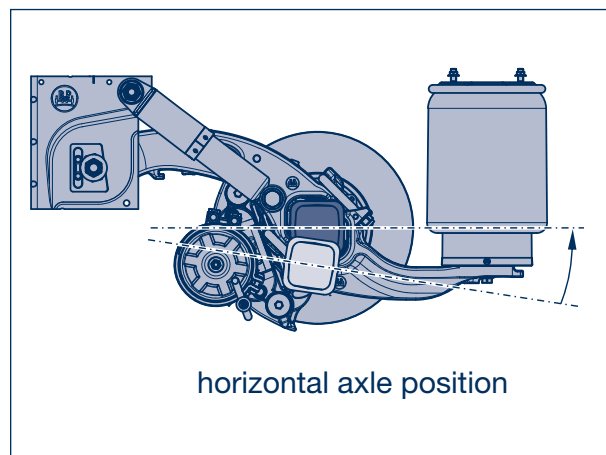
for rigid axles: -1 to +5 mm/m

for LL axles

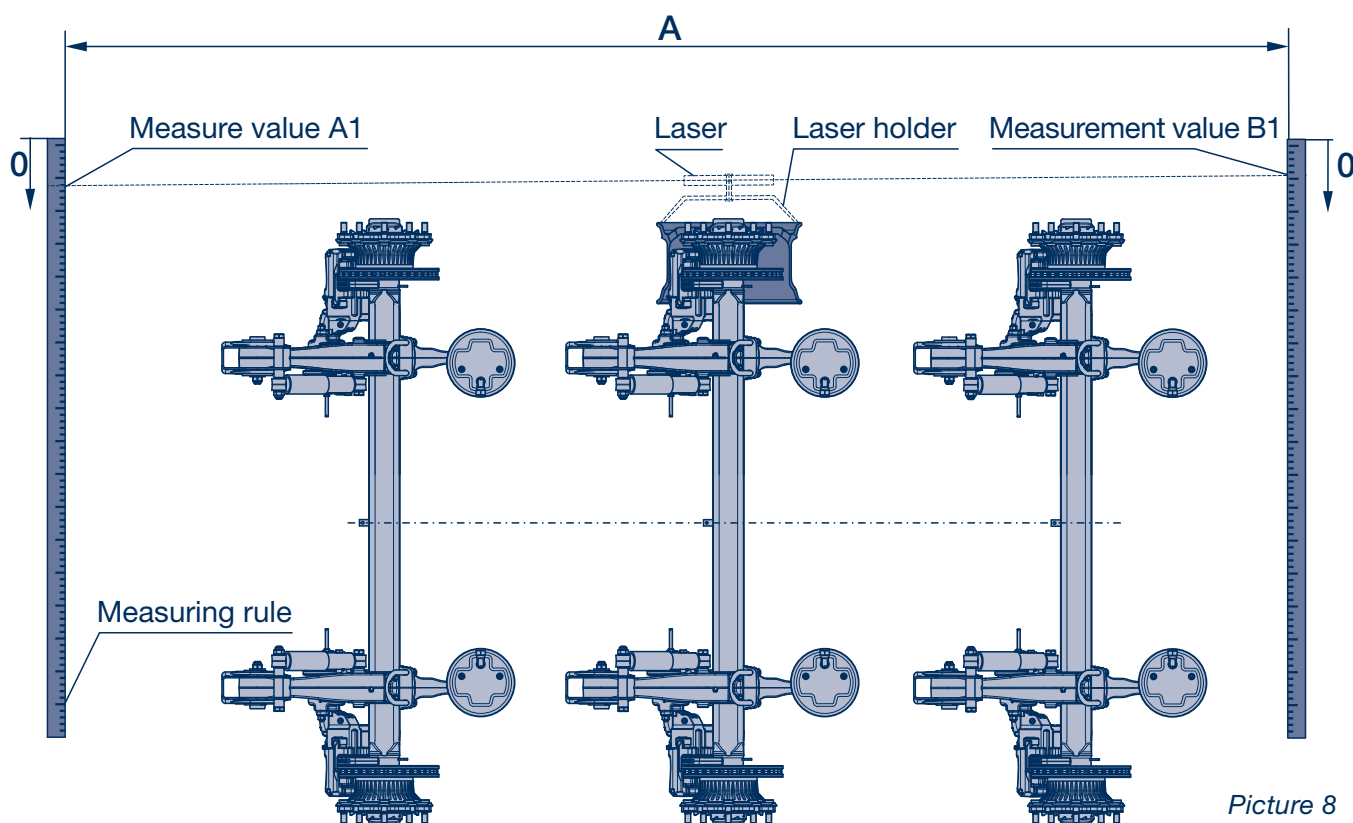
unladen: -2 to +2 mm/m

laden: 0 to +6 mm/m

- [3] Correct track if out of tolerance (see chapter 15.1).



Picture 7



Picture 8

16 Notice

BPW is a globally leading manufacturer of intelligent running gear systems for trailers and semi-trailers. As an international mobility and system partner, we offer a wide range of solutions for the transport industry from a single source, from axle to suspension and brake to user-friendly telematics applications.

We thereby ensure outstanding transparency in loading and transport processes and facilitate efficient fleet management. Today, the well-established brand represents an international corporation with a wide product and service portfolio for the commercial vehicle industry. Offering running gear systems, telematics, lighting systems, composite solutions and trailer superstructures, BPW is the right system partner for automotive manufacturers.

BPW, the owner-operated company, consistently pursues one target: To always give you exactly the solution which will pay off. To this end, we focus our attention on uncompromising quality for high reliability and service life, weight and time-saving concepts for low operating and maintenance costs as well as personal customer service and a close-knit service network for quick and direct support. You can be sure that with your international mobility partner BPW, you always use the most efficient method.

Your partner on the path to economic viability



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