Maintenance instructions
BPW-W 331111201e

BPW BERGISCHE ACHSEN

BPW Trailer Axles and Suspensions

MAINTENANCE INSTRUCTIONS

CONTENTS:

1.1. General

The following maintenance instructions apply to BPW trailer axles and BPW suspensions for drawbar and semi-trailers (manufactured from 1982 onwards). They are part of the Terms and Conditions for the ECO Plus Warranty (see warranty documents at www.bpw.de).

Carry out the latest maintenance instructions in accordance with the prescribed intervals in order to maintain the safe operation and roadworthiness of the vehicle. The latest version of the maintenance instructions can always be found at www.bpw.de. The latest printed version is available by post on request. The relevant operation and service regulations of the vehicle manufacturer and the manufacturers of other vehicle parts must also be adhered to.

These maintenance intervals are set out in calendar weeks and are listed to coincide with statutory testing requirements.

1.2. Maintenance, Repair and Spare Parts

Rectification of any discovered defects 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 appropriate personnel facilities, equipment and workshop manuals available and possesses an official certificate to perform interim inspections or special brake inspections.

We strongly recommend that only genuine BPW parts, brake linings in particular, are used when fitting spare parts. Parts authorised by BPW for trailer axles and axle units are regularly subjected to special inspections. BPW accepts product responsibility for them.

BPW is unable to determine whether all third party product can be used with BPW trailer axles and axle suspensions without any safety risk; this also applies even if an authorised testing organisation has accepted the product.

The ECO Plus Warranty (see warranty documents) will cease to apply if spare parts other than genuine BPW spare parts are used.

1.3. Definition On-Road / Off-Road

The term „On-Road“ refers to roads having a sealed and metalled surface, in other words with an asphalt or concrete surface. Gravel roads are regarded as being Off-Road. A vehicle is also regarded as being in Off-Road operation even if it departs from sealed surfaces under operating conditions for only short periods. Off-Road operation is assumed in all cases in tippers and vehicles with comparable applications.

1.4. Latest Version

The latest maintenance instructions are dated 01.07.2012 and replace maintenance instructions BPW-W 33111102e. All previous maintenance instructions become invalid. We reserve the right to make any changes.

The following instructions should also be adhered to by the driver in addition to the statutory regulations:

In case of a new vehicle:

– After the first run under load conditions and after each wheel change:
  • Check wheel nuts for firm seating using a torque wrench. See point 1 on page 24, 38, 48.

– After the first two weeks (after the first runs under load conditions):
  • Check that the bolt connections of the spring attachments and axle steering devices are secure, depending on the application (On-Road or Off-Road). Observe the stipulated tightening torques.

  • Air suspensions: see 4 to 9 page 68 - 73
  • Leaf-spring suspensions: see 2 and 4 to 7 page 87 - 88
see 1 and 3 page 93

Prior to each run:

– Air reservoir of the brake and air suspension set at operating pressure.
– Visual inspection:
  • Tyre pressures
  • Wheel fastenings
  • Check operation of lighting and braking systems
  • Drum brake: Check the brake pad/lining thickness when the brake pad/lining wear indicator is in the horizontal position.
  • Disc brake: Check the remaining brake pad / lining thickness.
    Type TSB: The thickness of the remaining pad can be determined by the position of the caliper in relation to the brake carrier (see page 39).
    Type SB: The thickness of the remaining pad can be detected by the position of the brake caliper in relation to the stationary guide sleeve (see pages 49 - 50).
  • Check that the air suspension has reached ride height and the air bags are not creased. This also applies after rapid loading or unloading.
  • Normal ride level of the air bags, check air bags are not creased. This also applies to rapid loading or unloading.

In the event of frost daily or in accordance with manufacturer's instructions:

– Drain off condensation water via the drainage valve at the bottom of the air reservoirs.
– Check the valve system.

Quarterly:

– Clean line filter (in accordance with manufacturer's instructions).

Proper use of the braking system:

– In the event of premature wear of the brake pads, a tractor/trailer harmonisation (according to ISO 20918 on braking threshold pressures for heavy commercial vehicle combinations) is to be carried out.
– To maintain the efficiency of the braking system, regular use of the wheel brakes with the appropriate level of heat generation is recommended.
– Before proceeding with an HU or SP (PTI), the braking system performance where applicable, must be measured (see ISO 7634).
– The appropriate installation and operating instructions for BPW brake components (see www.bpw.de) should be observed.

We wish you a safe journey!

3.1. Lubrication

Overview

For detailed description see pages 8 - 19

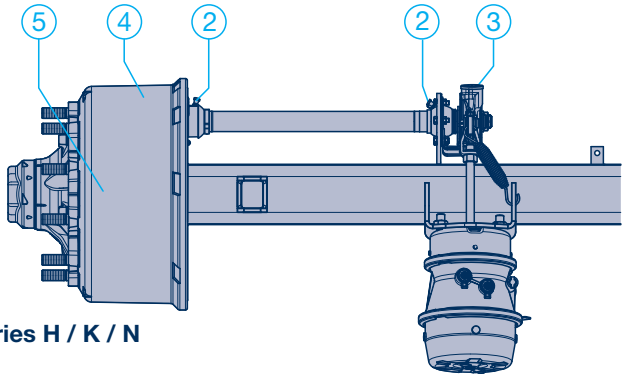
	Initially [1]	Every 6 weeks	Every 12 weeks	Every 26 weeks [1] [2]	At every brake lining replacement, [2]: Latest annually [1]	At every brake lining replacement, [2]: Latest every 2 years	Annually	⚠ BPW recommendation. Does not affect warranty: Every 2 years	⚠ BPW recommendation. Does not affect warranty: Latest every 3 years or min. every 500,000 km [2]	Every 3 years	After 5 years, thereafter every 3 years
① Steering knuckle bearing, top and bottom		①									
② Brake camshaft bearing, outer and inner											
Low maintenance camshaft bearing from year of manufacture 1993											
On-Road conditions					②						
Off-Road conditions				②							
Outside Europe				②							
Conventional brake camshaft bearing up to year of manufacture 1992	②		②								
③ Slack adjusters manual			③								
Slack adjuster ECO-Master											
On-Road conditions					③						
Off-Road conditions				③							
Outside Europe				③							
④ Brake shoes with closed anchor eye						④					
⑤ ECO Plus 2 and ECO^{Plus} Unit:											
On-Road conditions											⑤
Off-Road conditions										⑤	
Outside Europe: On-Road conditions								⑤			
Outside Europe : Off-Road conditions							⑤				
ECO Unit											
Outside Europe							⑤		⑤		
Conventional hub bearing					⑤						

For positions ① to ③ the use of a high-pressure central lubrication system which is capable of feeding special longlife grease of consistency class 2-3 is permissible.

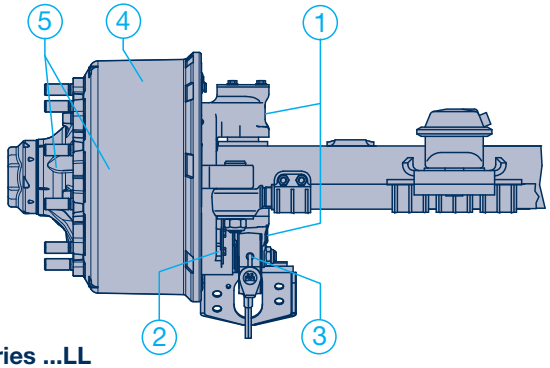
The use of liquid lubricants is not permitted!

[1] After a long idle period, prior to initial operation actuate the brake lever and lubricate the brake camshaft bearing.

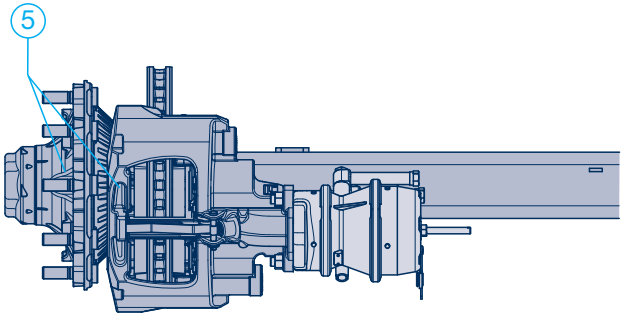
[2] With usage extreme conditions (e.g. extreme Off-Road use) more frequent lubrication with high pressure grease is necessary



Series H / K / N



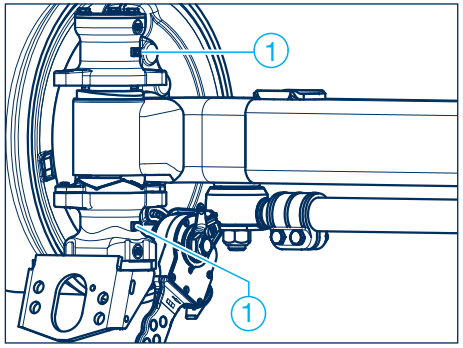
Series ...LL



Series SH / SKH

3.1. Lubrication

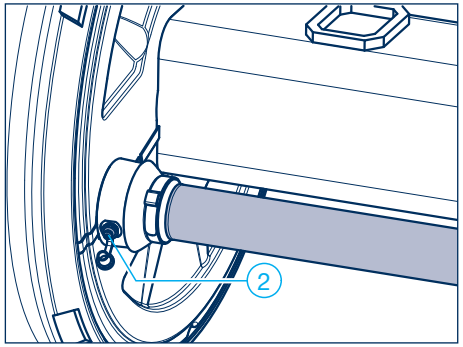
Note: After cleaning the vehicle with high-pressure cleaners, all lubrication points must be relubricated.



① **Steering knuckle bearing, top and bottom**

– every 6 weeks –

Lift axle in order to relieve the steering pivot bearing. Grease lubrication nipple with BPW special longlife grease **ECO-Li^{Plus}** until fresh grease emerges from the bearing points.

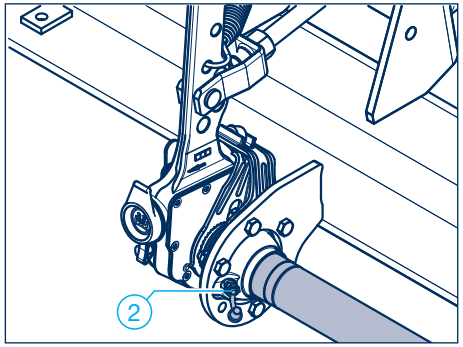


② **Brake camshaft bearing, outer and inner**

Low maintenance brake camshaft bearing (from year of manufacture 1993)

– every year and with each brake lining change in On-Road use –
– every 6 months in Off-Road use and in use outside Europe –

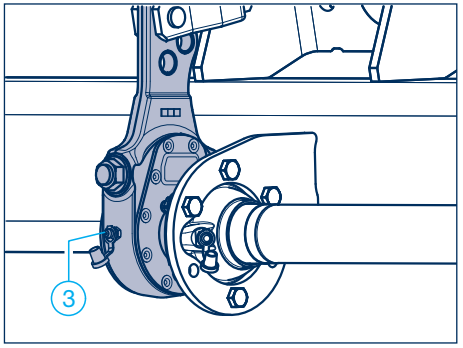
Use only BPW special longlife grease **ECO-Li^{Plus}** until fresh grease emerges from the bearing points.



☞ **Conventional brake camshaft bearing** (up to year of manufacture 1992)

– quarterly –
(and prior to initial operation after a long idle period!)

Grease lubrication nipple with BPW special longlife grease **ECO-Li^{Plus}** until fresh grease emerges from the bearing points.



③ **Slack adjusters (manual)**

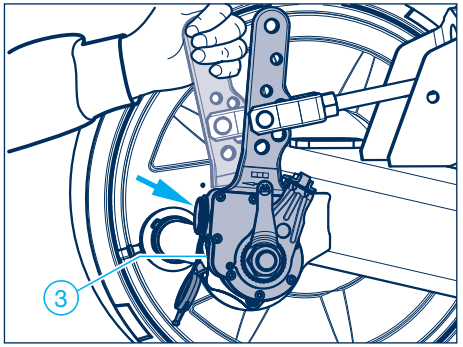
– quarterly –

Grease lubrication nipple with BPW special longlife grease **ECO-Li^{Plus}** until fresh grease emerges.

☞ **Automatic slack adjuster ECO-Master** (from year of manufacture 5/91)

– every year and with each brake lining change in On-Road use –
– every 6 months in Off-Road use and in use outside Europe –

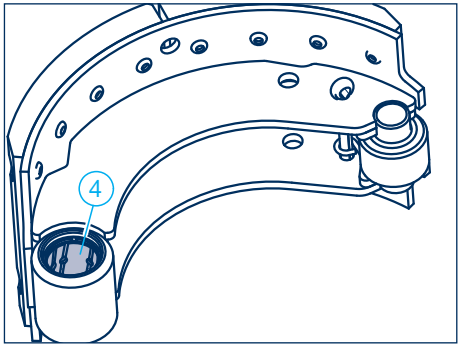
Remove rubber seal cap. Grease with BPW special longlife grease **ECO-Li^{Plus}** (approx. 80 g) until sufficient new grease emerges from the adjustment bolt.



Turn back adjustment screw (keep clutch sleeve pressed down) by approx. one turn using a ring spanner. Actuate the brake lever several times by hand. The adjustment must be carried out smoothly. If necessary, repeat several times.

Once again only use BPW special longlife grease **ECO-Li^{Plus}**. Replace seal cap.

Adjust the brake - see relevant workshop manual.



④ **Brake shoes with closed anchor eye**

– every 2 years and with each brake lining change –

Clean the bush and roller, check for wear and, if necessary replace. Smear BPW special longlife grease **ECO-Li^{Plus}** onto bearing points of brake shoe.

3.1. Lubrication

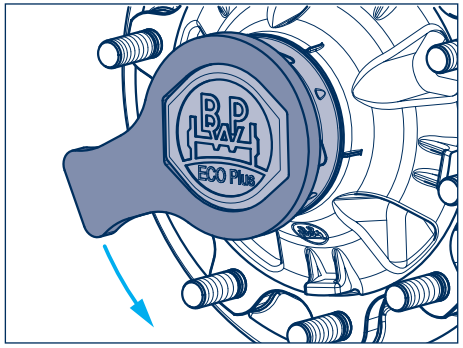
⑤ **ECO Plus 2 Unit**

– for the first time after 5 years in On-Road use, or every 3 years in Off-Road use in Europe, then at least every 3 years depending on operating conditions –

– every 2 years in On-Road use or every year in Off-Road use outside Europe –

Prevent the vehicle from rolling away.
Remove the wheel.

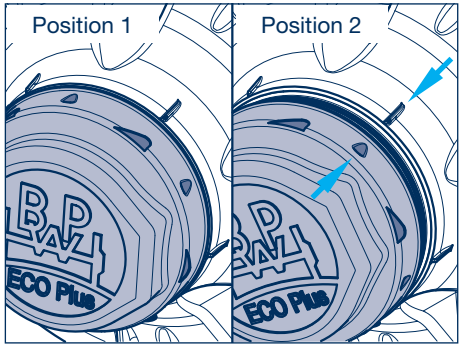
Unscrew the cap with a 120 mm cap spanner.



Important!
Do not use an impact driver - bayonet lock.

Undo the cap by turning it anti-clockwise by approx. 30° from position 1 to position 2.

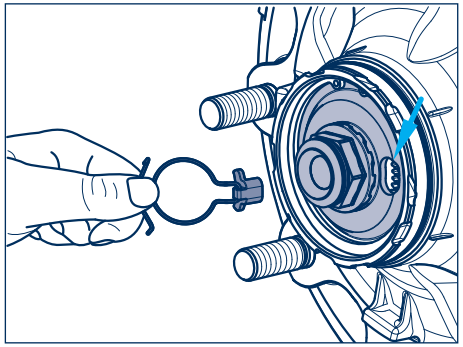
When turned further the hub cap lifts clearly away from the ECO Unit and can be removed by pulling it away.



Remove the hooked spring ring and retaining key from the axle bolt.

Unscrew the axle bolt, pulling the complete ECO Unit off the bearing seats of the axle stub as you do so.

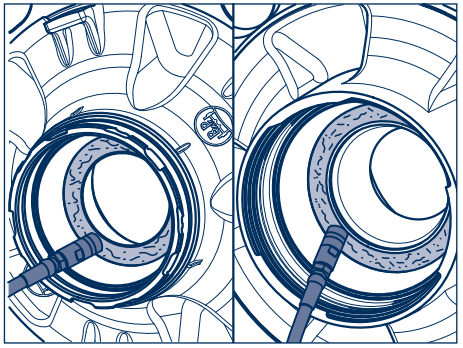
Dismantle the ECO Unit - see the corresponding workshop manuals.



Clean the tapered roller bearings thoroughly (e.g. with diesel oil), dry them and check if they can be re-used. Fit a new shaft seal.

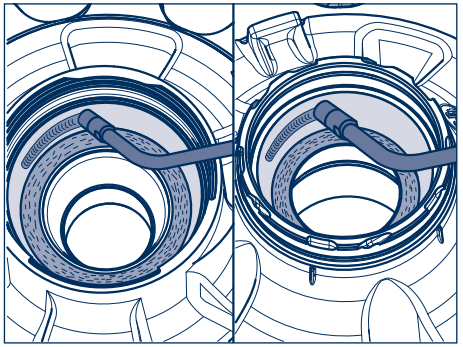
(Recommendation: Renew the tapered roller bearings after 5 years in On-Road use and after 3 years in Off-Road use.)

Clean the grease cartridge and fill it on both sides up to the edge with BPW special longlife grease ECO-Li^{Plus}. It is important to ensure that it is filled without any trapped air or cavities.



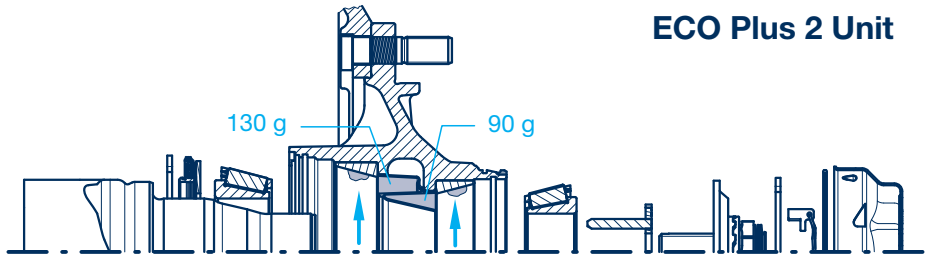
Apply a ring-shaped bead of grease to the running surfaces of the bearing outer races (see arrows in illustration below).

☞ When BPW grease applicators are used, there is no need to fill the grease cartridge or to apply the bead of grease.



Mount the ECO Unit.

Clean the bearing seats of the axle stub (metal must be bright, dry and free from grease). Apply **BPW ECO Protection Grease** as thin as possible and around the entire area. Bare metal surfaces are prohibited after application.



3.1. Lubrication

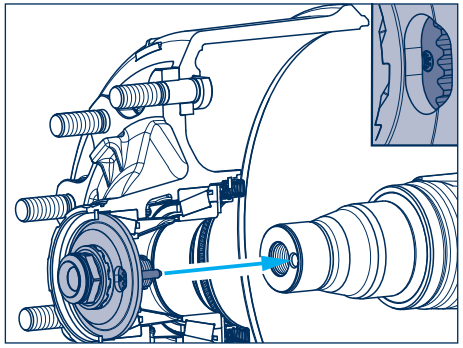
Apply only a thin layer of BPW ECO-Li^{Plus} to the threaded hole in the axle stub.

☞ **Important!**

Do not apply too much grease!

It is necessary to make sure that the axle bolt can be completely screwed into the axle stub.

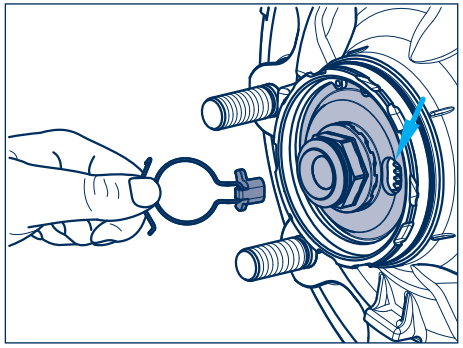
Mount the ECO Unit. Guide the toothed lock washer into the hole in the axle stub. The position of the pin can be seen by the punched-in BPW logo in the recess of the axle bolt.



Fasten axle bolt (SW 46) with the continuous turning of the ECO unit. It should take several turns until the teeth of the axle bolt start skipping .
(Do not turn back the axle bolt.)

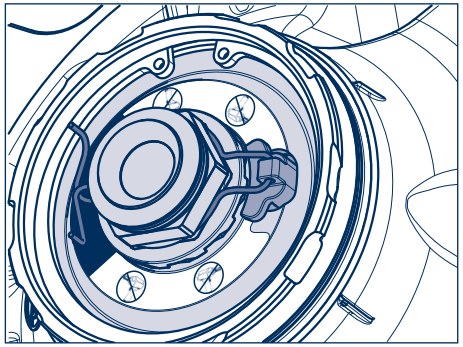
Important!
Do not use an impact driver.

Insert the retaining key into the recess in the axle bolt and the gearing of the toothed lock washer. (Do not turn back the axle bolt.)



Insert the hooked spring ring into the groove of the hexagon profile of the axle bolt.

☞ **Make sure that the hooked spring ring assembly is correctly seated in the annular groove of the axle bolt.**



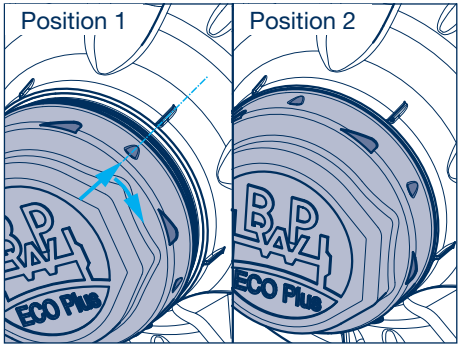
Insert a new O-ring into the groove in the wheel hub.

Apply a thin layer of BPW ECO-Li^{Plus} special longlife grease to the cap in the area of the O-ring contact surface and the bayonet fitting.

Screw on the cap with a 120 mm cap spanner.

Important!
Do not use an impact driver - bayonet lock.

Push on the cap, see position 1.
Press on the cap and turn it by approx. 30° in a clockwise direction to lock it in place. A tight seat is provided when position 2 is reached.



3.1. Lubrication

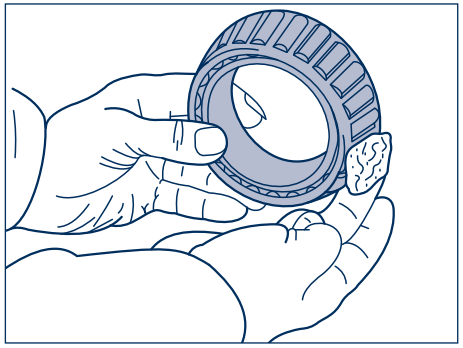
☞ ECO^{Plus} Unit

– for the first time after 5 years in On-Road use, or every 3 years in Off-Road use in Europe, then at least every 3 years depending on operating conditions –

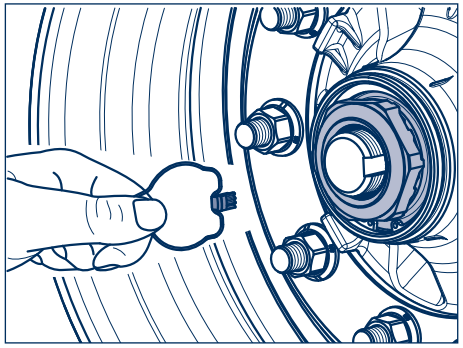
– every 2 years in On-Road use or every year in Off-Road use outside Europe –

Thoroughly clean taper roller bearings and seals (using e.g. diesel oil), dry and check for re-useability. Replace oil seal.

(Recommendation: Renew the tapered roller bearings after 5 years in On-Road and after 3 years in Off-Road use.)



Work BPW special longlife grease **ECO-Li^{Plus}** thoroughly into the cavities between the taper rollers and the cage in both taper roller bearings. (For grease quantity see illustration on page 15.) Smear any residual grease into the hub's outer bearing race.



Smear the lip of the new seal all round with BPW special longlife grease **ECO-Li^{Plus}**. Clean the bearing seats of the axle stub (metal must be bright, dry and free from grease).

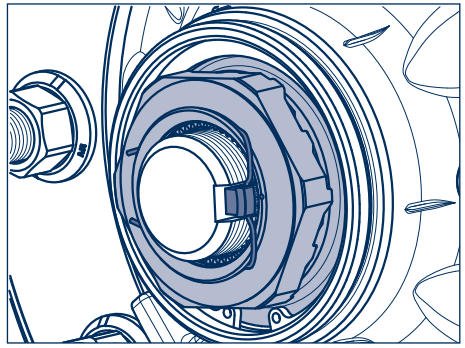
Apply **BPW ECO Protection Grease** as thinly as possible and around the entire area. Bare metal surfaces are prohibited after application.

Fasten the axle nut using a torque wrench with the continuous turning of the ECO unit. It should take several turns until the tightening torque has reached 150 Nm. Turn back to the next lower securing position (max. 15°).

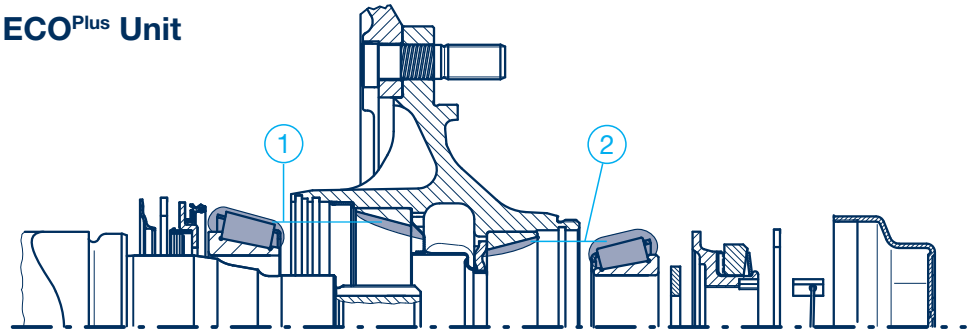
Important!
Do not use an impact driver.

Fit the retaining key in the groove between the axle stub and the nut (do not reset the axle nut).

For production date April 2000 onwards, insert the hooked spring ring behind the edge of the axle nut or, up to March 2000, into the thread on the axle stub. Screw on the cap and tighten to 800 Nm.



ECO^{Plus} Unit



	BPW special longlife grease ECO-Li^{Plus}	
	Grease quantity per taper roller bearing	
	① Inner bearing	② Outer bearing
Manual greasing	170 g	120 g
Greasing with a grease applicator	130 g	90 g

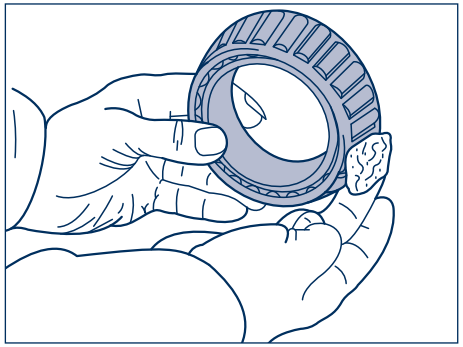
3.1. Lubrication

☞ ECO Unit

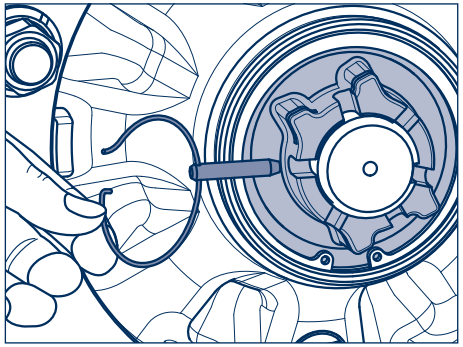
– latest every 3 years or min. every 500,000 km (Western European road conditions), annually in use outside Europe –

Thoroughly clean taper roller bearings and seals (using e.g. diesel oil), dry and check for re-useability. Replace oil seal.

Work BPW special longlife grease **ECO-Li^{Plus}** thoroughly into the cavities between the taper rollers and the cage in both taper roller bearings. Comply with the total grease quantity in tables Ⓐ and Ⓑ .



Smear any residual grease into the hub's outer bearing race. Smear the lip of the new seal all round with BPW special longlife grease **ECO-Li^{Plus}**.

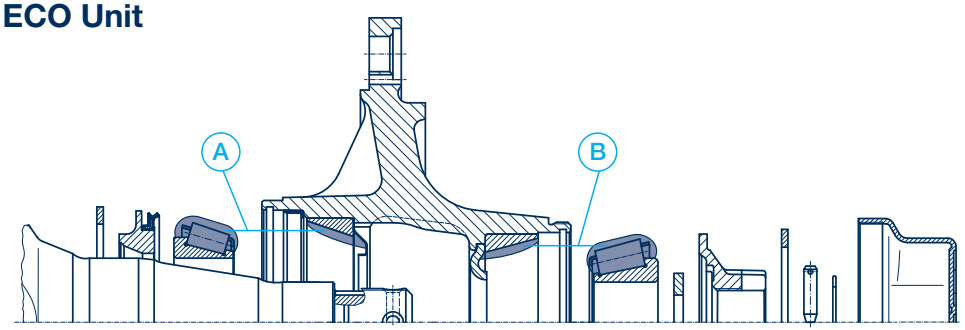


Clean the bearing seats of the axle stub (metal must be bright, dry and free from grease). Apply **BPW ECO Protection Grease** as thinly as possible and around the entire area. Bare metal surfaces are prohibited after application.

Fit the ECO Unit.
Fasten the axle nut using a torque wrench with the continuous turning of the ECO unit. It should take several turns until the tightening torque has reached 150 Nm. Turn back to the next lower securing position (max. 15°).

The next locking hole is reached by turning back the asymmetrical axle nut by a maximum of 15°. Fit pin with a snap hook. Tighten the cap to 800 Nm.

ECO Unit



	BPW special longlife grease ECO-Li^{Plus} Grease quantity per taper roller bearing	
Axle load	Ⓐ Inner bearing	Ⓑ Outer bearing
6000 - 9000 kg	120 g	120 g
10000 - 12000 kg	170 g	120 g
13000 - 14000 kg	230 g	150 g

3.1. Lubrication

☞ **Change wheel hub bearing grease**
(Conventional)

– whenever brake linings are changed: at the latest annually or after 150,000 km –

For demounting and re-fitting of wheel hubs, see workshop manuals.

Mark demounted wheel hubs and bearing races so that their identity is not mistaken during re-assembly.

Clean wheel hubs thoroughly inside and outside.

Thoroughly clean taper bearings (using e. g. diesel oil) dry and check for re-useability. Replace seals.

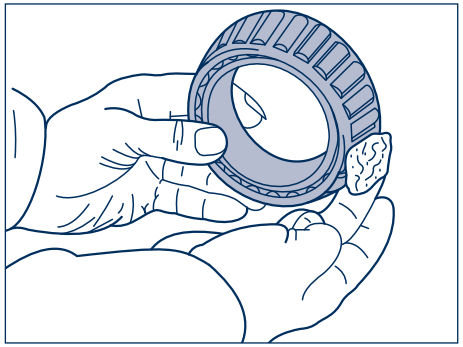
Work BPW special longlife grease ECO-Li^{Plus} into the cavities between the taper rollers and cage.

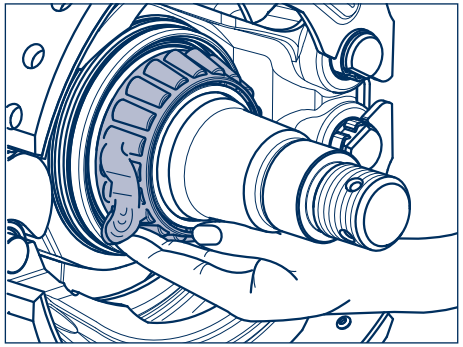
Comply with total grease quantity (table Ⓐ), smear any residual grease into the hub's outer bearing race.

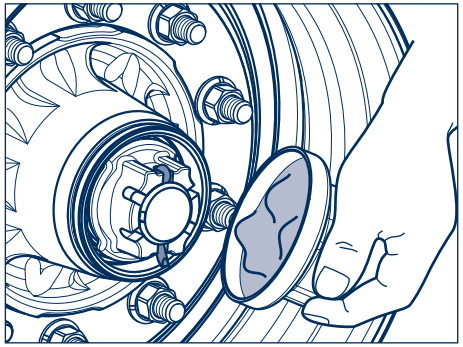
Fit wheel hubs and adjust bearing play (see point 7 page 35).

Fill hub caps with BPW special longlife grease ECO-Li^{Plus} (table Ⓑ) and screw on.

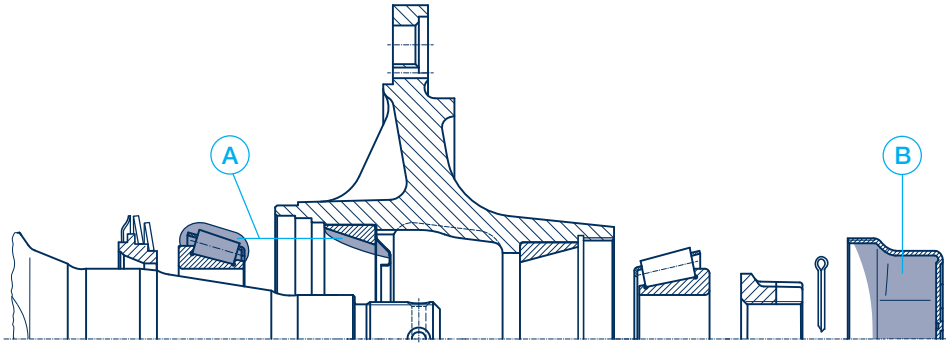
For tightening torques see 5 page 29.







Grease filling per wheel hub - Conventional wheel hub bearing



	BPW special longlife grease ECO-Li^{Plus} Grease quantity per taper roller bearing	
Axle load (Series H, K, N, M)	Ⓐ Inner bearing	Ⓑ Outer bearing (cap filling)
4000 - 5500 kg	80 g	130 g
6000 - 9000 kg	170 g	290 g
10000 - 12000 kg	180 g	320 g
13000 - 14000 kg	240 g	500 g
16000 - 18000 kg	400 g	800 g
20000 kg	440 g	900 g
Axle load (Series E and NE)		
3000 kg	70 g	100 g
3500 - 3800 kg	80 g	120 g
4500 kg	90 g	180 g

3.2. Maintenance Work and Visual Inspection

3.2.1. General

In order to distribute the braking effort evenly to all the brakes in the unit, **adjustment must always be carried out according to the vehicle manufacturer's specifications, or after 5,000 km.** Tractor units with EBS cannot have their brakes adjusted in the normal manner. As a result, the trailer or semi-trailer merely has to be checked for compliance with the EC tolerance bands. Always check the tractor vehicle if the trailer is in the EC band despite premature brake pad wear. The EBS parameters in the tractor unit must be modified in order to improve compatibility, see ECE R 13 in this connection. Failure to do so will invalidate the warranty (see warranty documents).

Other possible solutions to premature brake pad wear:

- Prescribed maintenance work must be performed at regular intervals.
- Use the retarder or engine brake to adjust the vehicle's speed.
- Think ahead when driving.
- Drop down to a lower gear in good time.
- BPW Disc Protector (cover plates for brake discs).

Even at high temperatures, disc brakes display stable braking properties and a high level of safety. Excessive temperatures do not make themselves apparent through brake fading and should be avoided. This effect leads to increased wear when used under these conditions.

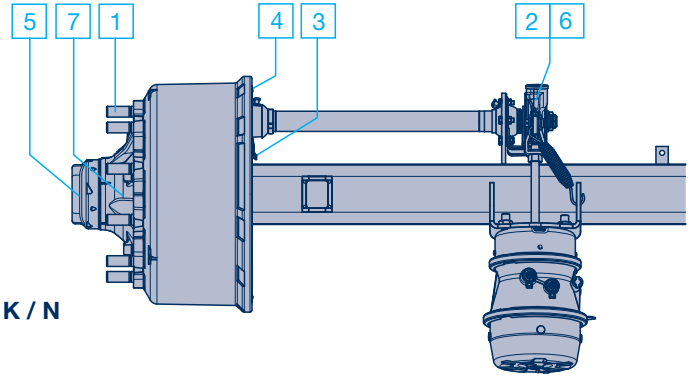
3.2. Maintenance Work and Visual Inspection

3.2.2. Drum brakes

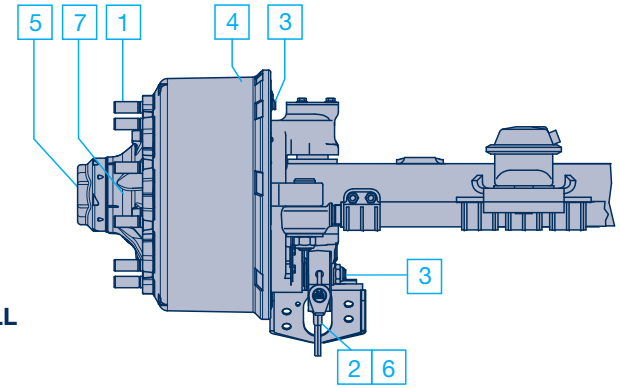
Overview For detailed description, see pages 24 - 35 Disc brakes, see pages 36 - 58 Air suspension, see pages 60 - 83 Suspension, see pages 84 - 93	Initially	Every 1 to 3 weeks	Every 12 weeks	Every 26 weeks [2]	At every brake lining replacement, latest annually [2]
Maintenance work - Drum brakes					
1 Check wheel nuts for tightness.	1 [1]				
2 With manual slack adjusters, check brake play, adjust if necessary to 10 - 12% of the connected brake lever length and activate by hand or with 0.5 - 0.8 bar. (Not applicable in the case of automatic slack adjusters.)		2			
- Check the tyres for uneven wear, adjust the inflation pressure if necessary, according to the manufacturer's specifications.			-		
3 Check brake lining thickness is at least 5 mm. (Cam brake N 3006 min. 2.5 mm residual lining thickness.)			3		
4 Check brake drum for cracks and check the internal diameter.			4		
5 Check caps for firm seating (not necessary with ECO Plus 2 and ECO^{Plus} axles).				5	
6 Check operation of automatic slack adjusters.			6 [3]	6	
○ Visual inspection of all component parts and welding seams for damage and wear.			○ [3]	○	
7 Check wheel hub bearing play, adjust if necessary. - ECO Plus 2 and ECO^{Plus} Unit - ECO Unit, conventional bearing				7	7

[1] After the first run under load conditions, likewise after each wheel change.
[2] Under extreme conditions, increase frequency (e.g. construction sites and poor roads).
[3] For use outside Europe.

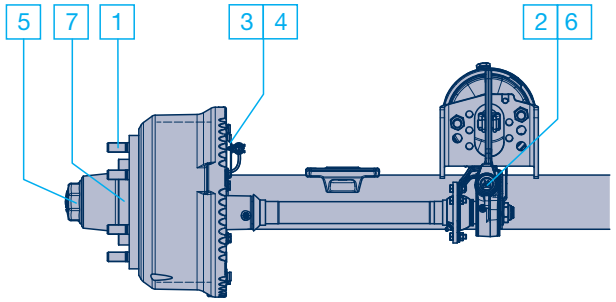
Note: Components that have damages due to improper mounting are to be exchanged after a review by a BPW Service Centre.



Series H / K / N



Series ...LL



Series NE / NM / NR / M

3.2. Maintenance Work and Visual Inspection

3.2.2. Drum brakes

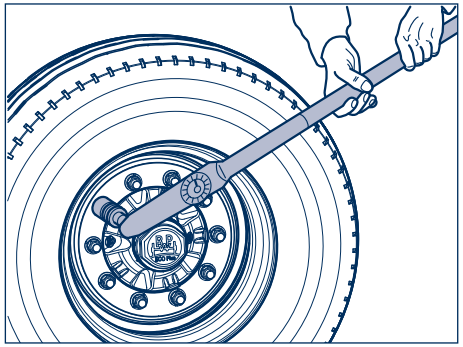
1 Check wheel nuts for tightness

– the tightening torque of the wheel nuts must be checked after the first high load journey as well as after each wheel change and, if appropriate, retightened to the prescribed value –

Tighten wheel nuts diagonally using a torque wrench to the tightening torque shown in the table.

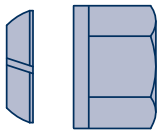
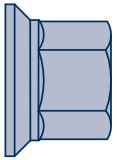
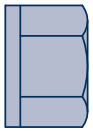
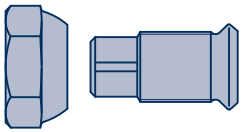
In the case of Trilex-wheels tighten the nuts consecutively several times around.

Wheel contact surfaces should not have additional coats of paint (risk of the wheels becoming detached!)



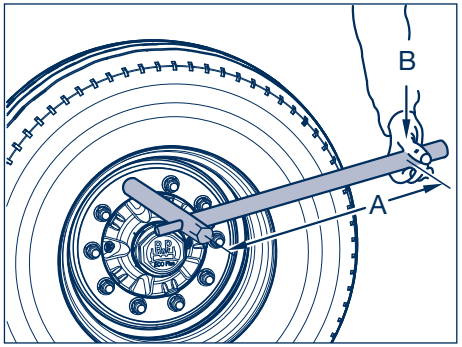
Tightening torques for wheel nuts

It is imperative that the prescribed tightening torques are adhered to in order to ensure the wheels are securely fastened!

Stud alignment	Tightening torque	
M 14 x 1.5	**125 Nm** (120 - 130 Nm)	
M 18 x 1.5	**290 Nm** (275 - 305 Nm)	
M 20 x 1.5	**380 Nm** (360 - 400 Nm)	
M 22 x 1.5	**510 Nm** (485 - 535 Nm)	
M 22 x 2	**460 Nm** (435 - 485 Nm)	
Spigot alignment		**Wheel nut with collar**
M 18 x 1.5	**350 Nm** (330 - 370 Nm)	
M 20 x 1.5	**480 Nm** (455 - 505 Nm)	
M 22 x 1.5	**630 Nm** (600 - 660 Nm)	
M 22 x 1.5 alloy wheels	**630 Nm** (600 - 660 Nm)	
M 24 x 1.5	**860 Nm** (820 - 900 Nm)	
Trilex-wheels		
M 18 x 2	**285 Nm** (270 - 300 Nm)	
M 20 x 2	**335 Nm** (320 - 350 Nm)	
Japan connection		
M 20 x 1.5	**570 Nm** (540 - 600 Nm)	
M 30 x 1.5	**570 Nm** (540 - 600 Nm)	

The torque values shown below can be achieved using a normal wheel nut spanner (vehicle tool kit) and a length of tubing.

However always check with a torque wrench as soon as possible afterwards.



To achieve tightening torques with on-board tools

Tightening torque	Tubing length “A“	Physical weight “B“
270 - 310 Nm	300 mm 350 mm 400 mm	90 - 105 kg 78 - 89 kg 68 - 78 kg
320 - 350 Nm	350 mm 400 mm 450 mm 500 mm	91 - 99 kg 80 - 88 kg 71 - 78 kg 64 - 70 kg
360 - 400 Nm	400 mm 450 mm 500 mm 600 mm	90 - 99 kg 80 - 89 kg 72 - 80 kg 60 - 67 kg
440 - 480 Nm	500 mm 600 mm 700 mm	88 - 96 kg 73 - 80 kg 63 - 69 kg
480 - 540 Nm	600 mm 700 mm 800 mm	80 - 90 kg 67 - 77 kg 60 - 67 kg
600 - 660 Nm	700 mm 800 mm 900 mm 1000 mm	85 - 95 kg 75 - 83 kg 67 - 73 kg 60 - 66 kg
820 - 900 Nm	1000 mm	82 - 90 kg

3.2. Maintenance Work and Visual Inspection
3.2.2. Drum brakes

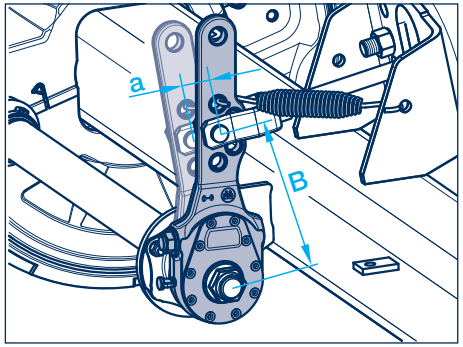
2 **Check and adjust wheel brake play with manual slack adjusters**

– frequent checks are necessary –
– depending upon application every 1 to 3 weeks –

Actuate slack adjusters by hand, pulling against the return spring. If there is more than 35 mm of play, the slack adjuster must be reset. This can be done by adjusting the nut on the slack adjuster as shown.

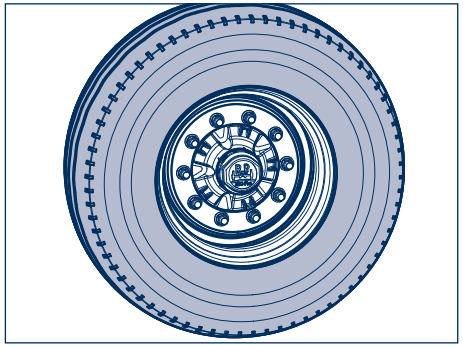
Adjust the play “a” to 10 -12% of the connected brake lever length “B”, e.g. lever length 150 mm = 15 - 18 mm of play.

Automatic slack adjusters make this adjustment automatically whenever the camshaft is rotated by more than 17.5°.



- **Check the tyres for uneven wear, adjust the inflation pressure if necessary according to the manufacturer‘s specifications.**

– quarterly –



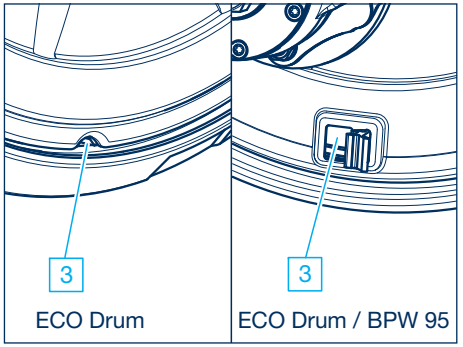
3 **Check brake lining thickness**

– quarterly –

Open inspection hole by folding back the rubber flap (not required with ECO Drum brakes).

The brake lining should be replaced at a residual lining thickness of 5 mm (check with slide gauge) or on reaching the bottom of the indicator machined into the edge of the lining.

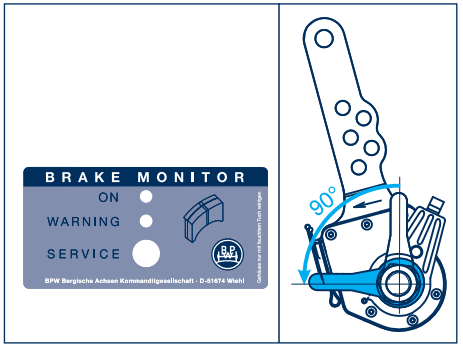
Re-insert the rubber flap.

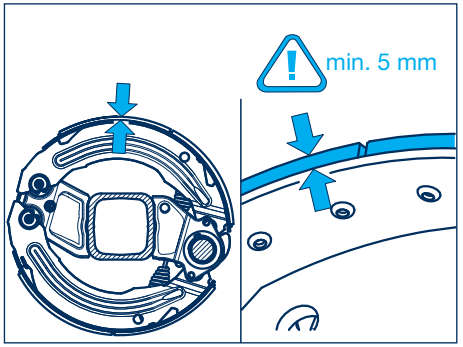


If brake lining wear indicators are fitted to the slack adjusters, the minimum thickness of the brake linings is indicated by the horizontal position of the lever (when the brake is released).

The Brake Monitor displays the “Service” signal when the wear sensor for drum brakes is installed. There is no warning function.

In certain cases the slack adjusters may not be fitted in the normal (i.e. vertical) position. In such instances, the position of the wear indicator will also be different. Linings should be changed when the wear indicator is approximately at right angles to the brake lever.





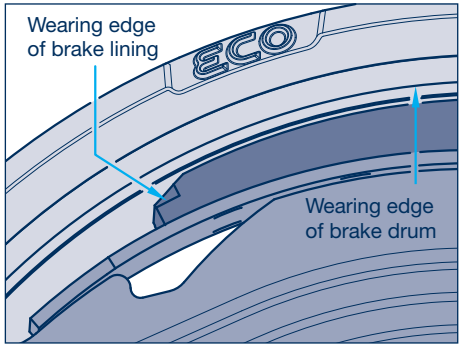
3.2. Maintenance Work and Visual Inspection

3.2.2. Drum brakes

4 Check the brake drum for cracks and the internal diameter

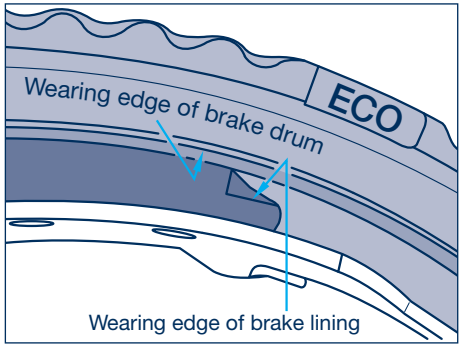
– quarterly –

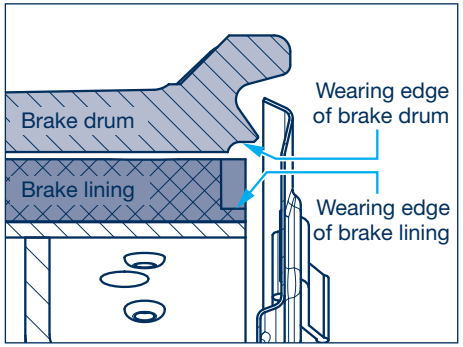
Check the condition of the brake drum and that there is adequate remaining thickness. If the wear is approaching the wear edge, measure the brake drum and renew it if the maximum permitted amount of wear has been reached.



Max. amounts of wear, measured at the position with the greatest wear:

Brake	Brake shoe width (mm)	Ø Max. amount of wear (mm)	Ø Skimming size (mm)
SN 420	120 / 160	424	423
SN 420	180 / 200 / 220	425,5	424
SN 360	160 / 200	364	363
SN 300	100 / 150 / 200	304	303
FL 300	80	303	302





5 Check caps for firm seating

– every 6 months –
(not necessary with ECO Plus 2 and ECO^{Plus} axles)

Check caps for tightness using a torque wrench or power tool.

Tightening torques:

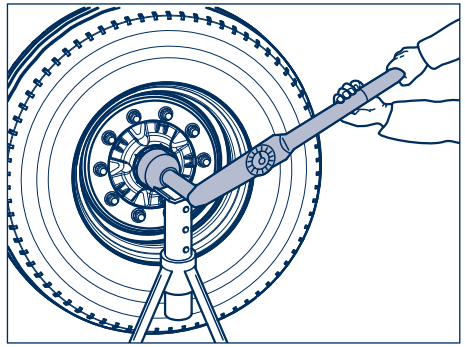
Cap for ECO and ECOPlus Unit	6 - 12 t	800	Nm
Steel cap	6 - 12 t	500	Nm
	14 t	800	Nm
Alloy cap	6 - 12 t	350	Nm

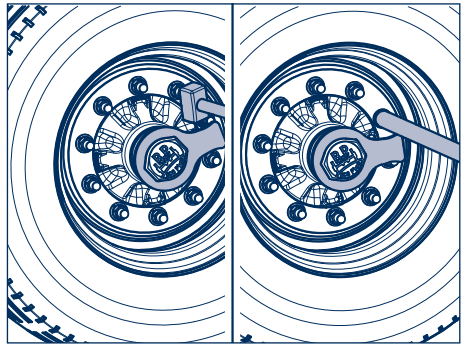
Steel cap	5,5 t	500	Nm
Steel cap	6 - 16 t	700	Nm
Alloy cap	5.5 - 12t	350	Nm

In an emergency the caps can be tightened using a normal cap spanner (vehicle tool kit) by striking the latter with a hammer, or also with the aid of a piece of tubing inserted into the spanner.

Caps with integrated hubodometers must be fitted and dismantled using only torque controlled (not impact!) air guns or manually with a torque wrench.

Tighten to the correct tightening torque as soon as possible.

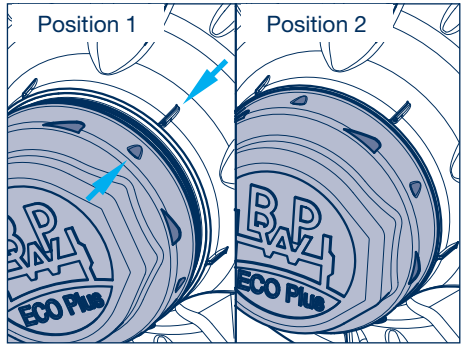




☞ Caps on ECO Plus 2 axles are provided with a bayonet fitting. Check for firm seating.

Position 1: Hub cap seated loosely on the Unit.

Position 2: Hub cap seated firmly on the Unit.



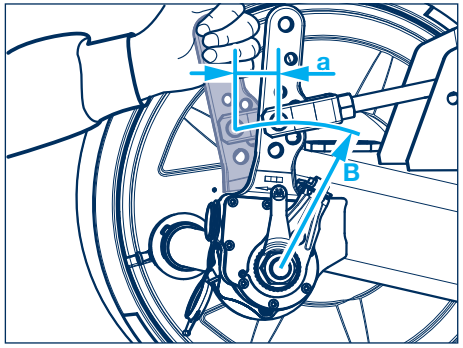
3.2. Maintenance Work and Visual Inspection

3.2.2. Drum brakes

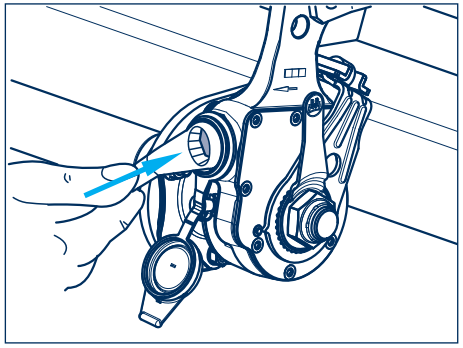
6 **Check operation of the automatic slack adjuster**

– every 6 months –
– quarterly in use outside Europe (e.g. within the scope of the statutory checks) –

Prevent the vehicle from rolling away. Release the service brakes and the handbrake.



Free play check:
Operate the slack adjuster by hand or with 0.8 bar. In this case, the free play „**a**“ corresponds to 10 - 15 % of the connected brake lever length „**B**“, e.g. brake lever length 150 mm = free play 15 - 22 mm.



Check the adjustment if the free play is not within tolerance:

Remove rubber seal cap. Turn back adjustment bolt, keep clutch sleeve pressed down, by approx. 3/4 of a turn in a counterclockwise direction using a ring spanner. A play of at least 50 mm with a lever length of 150 mm must be available.

Actuate the brake lever several times by hand. When this is done automatic adjustment must take place smoothly. Engagement of the clutch coupling is audible and on the return stroke the adjustment bolt turns slightly in a clockwise direction.

Grease with ECO-Li^{Plus}, see also ③ on page 9.

Fit seal cap.

Adjust the brake, see relevant workshop manual.

◦ **Visual inspection**

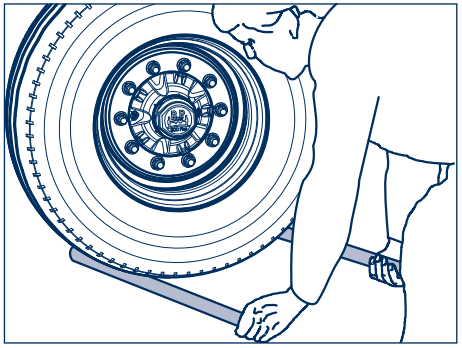
– every 6 months –
– quarterly in use outside Europe –

Check all components and welding seams for damage and wear.

7 **Check wheel hub bearing play**

– ECO Plus 2 and ECO^{Plus} Unit at every brake lining replacement, latest annually –
– ECO Unit und conventional hub bearing every 6 months –

Prevent the vehicle from rolling away.
In order to check the wheel hub bearing play, lift the axle until the wheels are off the ground. Release the brake. Apply a lever between the tyre and the ground and check the play.



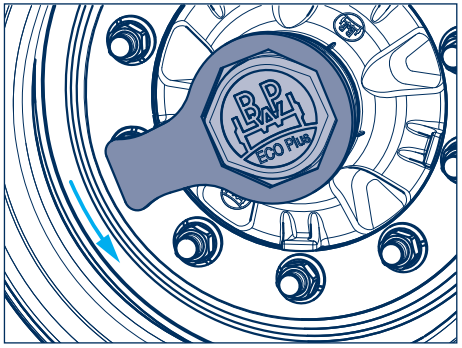
If bearing play is detected -
ECO Plus 2 Unit:

Adjust the bearing play

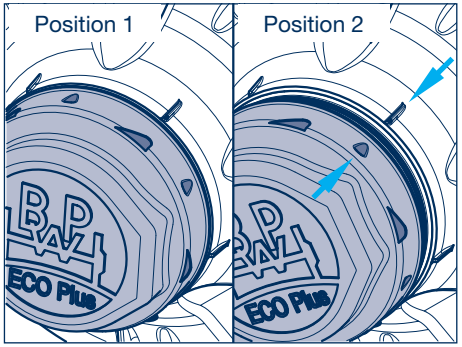
1. Unscrew the cap with a 120 mm hub cap spanner. Undo the cap by turning it anti-clockwise by approx. 30° from position 1 to position 2.

   When turned further the hub cap lifts clearly away from the ECO Unit and can be removed by pulling it away.

   Important!
   Do not use an impact driver - bayonet lock.



2. Remove the hooked spring ring and retaining key from the axle bolt.

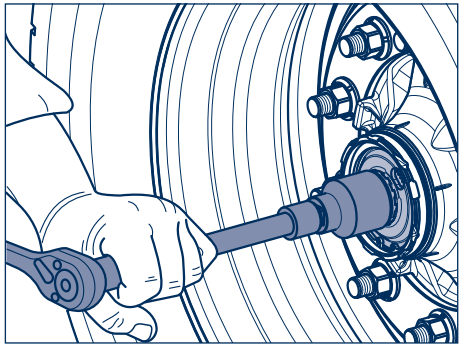


3.2. Maintenance Work and Visual Inspection

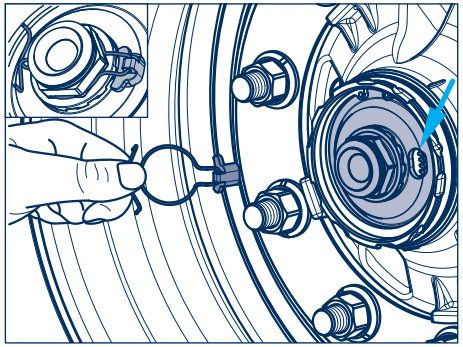
3.2.2. Drum brakes

3. Fasten the axle bolt using a hexagon socket spanner (SW 46) and with the continuous turning of the ECO Unit. It should take several turns until the teeth of the axle bolt start skipping

Important!
Do not use an impact driver.



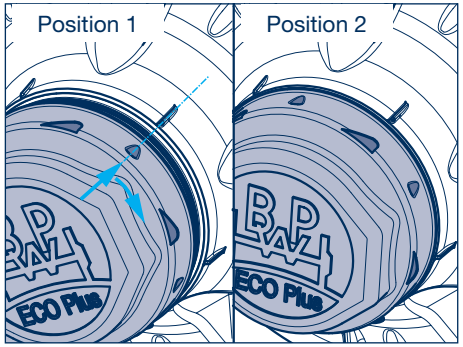
4. Insert the retaining key into the recess in the axle bolt and the gearing of the toothed lock washer (arrow). (Do not turn back the axle bolt.)
5. Insert the hooked spring ring into the groove of the hexagon profile of the axle bolt. Make sure that the clasped spring ring assembly is correctly seated in the annular groove of the axle bolt.
6. Insert a new O-ring into the groove in the wheel hub.



7. Apply a thin layer of BPW ECO-Li^{Plus} special longlife grease to the hubcap in the area of the O-ring contact surface and the bayonet fitting.
8. Screw on the cap with a 120 mm cap spanner.

Important!
Do not use an impact driver - bayonet lock.

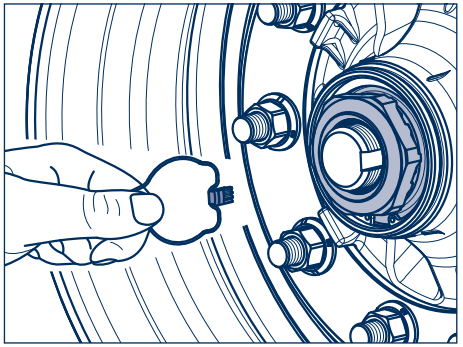
Push on the hubcap, see position 1. Press on the hubcap and turn it by approx. 30° in a clockwise direction to lock it in place. A tight seat is provided when position 2 is reached.



If bearing play is detected -
ECO^{Plus} Unit:

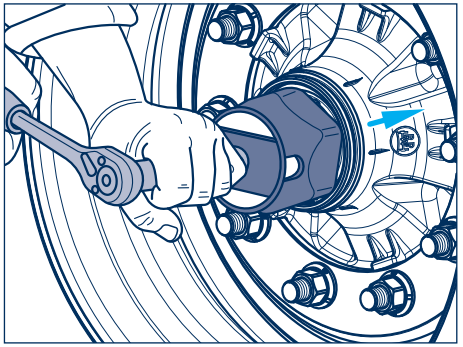
Adjust the bearing play

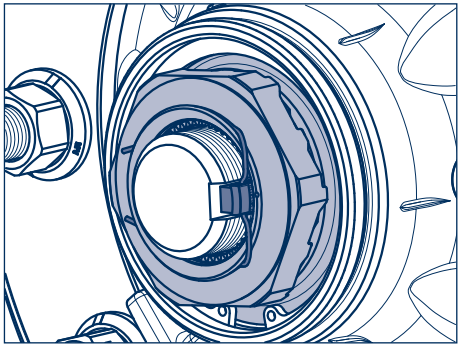
1. Unscrew the cap.
2. Remove the hooked spring ring with a wedge from the axle nut.
3. Fasten the axle nut using a hexagon socket spanner and with the continuous turning of the ECO Unit. It should take several turns until the teeth of the axle bolt starts skipping.



Important!
Do not use an impact driver.

4. Fit the retaining key in the groove between the axle stub and the nut (do not reset the axle nut).
5. For production date April 2000 onwards, insert the hooked spring ring behind the edge of the axle nut or, up to March 2000, into the thread on the axle stub.
6. Tighten the cap to 800 Nm.





3.2. Maintenance Work and Visual Inspection

3.2.2. Drum brakes

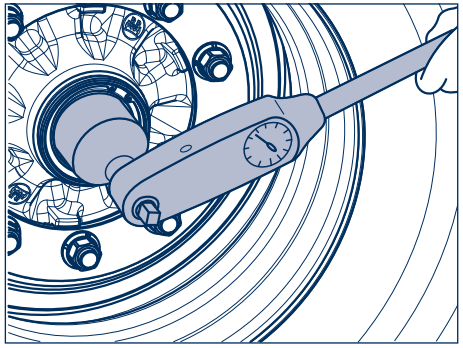
If bearing play is detected -
ECO Unit:

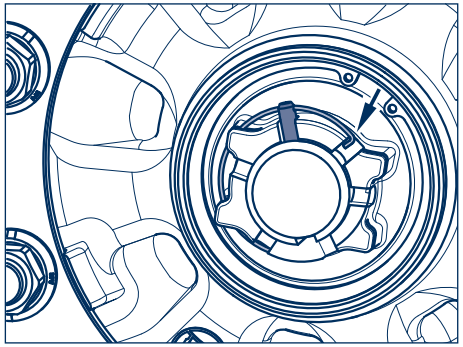
Adjust the bearing play

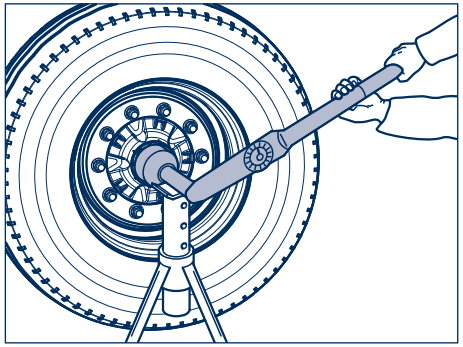
1. Unscrew the cap.
2. Loosen axle nut.
3. Fasten the axle nut using a torque wrench and with the continuous turning of the ECO Unit. It should take several turns until the tightening torque has reached 150 Nm.
   - If a normal axle nut spanner is used (vehicle tool kit), tighten the axle nut until the ECO Unit drags slightly (auxiliary solution).
4. Turn back axle nut to the next locking position (max. 15°). The asymmetrical cap of the axle nut enables the next locking position to be reached after turning back max. 15°.
5. Insert bolt and locking ring.
6. Screw on cap.

   Tightening torque:

Steel / cast cap	800 Nm
Aluminium cap	350 Nm







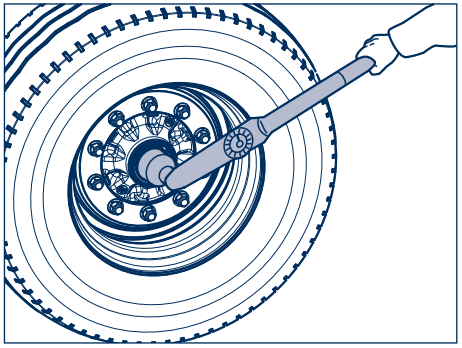
If bearing play is detected -
conventional hub bearing:

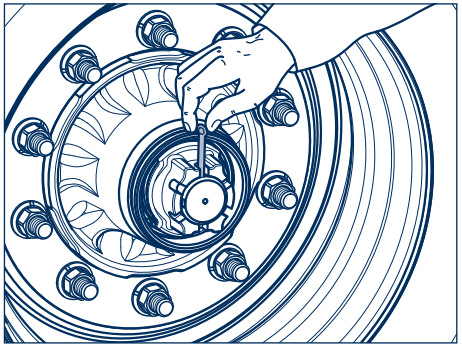
Adjust the bearing play

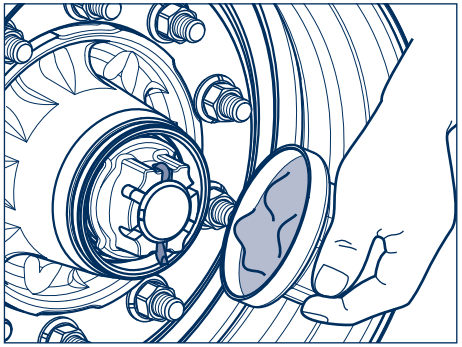
1. Unscrew the cap.
2. Remove the split pin from the axle nut.
3. Fasten the axle nut using a torque wrench and with the continuous turning of the wheel hub. It should take several turns until the tightening torque has reached the desired value.

   Tightening torques:
   Up to an axle load of 5.5 tons = 100 Nm,
   From 6 to 14 tons axle load = 150 Nm,
   From 16 to 30 tons axle load = 350 Nm.
   - If a normal axle nut spanner is used (vehicle tool kit), tighten the axle nut until the wheel bearing race drags slightly.
4. Turn back the axle nut to the next available split pin hole. Should they already be in line turn back to the next hole (30° at the maximum). (Does not apply to the ECO Plus 2, ECO^{Plus} and ECO Unit.)
5. Insert the split pin and bend upwards slightly.
6. Refill the cap as required with BPW special longlife grease ECO-Li^{Plus} and replace.

   For tightening torques see point 5 on page 29.







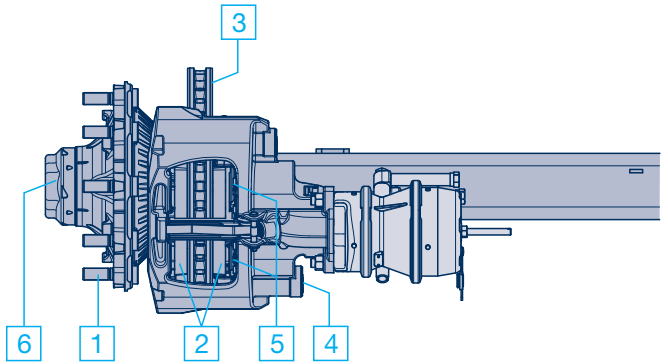
3.2. Maintenance Work and Visual Inspection

3.2.3. Disc brakes, brake types TSB 3709, TSB 4309, TSB 4312

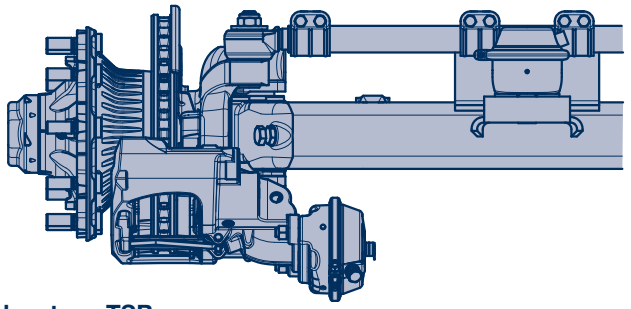
Overview For detailed description, see pages 38 - 44 Disc brakes type SB, see pages 46 - 58 Air suspension, see pages 60 - 83 Suspension, see pages 84 - 93	Initially	Every 12 weeks [1]	Every 26 weeks [1]	At every brake lining replacement, latest annually
Maintenance work - Disc brakes Brake type: TSB 3709, TSB 4309, TSB 4312				
1 Check wheel nuts for tightness.	1 [2]			
2 Check brake pad thickness.		2		
- Visual check, check all components and welding seams for damage, wear and corrosion.			-	
3 Check brake disc thickness and visually check for cracks.		3 [3]	3	
4 Check caliper guide system.		4 [3]	4	
5 Check coarse dirt seals at the pressure plates.			5 [3]	5
6 Check the bearing play of the ECO Unit, adjust if necessary.				6

[1] Under extreme conditions, increase frequency (e.g. Off-Road, heavy-duty braking work).
[2] After the first run under load conditions and likewise after each wheel change.
[3] For use outside Europe.

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



Series SH with disc brakes type TSB



Series LL with disc brakes type TSB

3.2. Maintenance Work and Visual Inspection

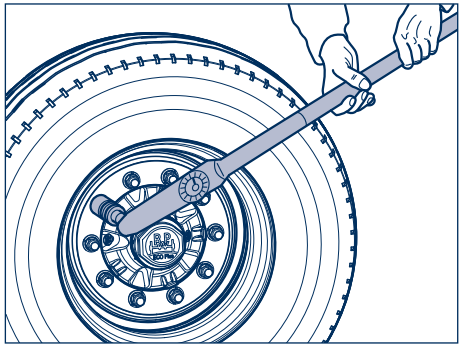
3.2.3. Disc brakes, brake types TSB 3709, TSB 4309, TSB 4312

1 Check wheel nuts for tightness

– the tightening torque of the wheel nuts must be checked after the first high load journey as well as after each wheel change and, if appropriate, retightened to the prescribed value –

Tighten wheel nuts diagonally using a torque wrench to the correct tightening torque.

It is imperative that the prescribed tightening torques are adhered to in order to ensure the wheels are securely fastened!

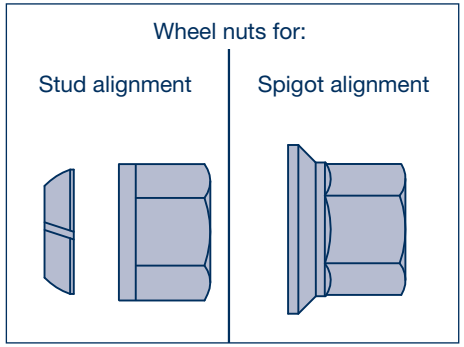


Tightening torques for wheel nuts M 22 x 1.5:

Stud alignment: **510 Nm** (485 - 535 Nm)
Spigot alignment: **630 Nm** (600 - 660 Nm)

Warning: Do not exceed specified settings!

Wheel contact surface should not have additional coats of paint (risk of the wheels becoming detached)!

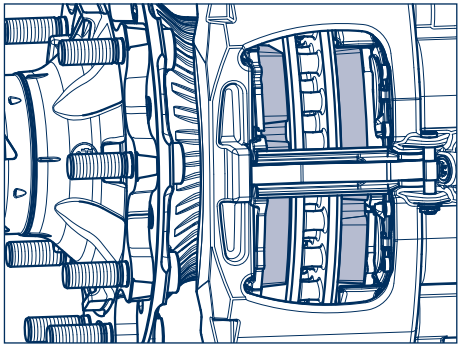


2 Check brake pad thickness

– quarterly –

The brake pad thickness must be checked regularly, e.g. during the tyre inflation pressure check. The intervals must not be more than 3 months.

The brake pad thickness can be checked where the brake caliper interfaces with the welded anchor plate with the wheels mounted (approximate wear indicator).



Dimension x (distance between brake caliper and brake anchor plate):

9 mm => when new

TSB 3709 / 4309

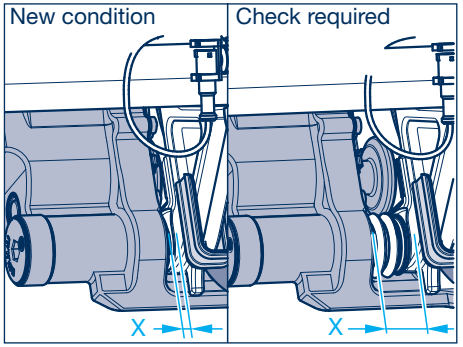
30 mm => max. permissible brake pad wear, 21 mm

34 mm => max. permissible wear for brake pad and brake disc

TSB 4312

28 mm => max. permissible brake pad wear, 19 mm

32 mm => max. permissible wear for brake pad and brake disc

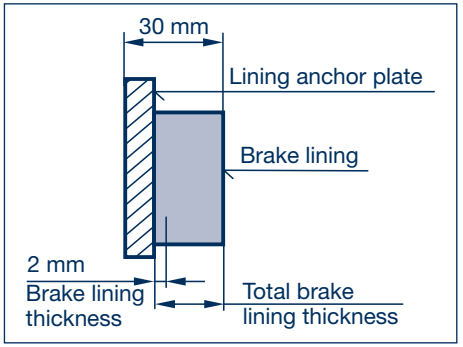


The brake pads must be removed to inspect them more closely - see relevant workshop manual.

Heat affected, glazed over, or oily brake pads must be replaced immediately.

The remaining brake pad thickness must **not** be less than 2 mm (use a caliper gauge for this).

Hairline cracks at the edges are permissible; replacement is required if more sizable surface cracks are present.



2 Visual inspection

– every six months –

Check all components and welding seams for damage, wear and corrosion.

3.2. Maintenance Work and Visual Inspection

3.2.3. Disc brakes, brake types TSB 3709, TSB 4309, TSB 4312

3 **Brake disc**
(Check the condition of the brake disc)

– every 6 months when used within Europe, quarterly when used outside Europe –

Sections **A - D** (see fig.) show the possible conditions of the disc surface:

A: Network-type tears = permissible

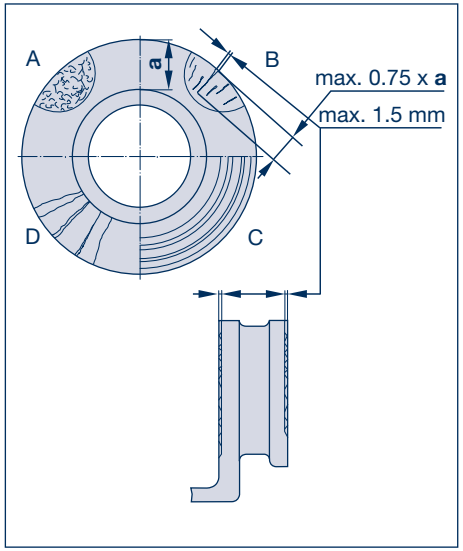
B: Radial cracks up to max. 1.5 mm width and depth = permissible

C: Uneven disc surface less than 1.5 mm = permissible

D: Continuous cracks = not permissible

Technical details:
- Disc thickness, new = 45 mm
- Minimum permissible disc thickness = 37 mm
  (Use a caliper gauge where the pads make contact)

In the case of surface conditions **A - C**, the brake disc can be used until the minimum permissible disc thickness has been reached.

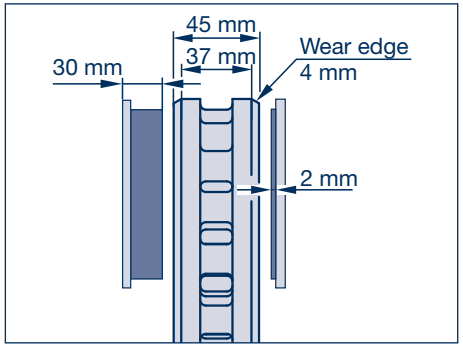


☞ IMPORTANT!

To prevent damage to the brake discs, the brake pads should be replaced when their thickness (excluding backing plate) is **2 mm** or less.

Brake discs should always be replaced in pairs. The brake pads should also be replaced when new brake discs are fitted.

If this instruction is not adhered to, there is a danger that braking performance could be seriously reduced.



4 **Checking the brake caliper guide system**
(check play and adjustment)

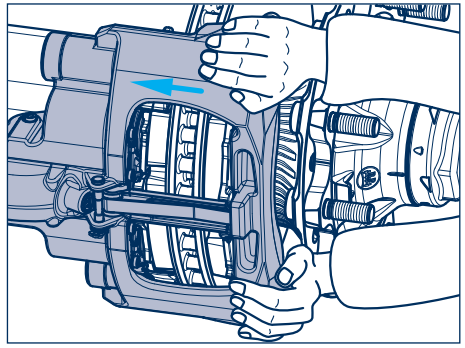
– every 6 months when used within Europe, quarterly when used outside Europe –
e.g. within the scope of the statutory checks)

Prevent the vehicle from rolling away. Release the service and parking brakes.

The brake cylinder and fasteners for the brake pads can remain fitted.

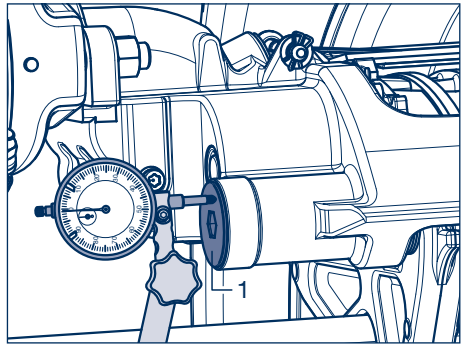
Forcefully push the sliding caliper in the axle direction. The caliper must move approximately 0.7 to 1.3 mm (play).

If play is not within this tolerance, the brake caliper guide must be checked and readjusted.



For close inspection of play with wheels mounted:

Use a dial gauge to determine the play. To this end, attach a dial gauge holder to the axle housing and position the button on the outside of the screw plug (1) or on the brake cylinder.

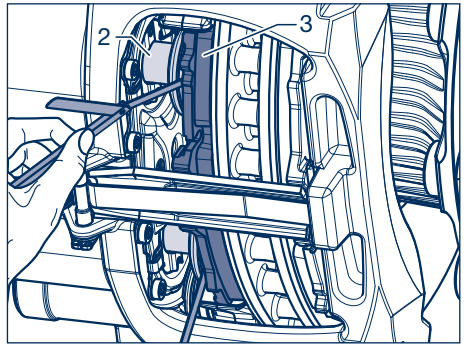


For close inspection of play with wheels removed:

Check the play using two feeler gauges.

Forcefully push the sliding caliper toward the centre of the axle and insert the gauges between the pressure plates (2) and pad backing plate (3).

If play is not within the tolerance required, adjustment must be carried out and the brake caliper guide checked.

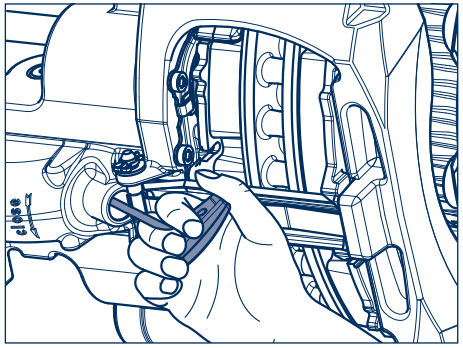


3.2. Maintenance Work and Visual Inspection

3.2.3. Disc brakes, brake types TSB 3709, TSB 4309, TSB 4312

Set play and check adjustment

1. Remove the plug.
2. Using a torx wrench (T25), depress the return spring and turn clockwise until it „clicks“ 2 times.
3. Actuate the brake 5 to 10 times with a force of approximately 2 bar.
4. Forcefully push the sliding caliper in the axle direction. The play exhibited at this time must be between 0.7 and 1.3 mm. **Adjustment is correct if play is within this tolerance.**
5. Reinsert the plug.

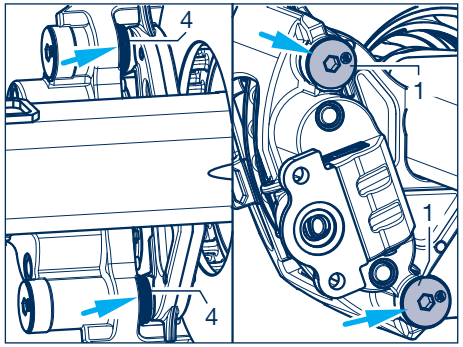


Check brake caliper guide:
The brake caliper guide must be checked if the play was not adjusted properly.

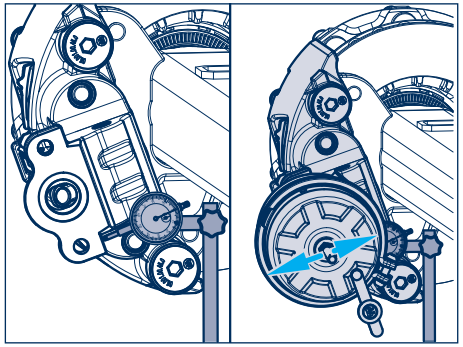
The guide bushings are sealed by the bellows (4) and the screw plug (1).

Inspect the bellows and sealing plugs for cracks, damage, and proper seating and replace if necessary. **Sealing plugs that have been removed must be replaced, not re-used.**

See workshop manual ECO Disc for information on how to repair the brake caliper guide.



Check the brake caliper bearing play:
The bearing play of the brake caliper can be established using a dial gauge. Attach the dial gauge holder to the axle beam and position the gauge, facing the long locating bearing, on the lower edge of the cylinder flange.
Press the brake caliper on the brake cylinder vertically downwards to its installation diagram and set the dial gauge to „zero“. Press the brake caliper upwards and read the bearing play on the dial gauge. If a brake caliper bearing play exceeds 1.5 mm, the brake caliper bearing must be replaced.



5 Check coarse dirt seals at the tappets

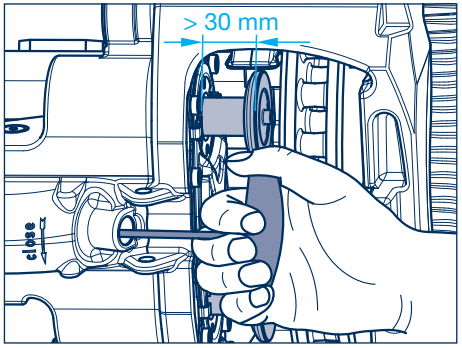
– at every brake lining replacement, latest annually in Europe –
– every six months in use outside Europe –

Prevent the vehicle from rolling away.
Release the service and parking brakes.

See workshop manual ECO Disc for information on how to remove the brake pads.

The service brake and spring actuator must be released.

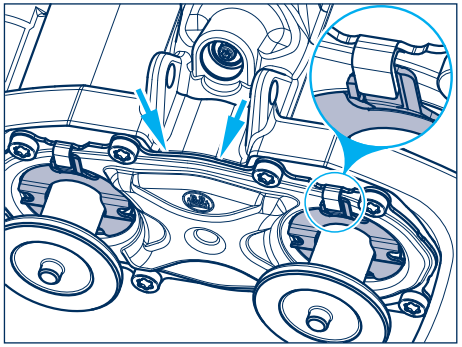
Unscrew the tappets (362) beyond the adjuster (min. 30 mm) until the coarse dirt seals (365) are plainly visible.



Ensure proper seating.
(Visual inspection, see detail extract)

Check the dust cover of the brake caliper in the area between the coarse dirt seals (365, arrows) for deformation. If deformation is detected, the brake caliper requires changing!

Note:
Penetrating dirt and damp cause corrosion and affect the operation of the clamping mechanism and adjustment.

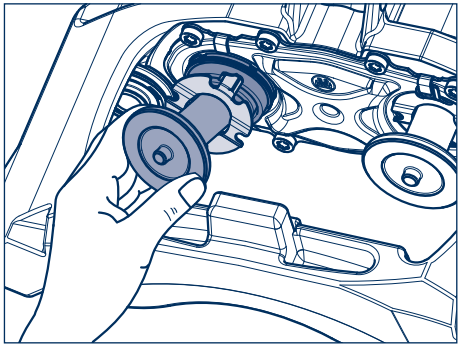


The bellows must be replaced if thermal overloading was detected.

Only new parts may be used.

The adjustment device must be checked for corrosion and ease of movement before the new parts are installed.

See workshop manual ECO Disc for information on how to replace the bellows.



3.2. Maintenance Work and Visual Inspection

3.2.3. Disc brakes, brake types TSB 3709, TSB 4309, TSB 4312

6 **Check the bearing play of the ECO Unit**

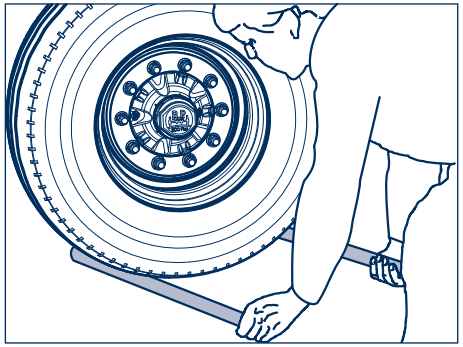
– at every brake lining replacement, latest annually –

Prevent the vehicle from rolling away.

In order to check the bearing play of the ECO Unit, lift the axle until the wheels are off the ground. Release the brake. Apply a lever between the tyre and the ground and check the play.

The bearing play must be reset if the bearing play can be felt.

See instructions on setting bearings for ECO Plus 2 and ECO^{Plus}, pages 31 to 33.



BPW-W 33111201e

3.2. Maintenance Work and Visual Inspection

3.2.4. Disc brakes, brake types SB 3308, SB 3745, SB 4309, SB 4345

Overview

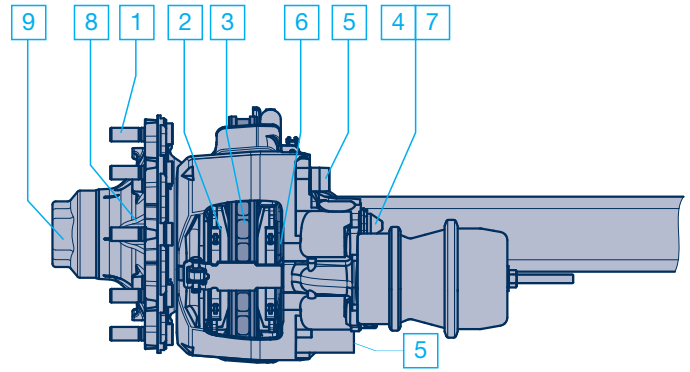
For detailed description, see pages 48 - 58

Disc brakes type TSB, see pages 36 - 44
Air suspension, see pages 60 - 83
Suspension, see pages 84 - 93

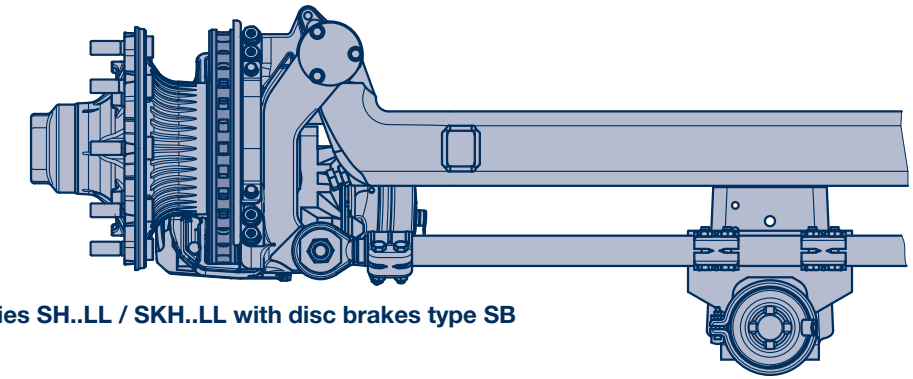
	Initially	Every 12 weeks	Every 26 weeks [2]	At every brake lining replacement, latest annually [2]
Maintenance work - Disc brake Brake type: SB 3308, SB 3745, SB 4309, SB 4345				
1 Check wheel nuts for firm seating.	1 [1]			
2 Check brake pad thickness.		2		
- Check the tyres for uneven wear, adjust the inflation pressure if necessary according to the manufacturer's specifications.		-		
◦ Visual check of all components and welding seams for damage, wear and corrosion.			◦	
3 Check brake disc thickness and visually check for cracks.		3 [3]	3	
4 Check brake adjustment.		4 [3]	4	
5 Check caliper guide system.		5 [3]	5	
6 Check bellows on the guide pins. - ECO Plus 2 and ECO^{Plus} axles - ECO axles and axles with conventional hub bearing			6 [3] 6	6
7 Check caliper unit. - ECO Plus 2 and ECO^{Plus} axles - ECO axles and axles with conventional hub bearing			7 [3] 7	7
8 Check wheel hub bearing play, adjust if necessary. - ECO Plus 2 and ECO^{Plus} Unit - ECO Unit and conventional hub bearing			8	8
9 Check caps for tightness. (not necessary with ECO Plus 2 and ECO^{Plus} axles)			9	

1) After the first run under load conditions, likewise after each wheel change.
2) Under extreme conditions, increase frequency (eg. construction sites and poor roads).
3) For use outside Europe.

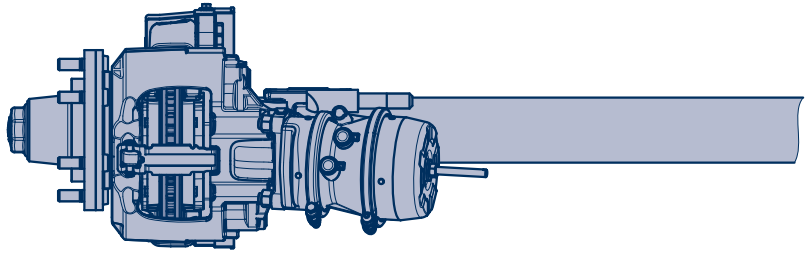
Note: Components that have damages due to improper mounting are to be exchanged after a review by a BPW Service Centre.



Series SH / SKH with disc brakes type SB



Series SH..LL / SKH..LL with disc brakes type SB



Series SNR with disc brakes type SB

3.2. Maintenance Work and Visual Inspection

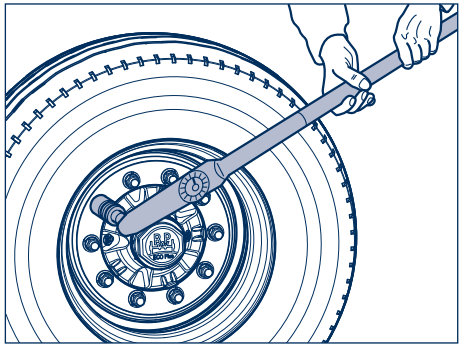
3.2.4. Disc brakes, brake types SB 3308, SB 3745, SB 4309, SB 4345

1 Check wheel nuts for tightness

– the tightening torque of the wheel nuts must be checked after the first high load journey as well as after each wheel change and, if appropriate, retightened to the prescribed value –

Tighten wheel nuts diagonally using a torque wrench to the correct tightening torque.

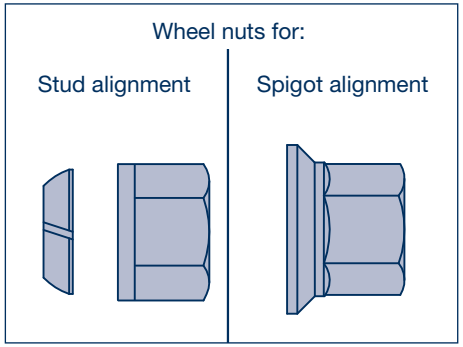
It is imperative that the prescribed tightening torques are adhered to in order to ensure the wheels are securely fastened!



Tightening torques for wheel nuts

M 18 x 1.5
Stud alignment: **290 Nm** (275 - 305 Nm)
Spigot alignment: **350 Nm** (330 - 370 Nm)

M 22 x 1.5:
Stud alignment: **510 Nm** (485 - 535 Nm)
Spigot alignment: **630 Nm** (600 - 660 Nm)



Warning:
Do not exceed specified settings!

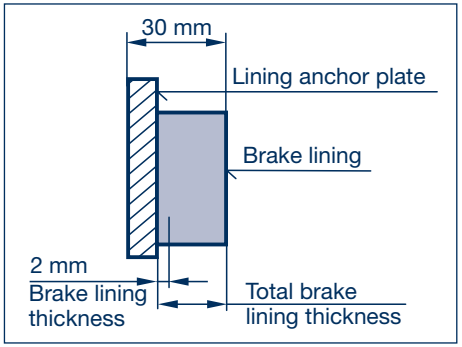
Wheel contact surface should not have additional coats of paint (risk of the wheels becoming detached)!

2 Check brake pad thickness
SB 3745 / SB 4309 / SB 4345

– quarterly –

The brake pad thickness must be checked regularly, e.g. during the tyre inflation pressure check. The intervals must not be more than 3 months.

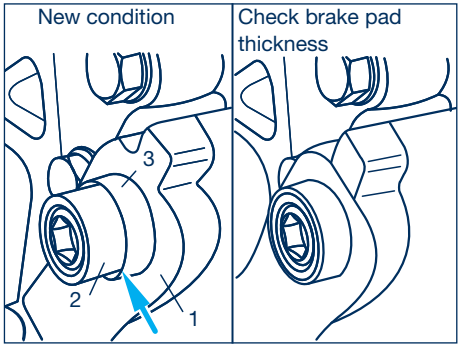
The thickness of the remaining pad must **not be less than 2 mm** (check with slide gauge).



☞ Open bearing:

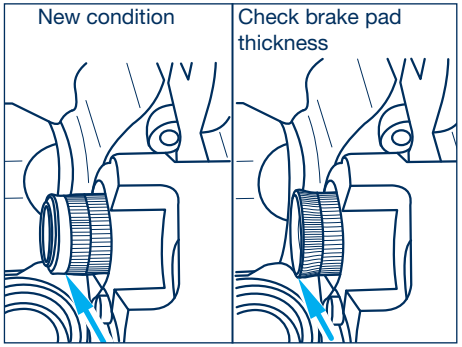
The thickness of the brake pad can be checked by the position of the brake caliper (1) in relation to the guide rod (2) (rough indication of wear).

If the end of the guide sleeve (3) is level with the fixed guide rod, the pad thickness must be checked again after the wheels have been removed.



☞ Sealed bearing:

The sealed bearing has a ridged rubber seal which is fitted over the guide pin. Pad wear should be checked when the wear mark (transition point between the ridged and smooth areas - see diagram) has moved to the end of the guide pin.



3.2. Maintenance Work and Visual Inspection

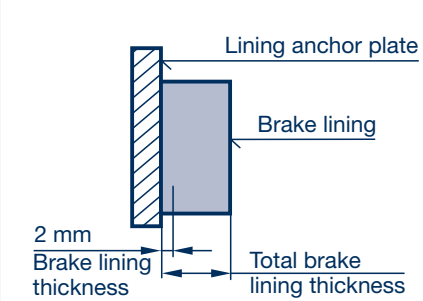
3.2.4. Disc brakes, brake types SB 3308, SB 3745, SB 4309, SB 4345

Check brake pad thickness SB 3308

– quarterly –

The brake pad thickness must be checked regularly, e.g. during the tyre inflation pressure check. The intervals must not be more than 3 months.

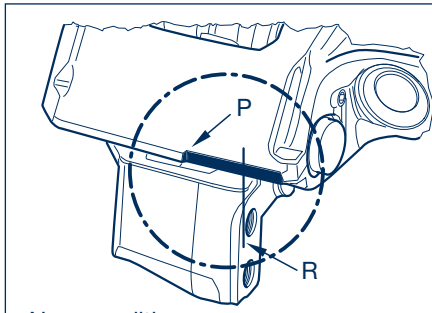
The thickness of the remaining pad must **not be less than 2 mm** (check with slide gauge).



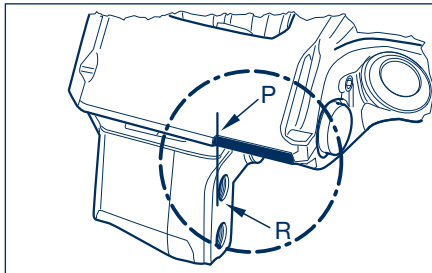
The brake pad thickness can be checked with the wheels attached by means of the position of the brake caliper marking (P) in relation to the fixed brake carrier flange (R).

On reaching the status as shown in the illustration below right, the brake pad thickness and the brake disc must be checked with the wheel removed.

Replace the brake pads and/or brake disc as necessary.



New condition



A brake pad and brake disc check is necessary

- **Check the tyres for uneven wear and adjust the inflation pressure if necessary according to the manufacturer's specifications**

  – quarterly –

- **Visual inspection**

  – every six months –

  Check all components and welding seams for damage, wear and corrosion.

3 **Brake disc**

(Check the condition of the brake disc)

– every 6 months –

– quarterly in use outside Europe –

Section A - D (see fig.) show the possible conditions of the disc surface:

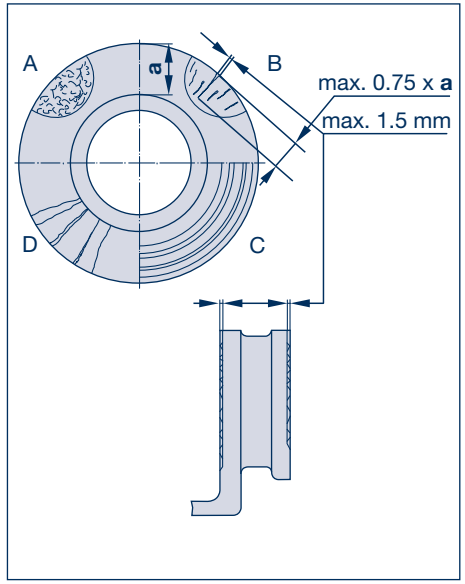
A: Network-type tears = permissible

B: Radial cracks up to max. 1.5 mm width and depth = permissible

C: Uneven disc surface less than 1.5 mm = permissible

D: Continuous cracks = not permissible

In the case of surface conditions **A - C** the brake disc can be used until the minimum permissible disc thickness has been reached.



☞ IMPORTANT!

To prevent damage to the brake discs, the brake pads should be replaced when their thickness (excluding backing plate) is **2 mm** or less.

If this instruction is not adhered to, there is a danger that braking performance could be seriously reduced.

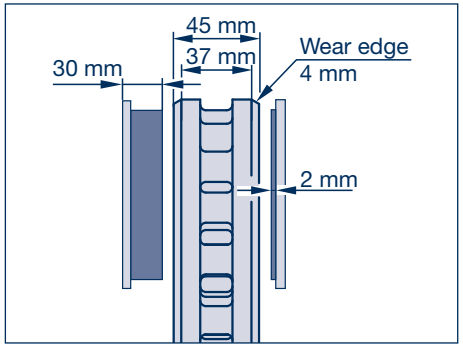
3.2. Maintenance Work and Visual Inspection

3.2.4. Disc brakes, brake types SB 3308, SB 3745, SB 4309, SB 4345

SB 3745 / SB 4309 / SB 4345

Technical details:

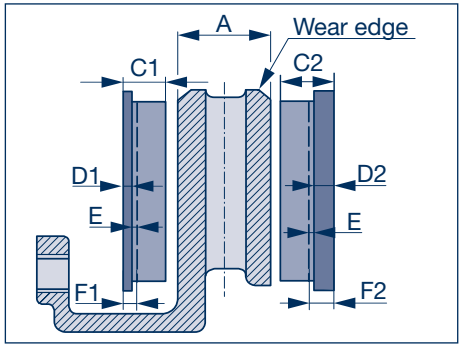
- Disc thickness, new = 45 mm
- Minimum permissible disc thickness (check with slide gauge) = 37 mm



SB 3308

Technical details:

A	Disc thickness, new	= 34 mm
	minimum permissible disc thickness (check with slide gauge)	= 28 mm
C1	Overall thickness of new brake pad	= 27 mm
C2	Overall thickness of new brake pad	= 34 mm
D1	Pad backing plate	= 8 mm
D2	Pad backing plate	= 15 mm
E	Brake pad minimum thickness	= 2 mm
F1	Brake pad minimum thickness incl. pad backing plate	= 10 mm
F2	Brake pad minimum thickness incl. pad backing plate	= 17 mm



4 Check adjustment

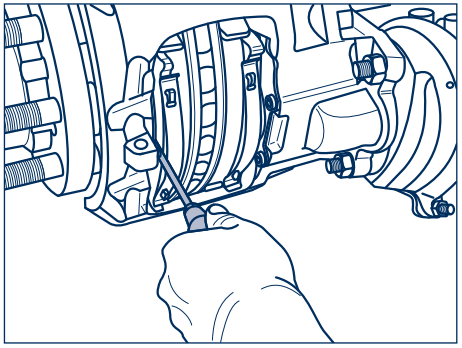
– every 6 months –
– quarterly in use outside Europe –

Prevent the vehicle from rolling away. Release the service brakes and the handbrake.

SB 3308

Remove wheel. Remove pad retainer clip. Pull the brake caliper on its guide pins in the direction of the outside of the vehicle.

Using a suitable tool, press the outer brake pad in the direction of the pressure pad. Measure the gap between the backing plate and the inside of the caliper. This must be between 0.6 and 1.1 mm.

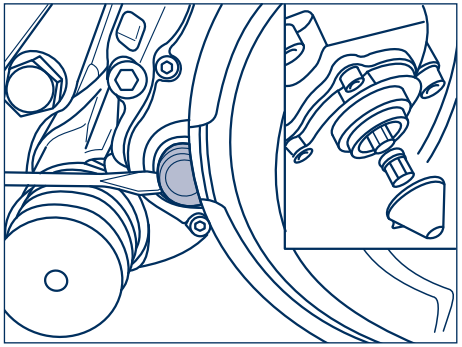


☞ Important!
If the air gap is too large, the braking effect may fail.
If the air gap is too small the brake may overheat and cause further damage.

If the air gap is to big or too small, the adjustment must be checked as follows:

SB 3308 / SB 3745 / SB 4309 / SB 4345

Remove cap.
Place a ring spanner size 8 on the hex. profile of the adjuster, or a spanner size 10 on the adjuster adapter. Turn anti-clockwise until the ratchet clicks 3 or 4 times.



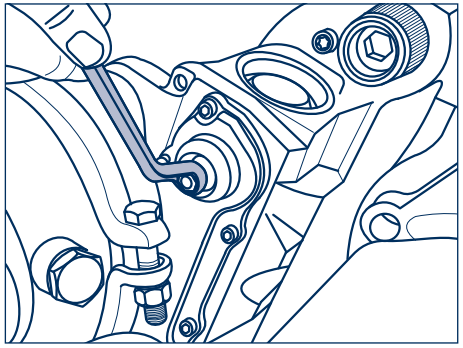
☞ Important!
If the version has an adjustment adapter, never turn without the adapter. Exceeding the specified break-off torque of the adapter will cause the adapter to break.
Repeat with a new adapter. Fit a new brake caliper if the adapter shears off again - this is an indication of internal damage.

Do not use an open-ended spanner.

Max. torque: approx. 25 Nm

3.2. Maintenance Work and Visual Inspection

3.2.4. Disc brakes, brake types SB 3308, SB 3745, SB 4309, SB 4345



Apply brake 5 to 10 times (approximately 2 bar). If the adjustment is correct, the ring spanner will turn back in a clockwise direction (make sure the ring spanner can rotate freely).

Note: As the cycle rate increases, the movement of the ring spanner, becomes smaller.

If the ring spanner moves as described, the adjustment is OK.

Remove ring spanner.

Apply **Renolit HLT2** to the cap and re-fit. For the version with the adapter, fit the lug on the cap pointing towards the axle beam.

The adjuster, or the ring spanner:

a) does not turn,
b) turns only upon initial application,
c) turns forward and back again upon each application,

the adjustment is not correct and the brake caliper must be replaced.

5 Check the brake caliper guide system

– every 6 months –
(e.g. within the scope of the statutory checks)

– quarterly in use outside Europe –

Prevent the vehicle from rolling away. Release the service brakes and the handbrake.

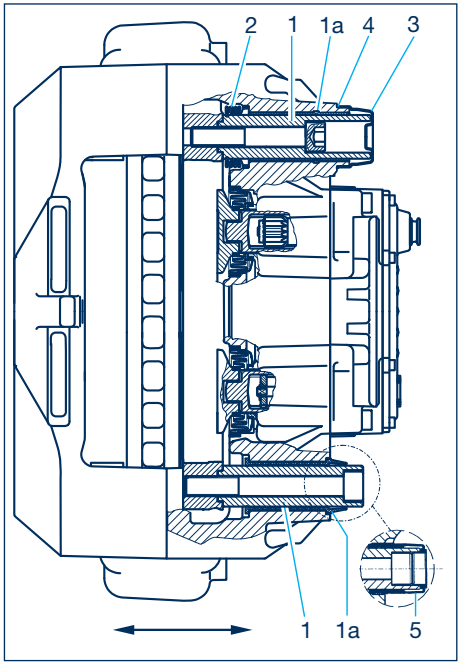
Apply considerable pressure to the sliding caliper in the direction of the guide bearing. It should be possible to move it by about 0.5 to 1 mm (play). Check the brake caliper guide if this is not the case.

SB 3745 / SB 4309 / SB 4345

The guide bush (1a) is sealed by the bellows (2) and the sheet metal cap (3) with the sealing ring (4).

Parts (2) and (3) must not be split or damaged in any way. Check for correct fitting.

If the version has a guide sleeve (5), check it for damage and to make sure it is correctly seated.



SB 3308

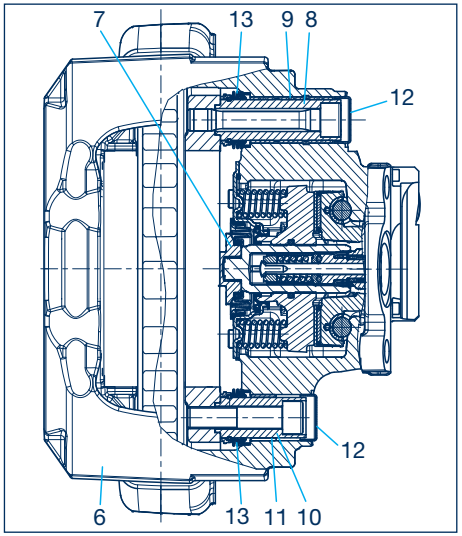
Ability of the caliper to slide to the full extent of the caliper guides:

Remove the brake pads. Fully retract the pressure pad (7) by turning the adjuster in an anti-clockwise direction, using an adapter.

It must be possible to slide the brake caliper (6) by hand over the entire distance of more than 20 mm on the guide pieces (8) and (9) as well as (10) and (11), without using any tools.

Check caliper guide seals:

The guide bushes (8) and (10) are sealed by means of the bellows pieces (12) and (13). These parts must not show any cracks or damage. Check that everything is properly seated.



3.2. Maintenance Work and Visual Inspection

3.2.4. Disc brakes, brake types SB 3308, SB 3745, SB 4309, SB 4345

6 Bellows at the thrust pieces

– ECO Plus 2 and ECO^{Plus} axles, when used within Europe, at every brake pad change or every year at the latest; every six months outside Europe –

– ECO axles and axles with conventional mounting, every six months –

Prevent the vehicle from rolling away.
Release the service brakes and the hand-brake.

Remove the brake pads, if necessary.

The service brake and the spring-loaded parking brake must be in the released state.

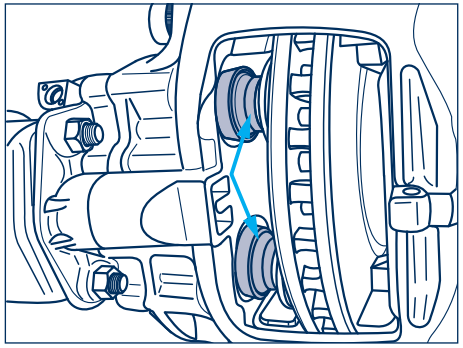
Use the adjuster to extend the pressure pad,
SB 3745 / SB 4309 / SB 4345 max. 30 mm,
SB 3308 max. 40 mm,
until the bellows seal is clearly visible.

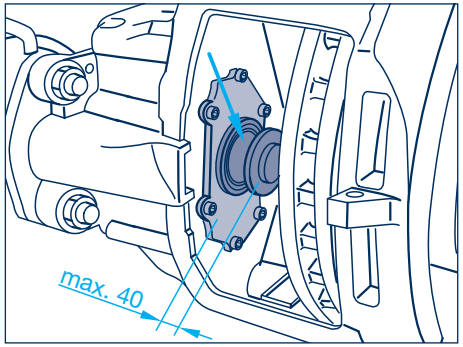
The bellows on the tappets (arrow) must have no splits or damage.

Check for correct fitting.

Note: Penetrating dirt and moisture cause corrosion and affect the operation of the clamping mechanism and adjustment.

If water has penetrated or rusting has been detected, replace the brake caliper.





SB 3308

7 Check the caliper

– ECO Plus 2 and ECOPlus axles, when used within Europe, at every brake pad change or every year at the latest; every six months outside Europe –

– ECO axles and axles with conventional mounting, every six months –

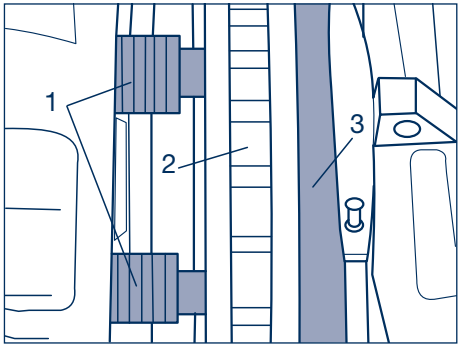
If damage to the parts becomes visible on the thrust tappet when the bellows are checked, both bellows must be dismantled. The parts which have been removed must be replaced by new ones.

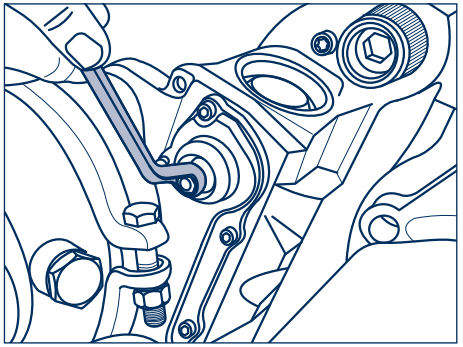
Before the new parts are fitted, check that the adjusting unit is free of corrosion and operates smoothly.

To check the parts, turn the threaded tubes (1) (SB 3308 a threaded pipe) on the hexagon nut (size 8 or size 10 with an adapter) of the adjuster clockwise onto the brake disc (2).

The threads of the threaded tubes (1) can be checked during the turning process for corrosion damage.

If the threads are rusted, the brake caliper must be replaced.

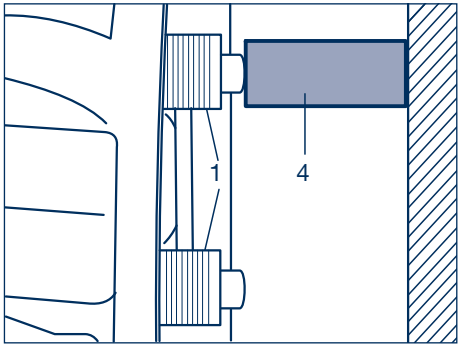




☞ Note:
To prevent the threaded tubes (1) from being turned completely out of the caliper, insert a new brake pad (3) into the caliper in the outboard brake pad position.

☞ To prevent the threaded tubes from being wound completely out of the caliper when working on a work bench, insert a separator (approx. 75 mm, in the case of SB 3308, approx. 60 mm) between the tubes and the caliper housing.

If the threaded tubes are wound completely out of the caliper, the brake caliper must be replaced.



3.2. Maintenance Work and Visual Inspection

3.2.4. Disc brakes, brake types SB 3308, SB 3745, SB 4309, SB 4345

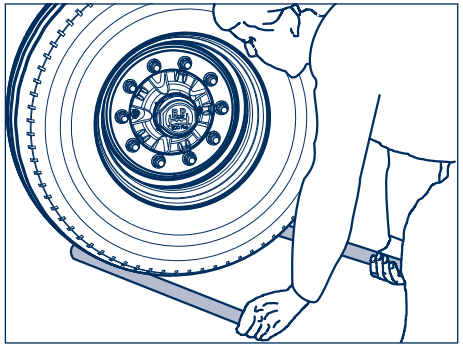
8 Check wheel hub bearing play

– ECO Plus 2 and ECO^{Plus} Unit at every brake pad change, however at least once a year –

– ECO Unit and conventional hub bearing every six months –

To check the wheel hub bearing play, raise the axle until the tyres are free. Release brake. Position lever between tyre and ground, and check play.

If you can feel play in the bearing, adjust the bearing play as described on pages 31 - 35..



9 Check caps for tightness

(not necessary with ECO Plus 2 and ECO^{Plus} axles)

– every 6 months and/ or as part of any other service inspection –

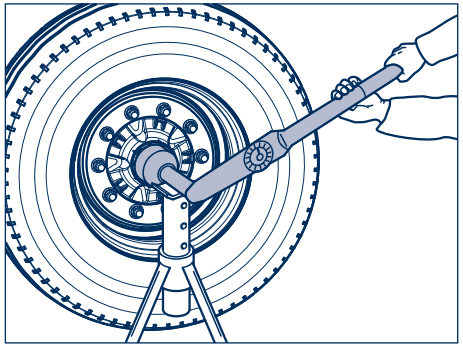
Check caps for tightness using a torque wrench or power tool. Tightening torques:

Steel cap	5.5 t	M = 500 Nm
	6 - 12 t	M = 800 Nm
Alloy cap		M = 350 Nm

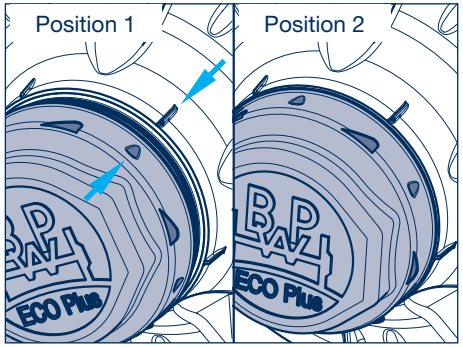
In an emergency the caps can be tightened using a normal cap spanner (vehicle tool kit) by striking the latter with a hammer, or also with the aid of a piece of tubing, inserted into the spanner.

Caps with integrated hubodometers must be fitted and dismantled using only torque controlled (not impact!) airguns or manually with a torque wrench.

Tighten to the correct tightening torque as soon as possible.



☞ Caps on ECO Plus 2 axles are provided with a bayonet fitting. Check for firm seating.



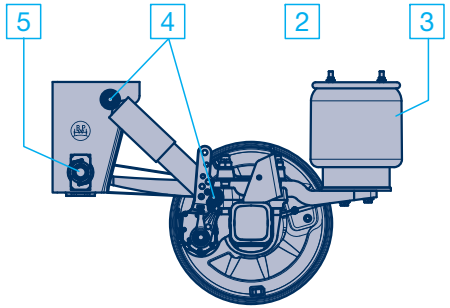
Position 1: Hub cap seated loosely on the Unit.

Position 2: Hub cap seated firmly on the Unit.

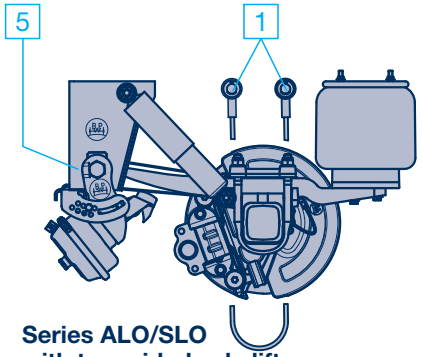
4.1. Overview
Lubrication and Maintenance Work, Visual Inspection

Overview For detailed description, see pages 62 - 74 Air suspension series EAC see pages 76 - 83 Suspension, see pages 84 - 93	Within 2 weeks of first journey under load, latest after 2000 km. [1]	Visual checks during the warranty period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months.	Annually [2]
(1) Grease stabilizer bearing bushes with BPW special longlife grease ECO-Li^{Plus} and check for wear.	○		○ [3]
- Visual inspection, check all component parts and welding seams for damage and wear.		☐	☐ [3]
1 Check strap: Check condition and fastening.		☐	☐
2 Check air suspension level valves for condition, seal-tightness and general tightness.		☐	☐
3 Check condition of air bags.		☐	☐
4 Check shock absorber fastening for tightness. Tightening torque with a torque wrench: M 20 (SW 30) M = **320 Nm** (300 - 350 Nm) M 24 (SW 36) M = **420 Nm** (390 - 460 Nm) For aluminium hanger brackets: M 24 (SW 36) M = **320 Nm** (300 - 350 Nm)	☐	☐	☐
5 Check spring pivot bolts for tightness. Tightening torque with a torque wrench: Hanger brackets and channel crossmember Airlight II from 09/2007: M 24 (SW 36) M = **650 Nm** (605 - 715 Nm) Hanger brackets from 8/2001: M 30 (SW 46) M = **900 Nm** (840 - 990 Nm) Hanger brackets up to 7/2001: M 30 (SW 46) M = **750 Nm** (700 - 825 Nm) Channel crossmember: M 30 (SW 46) M = **900 Nm** (840 - 990 Nm)	☐	☐	☐

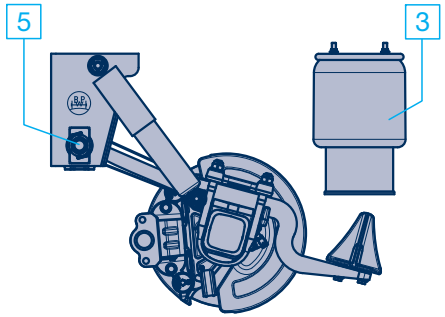
[1] ECO Plus Units with Airlight II and Airlight Direct air suspension are maintenance-free in On-Road applications and do not need to be retightened (see warranty documents ECO Plus).
[2] Under extreme conditions, with more frequency.
[3] Check twice annually.



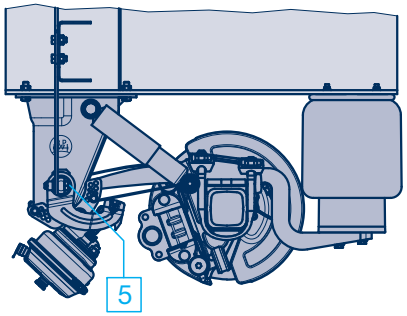
Series ALO/SLO



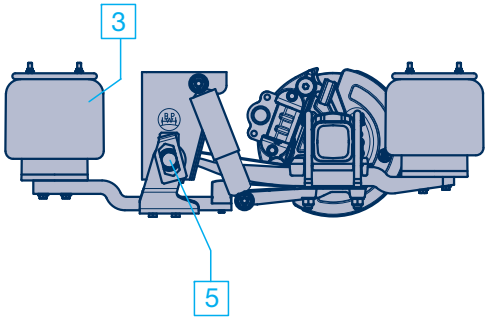
Series ALO/SLO with two-sided axle lift



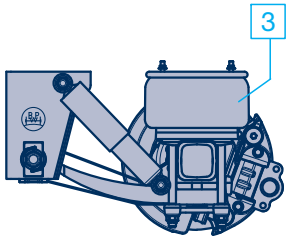
Series ALM/SLM with Kombi-Air Bag II



Series ALM/SLM with bolted-on air suspension hanger bracket



Series ALU/SLU with sidewise mounted axle lift



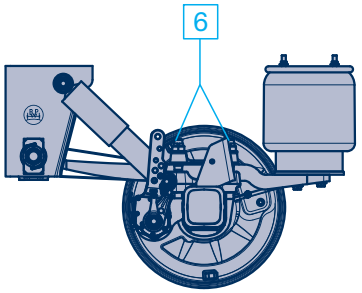
Series DLU - Airlight Direct

4.1. Overview
Lubrication and Maintenance Work, Visual Inspection

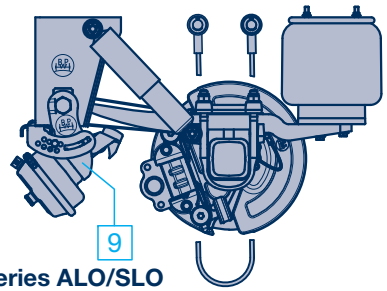
Overview For detailed description, see pages 62 - 74 Air suspension series EAC see pages 76 - 83 Suspension, see pages 84 - 93	Within 2 weeks of first journey under load, latest after 2000 km. [1]	Visual checks during the warranty period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months.	Annually [2]
6 Check spring mounting kit for tightness. Tightening torque with a torque wrench: M 20 (SW 30) M = **340 Nm** (315 - 375 Nm) M 22 (SW 32) M = **550 Nm** (510 - 605 Nm) M 24 (SW 36) M = **650 Nm** (605 - 715 Nm) When mounting new spring mounting kits for Airlight II: M 22 (SW 32) M = 550 Nm + 90° tightening angle	☐	☐	☐
7 Check the bolt connection between the air suspension hanger bracket and the longitudinal member for tightness. Tightening torques with a torque wrench: M 16 M = **260 Nm** (240 - 285 Nm)	☐	☐	☐
8 Tighten the spring bolt to gusset plate connecting bolt. Tightening torques with a torque wrench: M 18 x 1.5 (SW 27) M = **420 Nm** (390 - 460 Nm)	☐	☐	☐
9 Check axle lift for tightness. Tightening torques with a torque wrench: Cylinder M 20 (SW 30) M = 350 - 380 Nm M 16 (SW 24) M = 180 - 210 Nm Supporting arm M 16 (SW 22) M = 230 Nm Hexagon screw M 12 (SW 17) M = 75 Nm	☐	☐	☐

[1] ECO Plus Units with Airlight II and Airlight Direct air suspension are maintenance-free in On-Road applications and do not need to be retightened (see warranty documents ECO Plus).

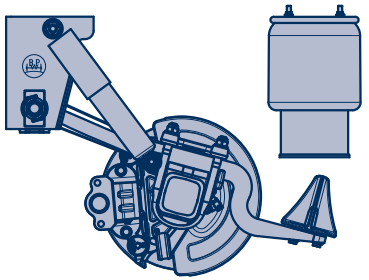
[2] Under extreme conditions, with more frequency.



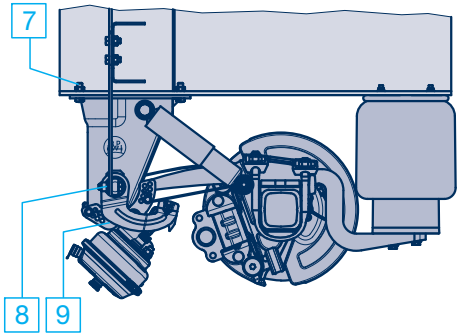
Series ALO/SLO



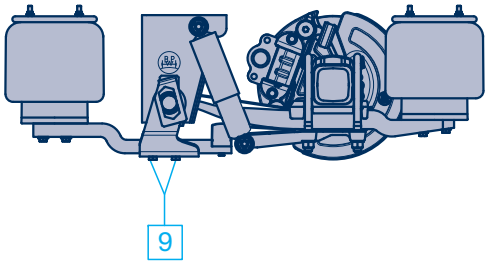
Series ALO/SLO with two-sided axle lift



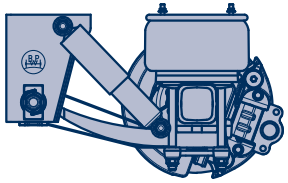
Series ALM/SLM with Kombi-Air Bag II



Series ALM/SLM with bolted-on air suspension hanger bracket and screw-on double-sided lift



Series ALU/SLU with sidewise mounted axle lift



Series DLU - Airlight Direct

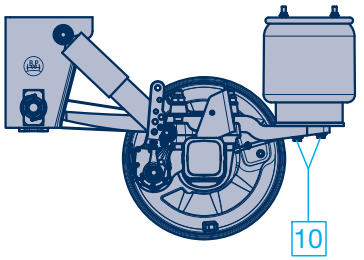
4.1. Overview
Lubrication and Maintenance Work, Visual Inspection

Overview For detailed description, see pages 62 - 74 Air suspension series EAC see pages 76 - 83 Suspension, see pages 84 - 93	Within 2 weeks of first journey under load, latest after 2000 km. [1]	Visual checks during the warranty period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months.	Annually [2]
10 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 - 300 Nm Lower attachment - centre screw M 16 (SW 22) M = 300 Nm	☐	☐	☐
11 Check stabilizer fastenings. Tightening torques with a torque wrench: M 10 (SW 17) M = 53 Nm M 30 (SW 46) M = **750 Nm** (700 - 825 Nm)	☐	☐	☐

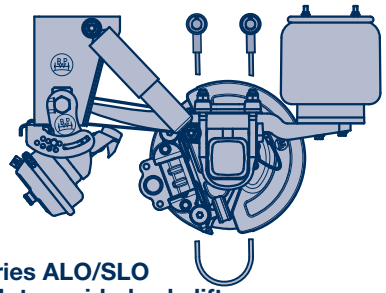
[1] ECO Plus Units with Airlight II and Airlight Direct air suspension are maintenance-free in On-Road applications and do not need to be retightened (see warranty documents ECO Plus).

[2] Under extreme conditions, with more frequency.

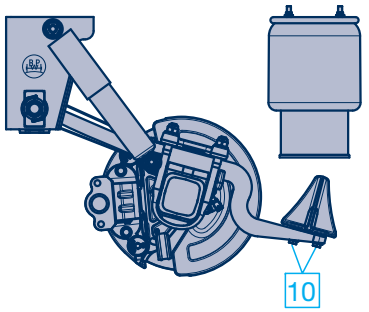
Note:
Components that have damages due to improper mounting are to be exchanged after a review by a BPW Service Centre.



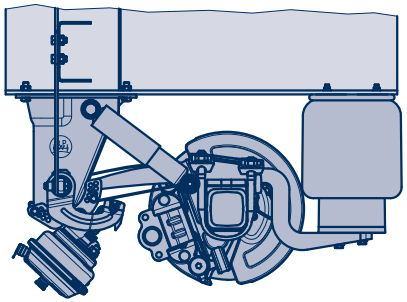
Series ALO/SLO



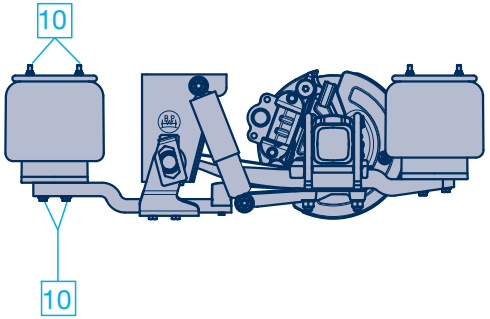
Series ALO/SLO with two-sided axle lift



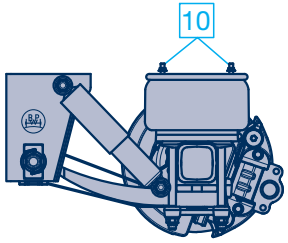
Series ALM/SLM with Kombi-Air Bag II



Series ALM/SLM with bolted-on air suspension hanger bracket



Series ALU/SLU with sidewise mounted axle lift



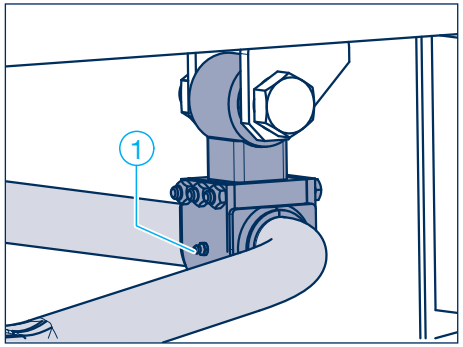
Series DLU - Airlight Direct

4.2. Lubrication
4.3. Maintenance Work and Visual Inspection

① Stabilizer bearing bushes

– Service intervals as shown on page 60 –

Grease stabilizer bearing bushes with BPW special longlife grease ECO-Li^{Plus} and check for wear.



- Visual inspection

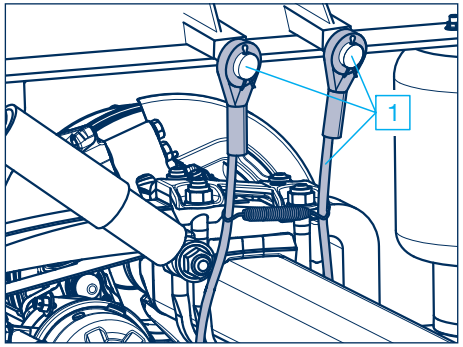
– Service intervals as shown on page 60 –

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

1 Check straps

– Service intervals as shown on page 60 –

Examine check straps and attachment. Replace if necessary.

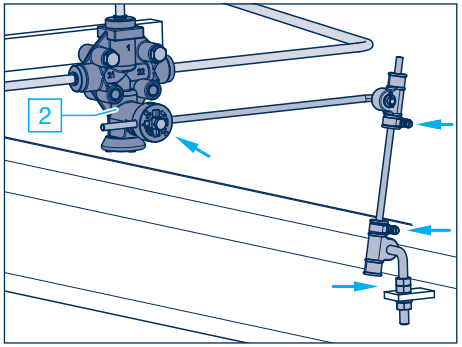


2 Air installation circuit

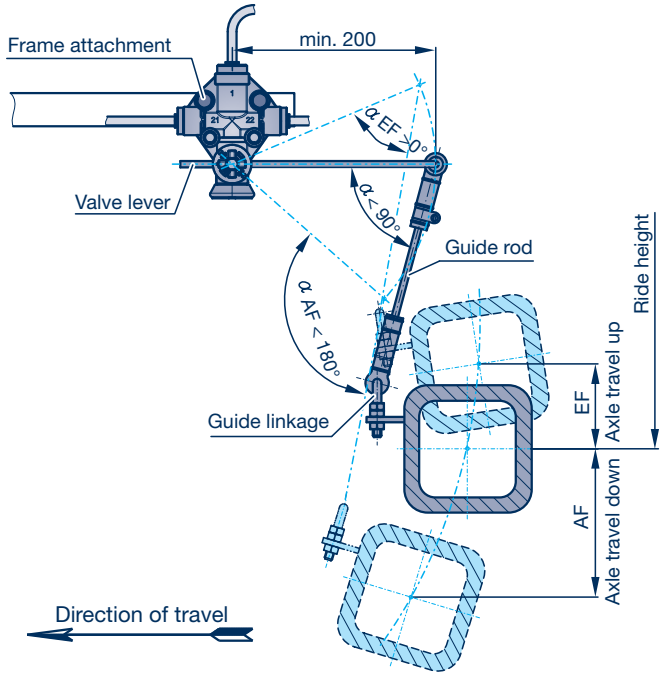
– Service intervals as shown on page 60 –

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 below.



Air suspension valve

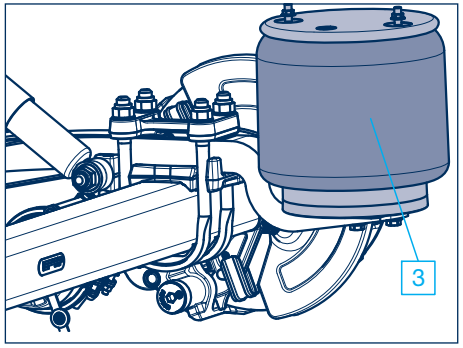


4.3. Maintenance Work and Visual Inspection

3 Air bags

– Service intervals as shown on page 60 –

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



⚠ Safety notice

No welding should be carried out on steel parts of air bags and pressure vessel!

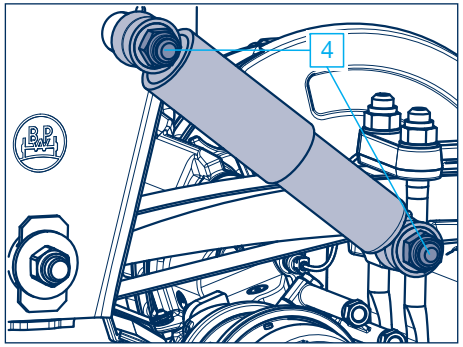
The air suspension should only be filled with compressed air when mounted.
Danger of injury!

4 Shock absorber fastening

– Service intervals as shown on page 60 –

Check lower and upper shock absorber fastening for tightness.
Tightening torques with a torque wrench:

M 20 (SW 30) M = **320 Nm** (300 - 350 Nm)
M 24 (SW 36) M = **420 Nm** (390 - 460 Nm)
In the case of alloy hanger brackets:
M 24 (SW 36) M = **320 Nm** (300 - 350 Nm)

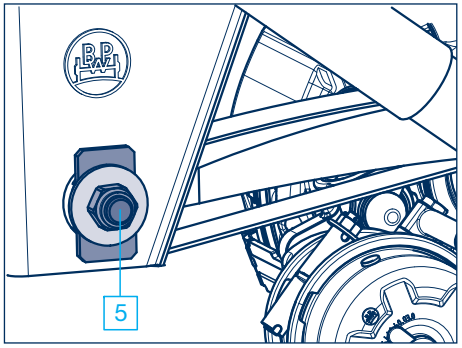


5 Spring pivot bolts

– Service intervals as shown on page 60 –

Check bushes, move vehicle back and forth slightly with the brake applied, or move rolled spring ends with the aid of a lever. No play should be present in the rolled spring end when doing so. If the fastening is loose the spring pivot bolt may be damaged.

- Check the lateral wear washers in the hanger bracket.
- Check the M 24 or M 30 lock nut on the spring pivot bolt for tightness.



Tightening torque with a torque wrench:

Air suspension hanger brackets and channel crossmember from 09/2007:
M 24 (SW 36) **M = 650 Nm** (605 - 715 Nm)

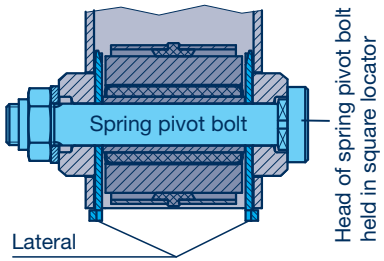
Hanger brackets from 08/2001:
M 30 (SW 46) **M = 900 Nm** (840 - 990 Nm)

Hanger brackets up to 07/2001:
M 30 (SW 46) **M = 750 Nm** (700 - 825 Nm)

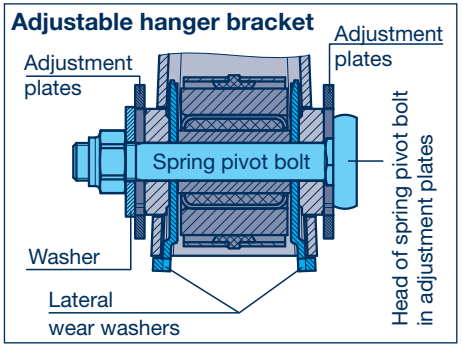
Channel crossmember:
M 30 (SW 46) **M = 900 Nm** (840 - 990 Nm)

The serviceable life of the rubber / steel bush is dependent on the tightness of the inner steel bushing.

Non-adjustable hanger bracket



Adjustable hanger bracket



4.3. Maintenance Work and Visual Inspection

6 Spring mounting kit

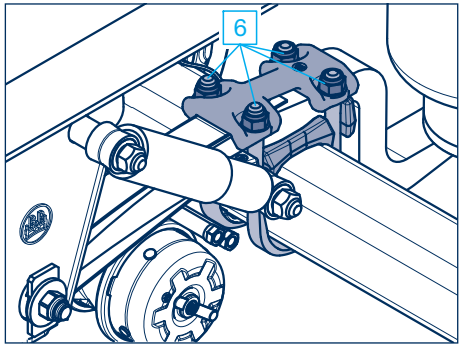
– Service intervals as shown on page 62 –

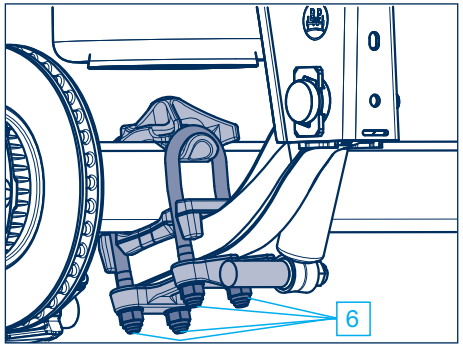
Check lock nuts of spring U-bolts for tightness. If loose, tighten nuts alternately a little at a time.

Tightening torques with a torque wrench:
M 20 (SW 30) M = **340 Nm** (315 - 375 Nm)
M 22 (SW 32) M = **550 Nm** (510 - 605 Nm)
M 24 (SW 36) M = **650 Nm** (605 - 715 Nm)

When mounting new spring mounting kit components for Airlight II, tighten the M 22 locknuts to a tightening torque of:
M = 550 Nm + 90° angle tightening.

☞ Note: No welding should be performed on the trailing arm spring!



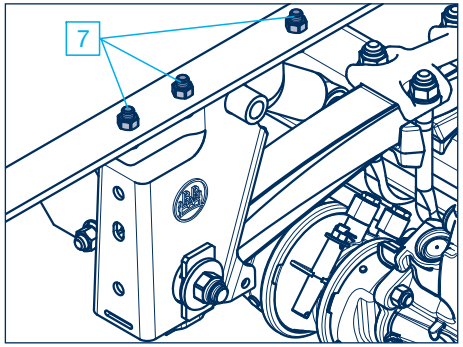


7 Bolted connection, air suspension hanger bracket to longitudinal chassis beam

– Service intervals as shown on page 62 –

Check that the mounting bolts of the air suspension hanger bracket on the longitudinal member are firmly tightened. Tighten with a torque wrench if necessary. Tightening torque:

M 16 M = **260 Nm** (240 - 285 Nm)

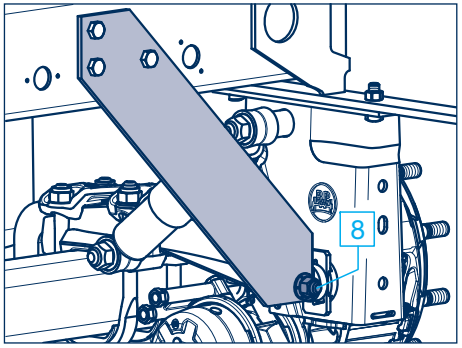


8 Bolted connection, gusset plate spring bolts

– Service intervals as shown on page 62 –

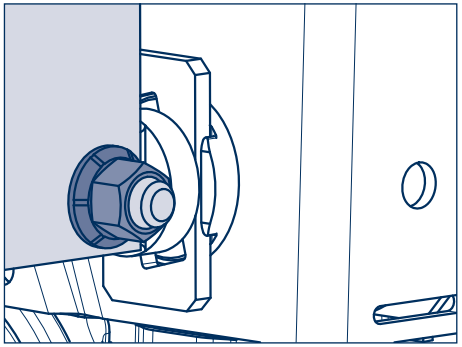
Check the mounting bolts of the gusset plates on the spring bolts are firmly tightened, and retighten with a torque wrench if necessary.

Tightening torque: M18 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 crossmember 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.



4.3. Maintenance Work and Visual Inspection

9 Axle lift

– Service intervals as shown on page 62 –

Single-sided lift:

Check the M16 lock nuts on the lever arm fixing to make sure they are tight. Tighten with a torque wrench if necessary.
Tightening torque:

M 16 (SW 22) M = 230 Nm

Check for wear on the bump stop on the lever arm. Make sure it is secure.
Tightening torque:

M 10 (SW 17) M = 25 Nm
M 12 (SW 17) M = 66 Nm

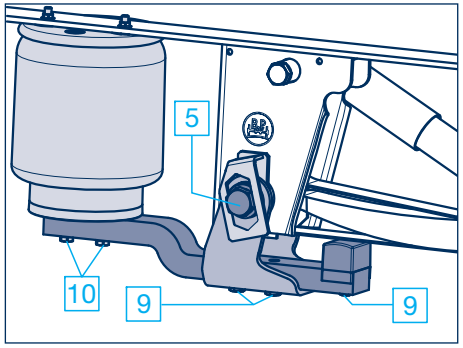
Two-sided lift:

a) Check the M 16 lock nuts on the diaphragm cylinder to make sure they are tight. Tighten with a torque wrench if necessary. Tightening torque:
M 20 (SW 30) M = 350 - 380 Nm
M 16 (SW 24) M = 180 - 210 Nm

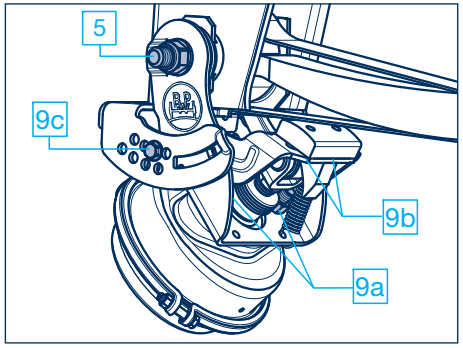
b) Check the bump stop on the lever arm for wear, and that the M 6 attachment bolts are firmly tightened.

c) Check that the attachment bolts of the front bracing strut of the mount on the air suspension hanger bracket are tight, and in the case of the bolt-on two-sided lift, the bolted connection on the air suspension hanger bracket.
Tightening torque:

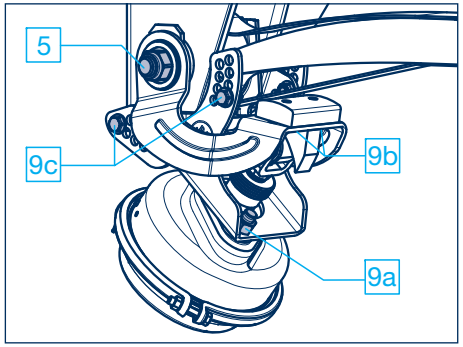
M 12 (SW 17) M = 75 Nm



Single-sided lift



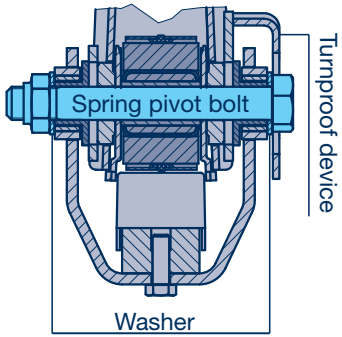
Two-sided lift



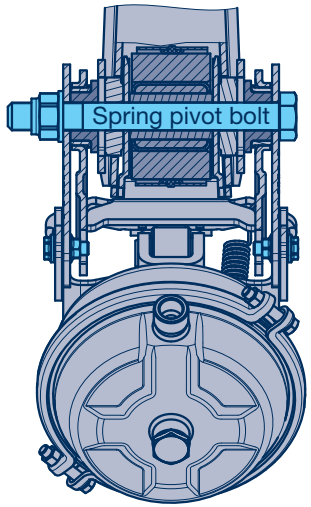
Bolt-on double-sided lift

Spring pivot bolt bearing with axle lift

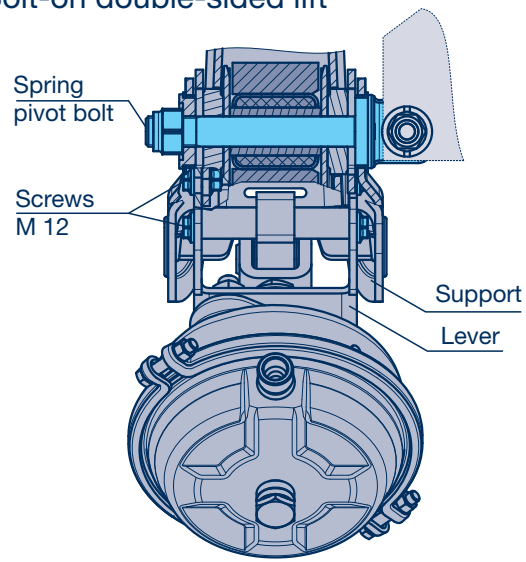
Single-sided lift



Two-sided lift



Bolt-on double-sided lift



4.3. Maintenance Work and Visual Inspection

10 **Air bag fastenings**

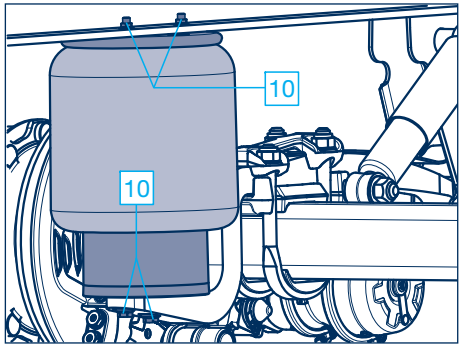
– Service intervals as shown on page 64 –

Check air bag fixing bolts or nuts for tightness.

Tightening torques with a torque wrench:

M 12 (SW 17) M = 66 Nm
M 16 (SW 22) M = 230 - 300 Nm

Lower attachment - centre screw
M 16 (SW 22) M = 300 Nm

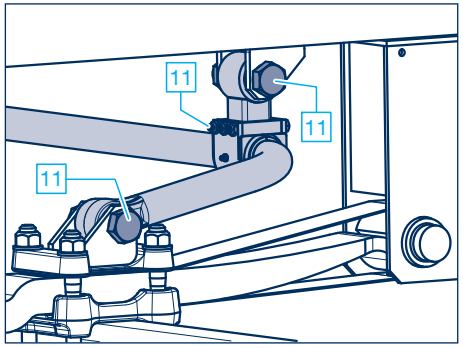


11 **Stabilizer**

– Service intervals as shown on page 64 –

Check stabilizer bearings for wear and tightness. Tightening torques with a torque wrench:

M 10 (SW 17) M = 53 Nm
M 30 (SW 46) M = **750 Nm** (700 - 825 Nm)

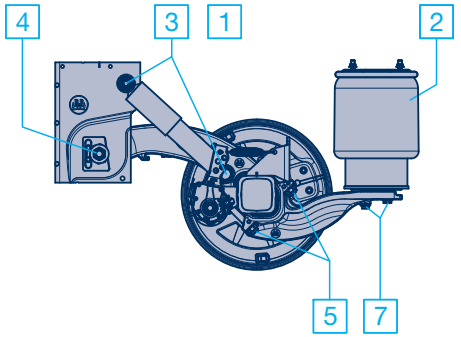


BPW-W 33111201e

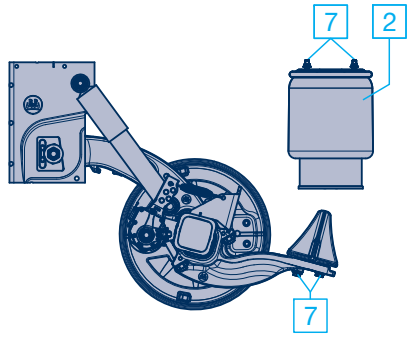
5.1. Overview
Maintenance Work and Visual Inspection

Overview For detailed description, see pages 78 - 83 Air suspension series O, SL, AL see pages 60 - 74 Suspension, see pages 84 - 93	Visual checks during the warranty period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months, subsequently yearly
1 Check air suspension level valves for condition, seal-tightness and general tightness.	☐
2 Check condition of air bags.	☐
- 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 = **530 Nm** (495 - 585 Nm)	☐
4 Check spring pivot bolts for tightness. Tightening torque with a torque wrench: M 24 (SW 36) M = **650 Nm** (605 - 715 Nm)	☐
5 Check axle clamping for tightness. Tightening torque with a torque wrench: M 20 (SW 30) M = **420 Nm**	☐
6 Tighten the spring bolt to gusset plate connecting bolt. Tightening torques with a torque wrench: M 18 x 1.5 (SW 27) M = **420 Nm** (390 - 460 Nm)	☐
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 - 300 Nm Centre screw M 16 (SW 22) M = 300 Nm	☐
8 Check axle lift for tightness. Tightening torques with a torque wrench: Supporting arm M 20 (SW 30) M = **350 Nm** (325 - 385 Nm) Cylinder M 16 (SW 24) M = 180 - 210 Nm Hexagon screw M 12 (SW 17) M = 75 Nm Cylinder cap screw M 10 (SW 8) M = 50 Nm	☐

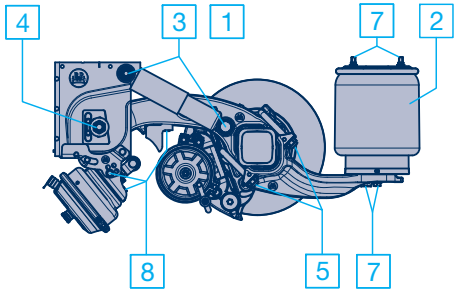
Note: Components that have damages due to improper mounting are to be exchanged after a review by a BPW Service Centre.



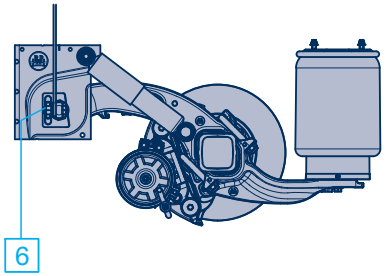
Serie ACBO



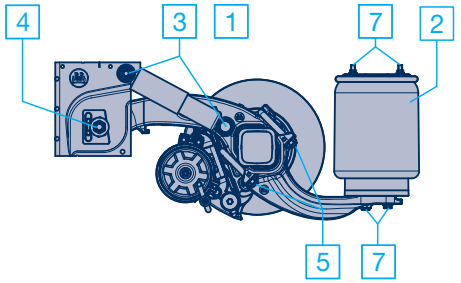
Serie ACBO with Kombi-Air Bag II



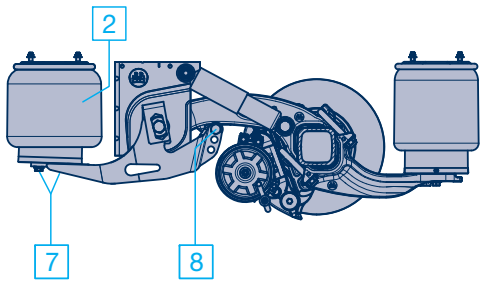
Series ACAM / ACBM with two-sided axle lift



Serie ACBM with screwed-on gusset plate



Series ACAU



Serie ACAM with sidewise mounted axle lift

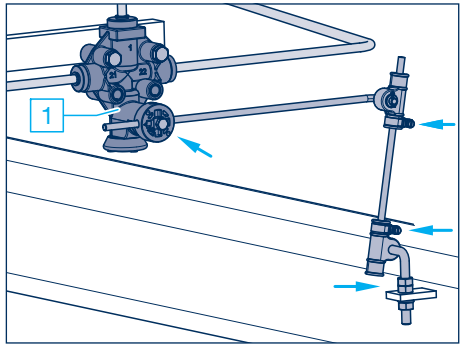
5.2. Maintenance Work and Visual Inspection

1 Air installation circuit

– Service intervals as shown on page 76 –

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

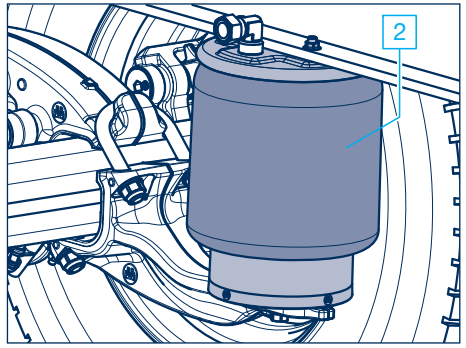
The length of the valve lever and permissible angular positions for the valve linkage are shown in the illustration below.



2 Air bags

– Service intervals as shown on page 76 –

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

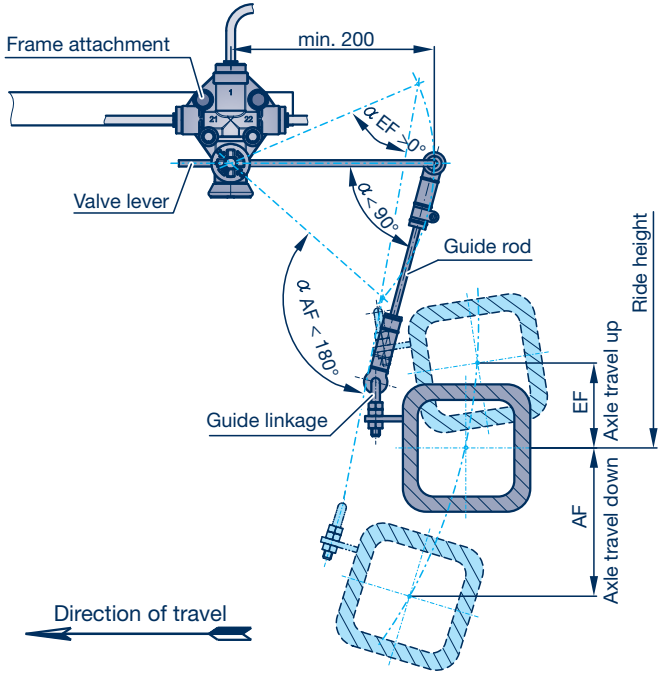


⚠ Safety notice

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.
Danger of injury!

Air suspension valve



- Visual inspection

– Service intervals as shown on page 76 –

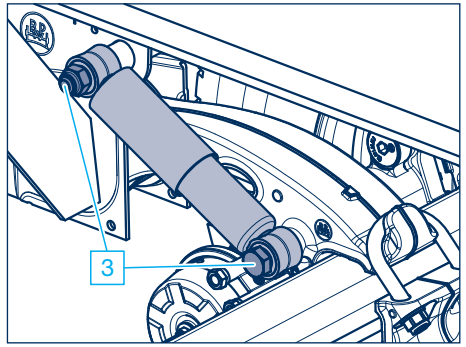
Check all component parts and welding seams for wear and damage.

3 Shock absorber fastening

– Service intervals as shown on page 76 –

Check lower and upper shock absorber fastening for tightness.
Tightening torques with a torque wrench:

M 24 (SW 36) M = **530 Nm** (495 - 585 Nm)



5.2. Maintenance Work and Visual Inspection

4 Spring pivot bolts

– Service intervals as shown on page 76 –

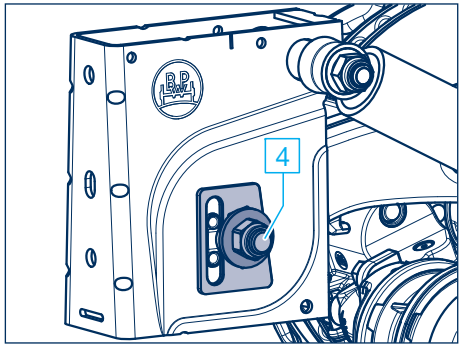
Check bushes, move vehicle back and forth slightly with the brake applied, or move rolled spring ends with the aid of a lever. No play should be present in the rolled spring end when doing so. If the fastening is loose the spring pivot bolt may be damaged.

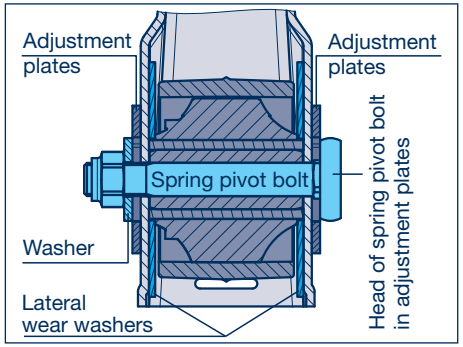
- Check the lateral wear washers in the hanger bracket.
- Check the M 24 lock nut on the spring pivot bolt for tightness.

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 tight seating of the inner bush.





5 Axle clamping

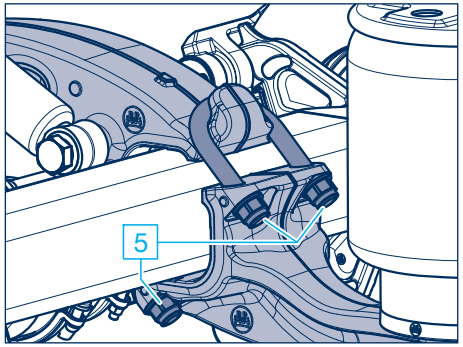
– Service intervals as shown on page 76 –

Check lock nuts of spring U-bolts for tightness. If loose, tighten nuts alternately a little at a time.

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 tightening torque of:
M = **420 Nm** + 90° angle tightening.

☞ Note: Do not weld on the trailing arms and the bellows support!

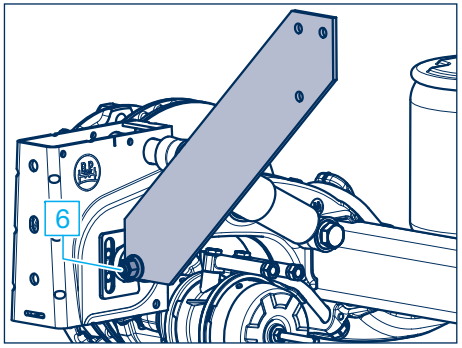


6 Bolted connection, gusset plate spring bolts

– Service intervals as shown on page 62 –

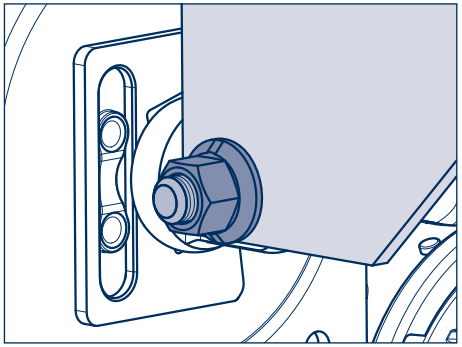
Check the mounting bolts of the gusset plates on the spring bolts are firmly tightened, and retighten with a torque wrench if necessary.

Tightening torque:
M 18 (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 crossmember 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 64 –

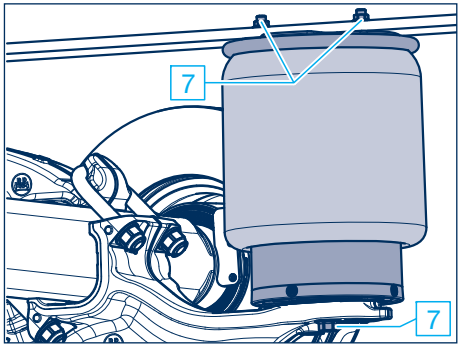
Check air bag fixing bolts or nuts for tightness.

Tightening torques with a torque wrench:

M 12 (SW 17)	M = 66 Nm
M 16 (SW 22)	M = 200 - 230 Nm

Lower attachment - centre screw:

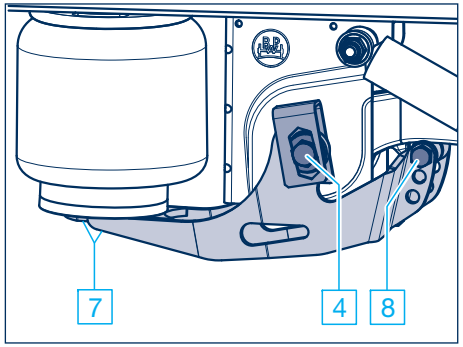
M 16 (SW 22)	M = 300 Nm



5.2. Maintenance Work and Visual Inspection

8 **Axle lift**

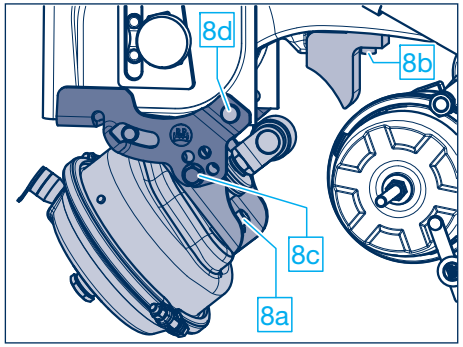
– Service intervals as shown on page 76 –



Sidewise 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 (SW 30) M = **350 Nm** (325 - 385 Nm)



Two-sided lift:

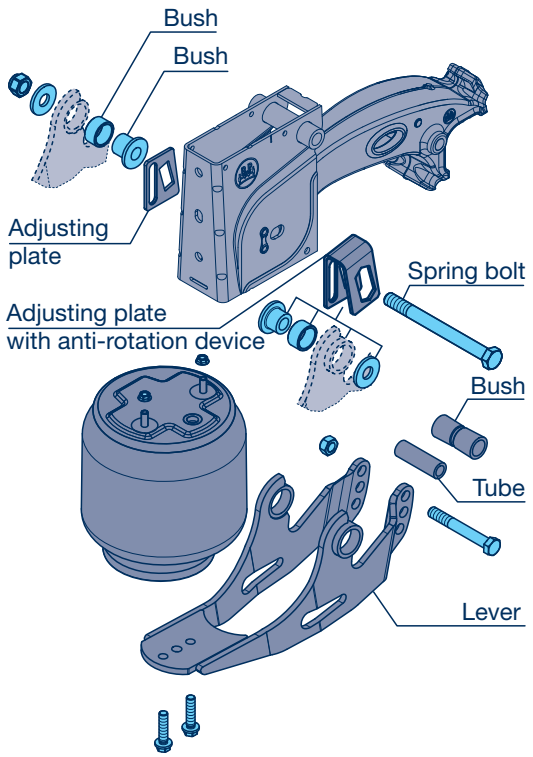
a) Check the M 16 lock nuts on the diaphragm cylinder to make sure they are tight. Tighten with a torque wrench if necessary. Tightening torque:
M 16 (SW 24) M = 180 - 210 Nm

b) Check for tight seating of the bump stop fixing screws on the trailing arms. Tightening torque:
M 10 (SW 8) M = 50 Nm

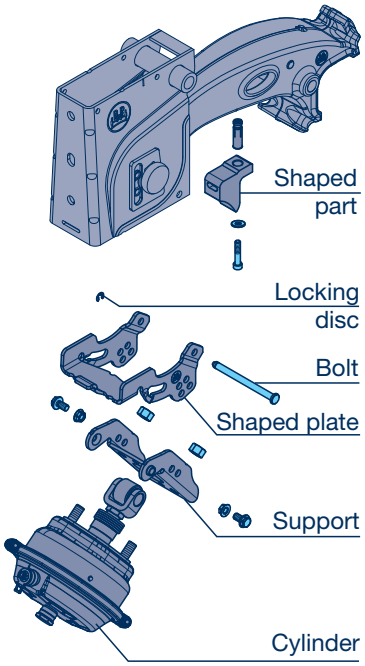
c) Check for tight seating of the bracket fixing screws on the shaped plate. Tightening torque:
M 12 (SW 17) M = 75 Nm

d) Check for the correct seating of the bolt circlip on the rear attachment support of the air suspension hanger brackets. If loose seating mount new bolt and lock.

Sidewise mounted axle lift



Two-sided lift

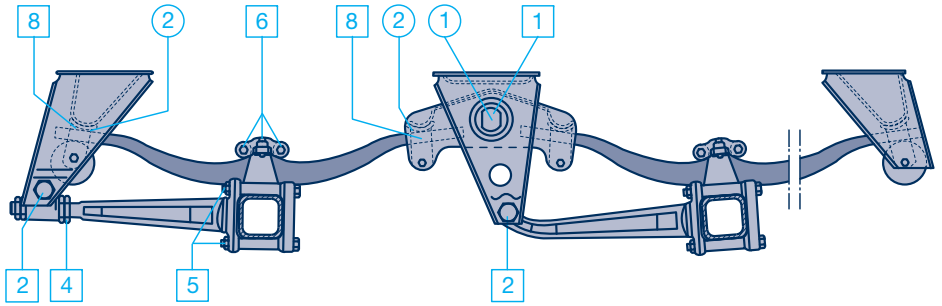


6.1. Overview
Lubrication and Maintenance Work, Visual Inspection

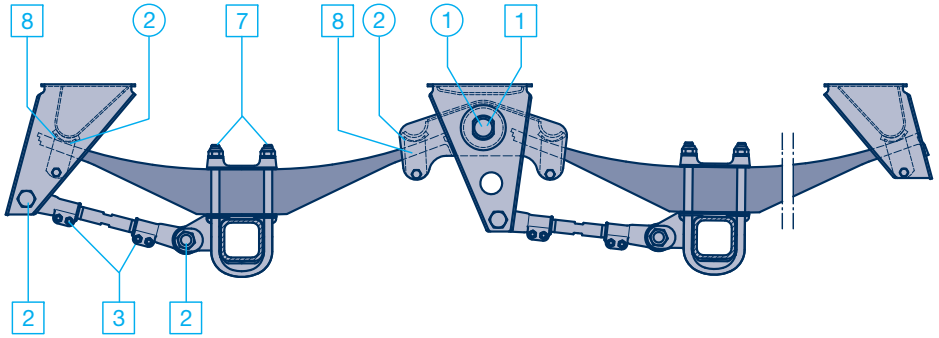
Overview For detailed descriptions, see pages 68 - 89 For BPW trailer axles / steering axles, see pages 6 - 58	Initially after 2 weeks	Every 6 weeks	Every 26 weeks (twice annually) [1]
(1) Grease bearings (suspension type E) with BPW special longlife grease ECO-Li^{Plus}. (Not applicable in the case of rubber/steel bushes.)	◯ [1]	◯ [1]	
(2) Slightly grease the slide elements/slide ends of springs.	◯	◯	
1 Check threaded bolts on floating arm bearings for tightness. VG M 24 M = 325 Nm VA / VB VA / VB up to an axle load of 12 tonnes M 42 x 3 M = 1100 Nm VA / VB from an axle load of 13 tonnes M 42 x 3 M = 1700 Nm			☐
2 Check axle guide linkage screws for tightness using a torque wrench. M 24 (VG) M = 325 Nm M 30 M = 725 Nm M 36 M = 1425 Nm	☐		☐
3 Check connecting rod clamping screws for tightness. M 12-8.8 M = 66 Nm M 14-8.8 M = 140 Nm			☐
4 Check axle guide linkage nuts for tightness. See point 4 on page 87.	☐		☐
5 Check axle fastening screws for tightness using a torque wrench. Lock nut M 20 M = 400 Nm Castellated nut M 22 M = 320 Nm Lock nut M 24 M = 570 Nm Check rubber plates for wear.	☐		☐
6 Check spring shackles for tightness M 14-10.9 M = 195 Nm M 16- 8.8 M = 163 Nm (rubber roller) M 14- 8.8 M = 140 Nm	☐		☐
7 Check spring U-bolts for tightness using a torque wrench. M 24 M = 600 - 650 Nm	☐		☐
- Visual inspection, check all component parts and welding seams for wear and damage.			☐
8 Check slide elements for tightness. M 14-8.8 M = 140 Nm M 20-8.8 M = 320 Nm			☐

[1] **Under extreme conditions, with more frequency.**

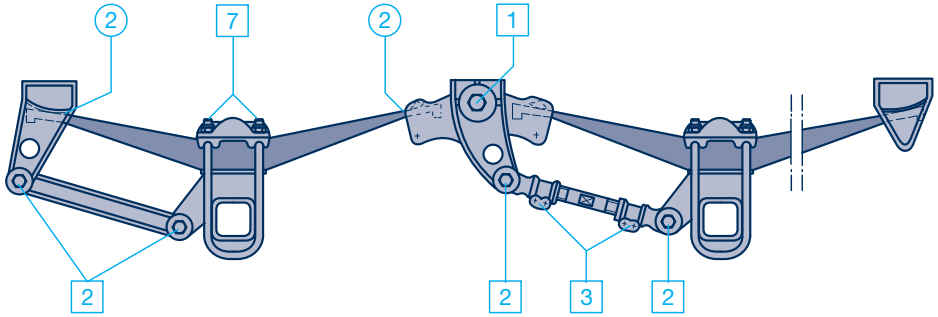
Note: Components that have damages due to improper mounting are to be exchanged after a review by a BPW Service Centre.



Series VA



Series VB



Series VG

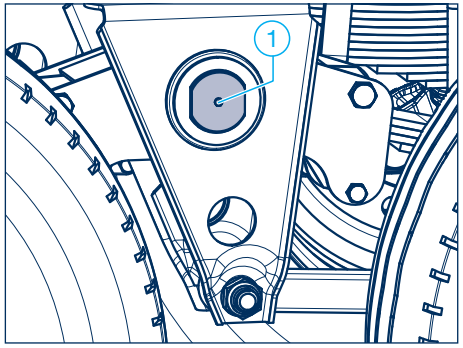
6.2. Lubrication
6.3. Maintenance Work and Visual Inspection

① **Equalizer arm bearings** with bronze bushes (series VA-E, VB-E)

– initially after 2 weeks then every 6 weeks –
– under extreme conditions, lubricate with more frequency –

☞ Lift trailer to take pressure off equalizer arm bearings.

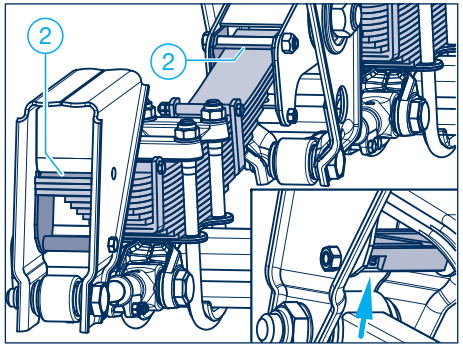
Grease bronze bush bearing via the grease nipple in the heads of the threaded bolts with BPW special longlife grease ECO-Li^{Plus} until fresh grease emerges. (Not applicable to rubber/steel bushes.)



② **Slide elements**

– initially after 2 weeks then every 6 weeks –
– under extreme conditions, lubricate with more frequency –

In the case of VB suspensions with anti-vibration leaf underneath the parabolic springs, grease the lower slide elements via the grease nipples.



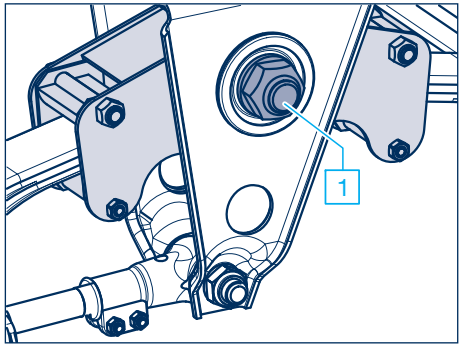
1 **Equalizer arm bearings**

– twice annually –

Check nuts on the equalizer arm bearings for tightness. The serviceable life of the rubber/steel bush bearings is dependent on the tightness of the inner steel bush.

Tightening torques:

VG	M 24	M = 325 Nm
VA/VB	up to an axle load of 12 tonnes	
	M 42 x 3	M = 1100 Nm
VA/VB	from an axle load of 13 tonnes	
	M 42 x 3	M = 1700 Nm

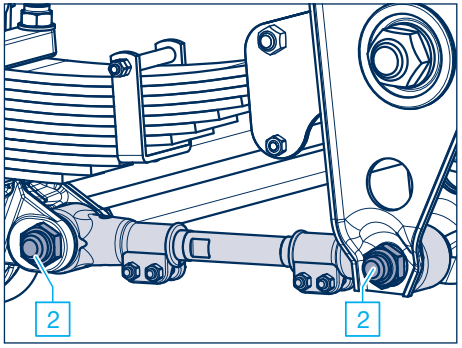


2 **Axle guide linkages**

– twice annually, initially after 2 weeks –

Check lock nuts of the axle guide linkages/ connecting rods for tightness using a torque wrench. Tightening torques:

VG	M 24	M= 325 Nm
VA/VB	M 30	M = 725 Nm
VA/VB	M 36	M = 1425 Nm

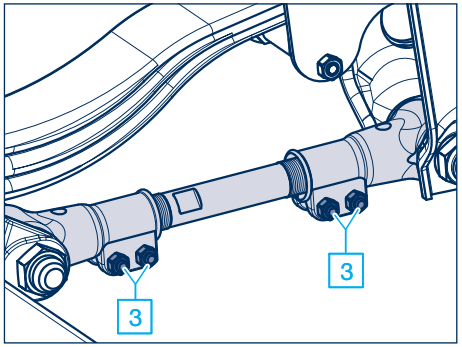


3 **Connecting rods**

– twice annually –

Check connecting rod clamping screws for tightness. Tightening torques:

M 12-8.8	M = 66 Nm
M 14-8.8	M = 140 Nm

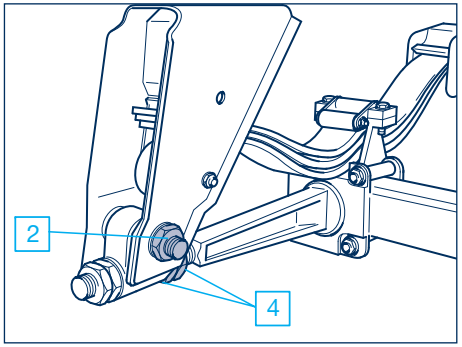


4 **Axle guide linkages (VA)**

– twice annually, initially after 2 weeks –

In the case of horizontal play in the axle guide linkages: loosen rear nut locking plate or lock nut. Tighten rear nut (M 42 x 2, M 55 x 1.5, M 70 x 1.5) to tightening torque M = 100 Nm and lock.

In the case of double nuts:
Tighten first nut to 100 Nm, tighten second nut to 1000 Nm, firmly locking both nuts together using two spanners. (The front double nuts (hex. nut M 36 x 2) remain locked at 1000 Nm or locked by means of a lock plate.)



6.3. Maintenance Work and Visual Inspection

5 Axle fastenings (VA)

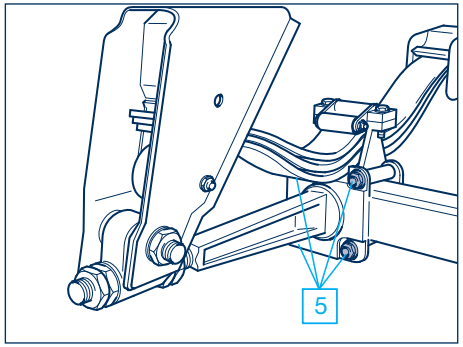
– initially after 2 weeks then twice annually –

Check axle fastening screws for tightness using a torque wrench. Tighten the 4 nuts crosswise, in the case of castle nuts secure again by means of a cotter pin.

Tightening torques:

Lock nut	M 20	M = 400 Nm
Castle nut	M 20	M = 320 Nm
Lock nut	M 24	M = 570 Nm

Check rubber plate between axle shaft and guide linkage for wear. If the rubber plate has visibly worked its way out downwards or upwards, replace the plate.



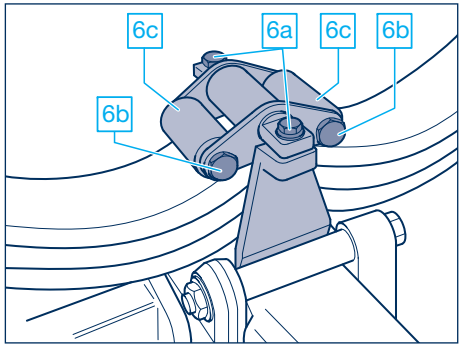
6 Spring shackle (VA)

– initially after 2 weeks then twice annually –

Check fastening screws of the spring shackle for tightness. Tightening torques:

(a)	M 14-10.9	M = 195 Nm
(a)	M 16-8.8	M = 163 Nm
(b)	M 14-8.8	M = 140 Nm (rubber roller)

(c) Check rubber rollers for wear and required pretensioning of at least 1 mm.



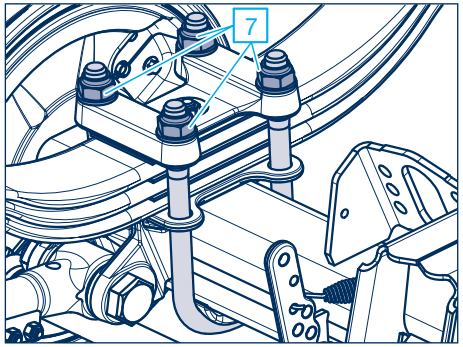
7 Spring U-bolts

– initially after 2 weeks then twice annually –

Check spring U-bolts for tightness. If necessary loosen lock nuts, tighten nuts alternately to the prescribed torque, and a bit at a time, if necessary then re-lock.

Tightening torques:

M 24	M = 600 - 650 Nm



- Visual inspection

– twice annually –

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

In order to check the bearing on the equalizer and axle guide linkage, move the vehicle back and forth slightly with the brake applied; or move the bearing points with the aid of a lever. No play should be present in the bearing when doing so.

8 Slide elements

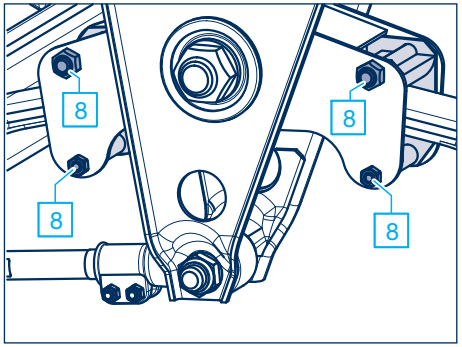
– twice annually –

Check slide elements and lateral wear plates in the shackle and equalizer arm for wear and the fastening screws for tightness.

Tightening torques:

M 14-8.8	M = 140 Nm
M 20-8.8	M = 320 Nm

If necessary, check rubber rollers under the spring ends for wear.

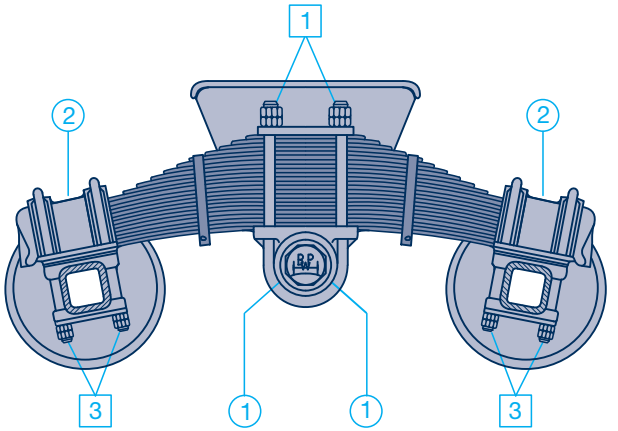


7.1. Overview
Lubrication and Maintenance Work, Visual Inspection

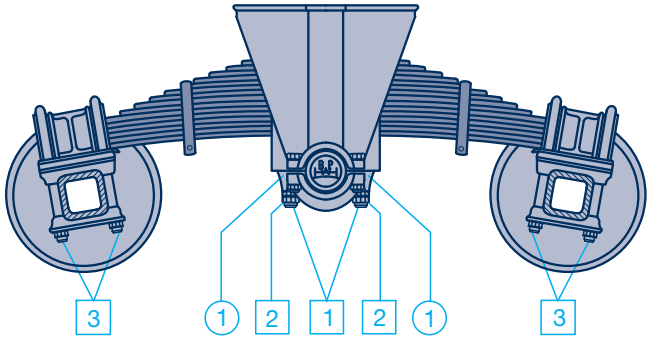
Overview For detailed description, see pages 92 - 93 BPW trailer axles / steering axles, see pages 6 - 58	Initially after 2 weeks	Every 6 weeks	Every 26 weeks (twice annually) [1]
(1) Grease axle support bearing series W, BW using BPW special longlife grease ECO-Li[Plus].	○ [1]	○ [1]	
(2) Grease spring housing series W using BPW special longlife grease ECO-Li[Plus].	○	○	
- Visual inspection, check all component parts and welding seams for wear and damage.			☐
1 Check spring U-bolt of support axle for tightness. M 30 x 2 - 8.8 M = 980 Nm M 36 - 8.8 M = 1555 Nm	☐		☐
2 Check fastening screws on the bearing covers for tightness. M 20-8.8 M = 320 Nm M 24-8.8 M = 570 Nm			☐
3 Check spring U-bolts on the spring housing for tightness. M 20-8.8 M = 320 Nm M 20-10.9 M = 450 Nm M 24-8.8 M = 570 Nm M 24-10.9 M = 700 Nm	☐		☐

[1] **Under extreme conditions, with more frequency.**

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



Series W



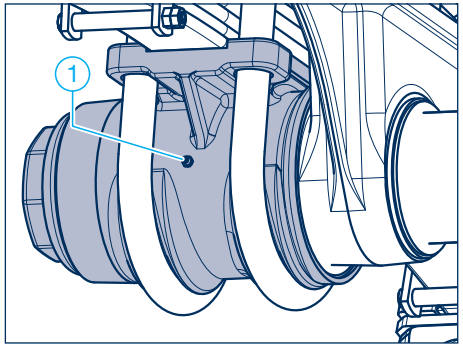
Series BW / GW

7.2. Lubrication

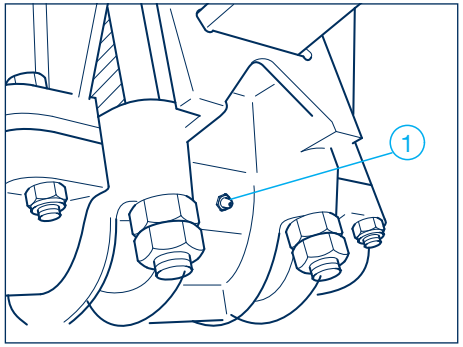
① **Support axle** (series W, BW)

– initially after 2 weeks then every 6 weeks –
– under extreme conditions, lubricate with more frequency –

Lift trailer to take pressure off the bearings. Grease lubrication nipple front and rear on the bearing brackets of the support axle using BPW special longlife grease ECO-Li^{Plus} until fresh grease emerges (not applicable to axle assembly series GW = rubber bush).



Series W

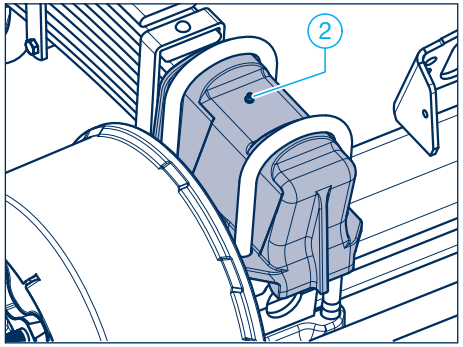


Series BW

② **Spring housing** (series W)

– initially after 2 weeks then every 6 weeks –

Grease lubrication nipples on the spring housing using BPW special longlife grease ECO-Li^{Plus}.



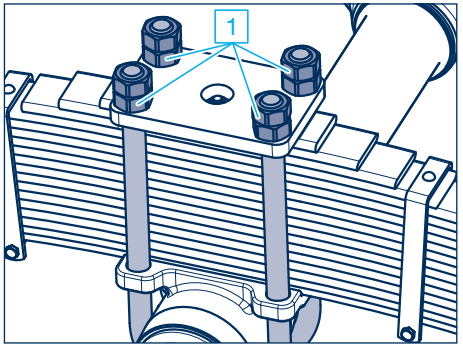
Series W

7.3. Maintenance Work and Visual Inspection

- **Visual inspection**

– twice annually –

Check all components and welding seams for wear and damage.

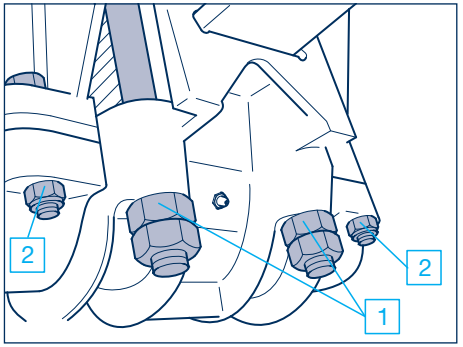


1 **Spring U-bolts on the trunnion axle**

– twice annually, initially after 2 weeks –

Check spring U-bolts for tightness.
If necessary loosen lock nuts, tighten nuts alternately to the prescribed torque, a bit at a time, then relock.
Tightening torques:

M 30 x 2-8.8	M = 980 Nm
M 36-8.8	M = 1555 Nm



2 **Fastening screws on the cover plates**

– twice annually –

Check the fastening screws on the cover plates of the support axle for tightness. Tightening torques:

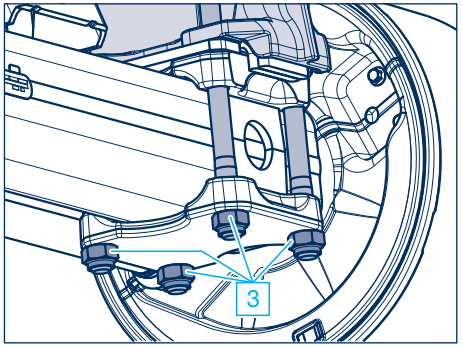
M 20-8.8	M = 320 Nm
M 24-8.8	M = 570 Nm

3 **Spring U-bolts on the spring housings**

– twice annually, initially after 2 weeks –

Check spring U-bolts on the spring housings for tightness. If necessary loosen lock nuts, tighten nuts alternately to the prescribed torque, a bit at a time, if necessary then relock. Tightening torques:

M 20-8.8	M = 320 Nm
M 20-10.9	M = 450 Nm
M 24-8.8	M = 570 Nm
M 24-10.9	M = 700 Nm



BPW-W 33111201e

BPW-W 331111201e

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