Maintenance instructions
BPW-W 3211801e

BPW BERGISCHE ACHSEN

# BPW trailer axles and suspensions

MAINTENANCE INSTRUCTIONS

## Contents:



The following maintenance instructions apply to BPW trailer axles and BPW suspensions for truck trailers and semi-trailers manufactured from 1982 onwards. They form part of the BPW warranty conditions.

All matters concerning warranty must initially be referred to the trailer manufacturer.

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

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

Rectification of any defects which are discovered or replacement of worn parts should be carried out by a BPW Service Centre or BPW Direct Service Partner unless the vehicle owner has the 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 be used when fitting spare parts. Parts authorised by BPW for trailer axles and axle units are regularly subjected to special inspections. BPW accepts product liability for them.**

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

**Our warranty will cease to apply if spare parts other than genuine BPW spare parts are employed in warranty-covered work and repairs.**

The warranty shall also be rendered null and void if the BPW axle systems are not installed in accordance with the technical guidelines given in the current BPW installation instructions.

Brake linings

Brake lining qualities authorised by BPW are matched to each other and their performance is confirmed in the assessment reports and the general certification of the components. These brake linings are subject to continual monitoring by the Quality Assurance Department, so that BPW is able to guarantee consistent quality.

BPW cannot verify the performance of the braking system should other types of lining be used. Our guarantee is therefore void if other brake linings are used.

**Valid 01.10.2009**

Replaces maintenance instructions BPW-W 1197701e and BPW-W ECO Plus 1204701e.

Subject to change without notice. Previous maintenance instructions become invalid.

**Operating instructions which should also be adhered to by the driver:**
**Observe the statutory regulations!**

## – Prior to each run –

- subject the brake and air suspension air reservoir to working 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 36).
  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 46 - 47).
- Rotary valve of air suspension in drive position.
- 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).

## – In the 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 20.

**- After the first two weeks (after the first runs under load conditions) –**

- Check that the U-bolt connections of the spring attachments and axle steering devices are secure, and observe the stipulated tightening torques.

Air suspensions: see 4 to 9 page 64 - 69

Leaf-spring suspensions: see 2 and 4 to 7 page 75 - 76
1 and 3 page 81

We wish you safe journey!

# Lubrication

Valid: 01.10.2009

## Lubrication
### Overview

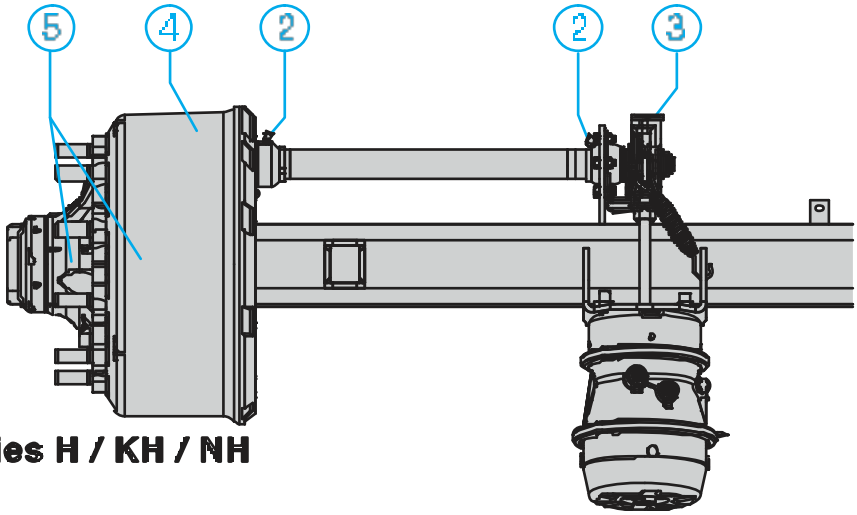
For detailed description see pages 6 - 17

| | 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 ECOPlus Unit: | | | | | | | | | | | |
| On-road conditions | | | | | | | | | | | (5) |
| Off-road conditions | | | | | | | | | | (5) | |
| outside Europe : On-road conditions | | | | | | | | (5) | | | |
| outside Europe : Off-road conditions | | | | | | | (5) | | | | |
| ECO Unit | | | | | | | | | (5) | | |
| outside Europe | | | | | | | (5) | | | | |
| Conventional hub bearing | | | | | (5) | | | | | | |

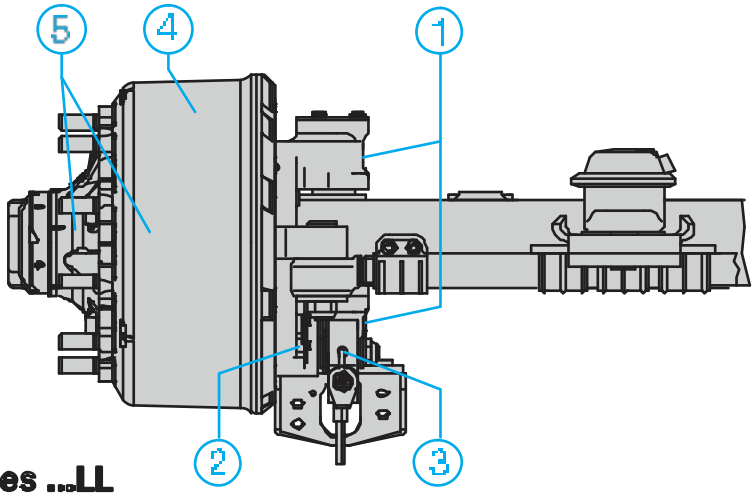
For the positions (1) to (3) the use of a high-pressure central lubrication system which is capable of feeding special longlife grease of consistency class 2-3 is permissible.
The use of liquid lubricants is not permitted!

1) after a long idle period, prior to initial operation actuate the brake lever and lubricate the brake camshaft bearing.

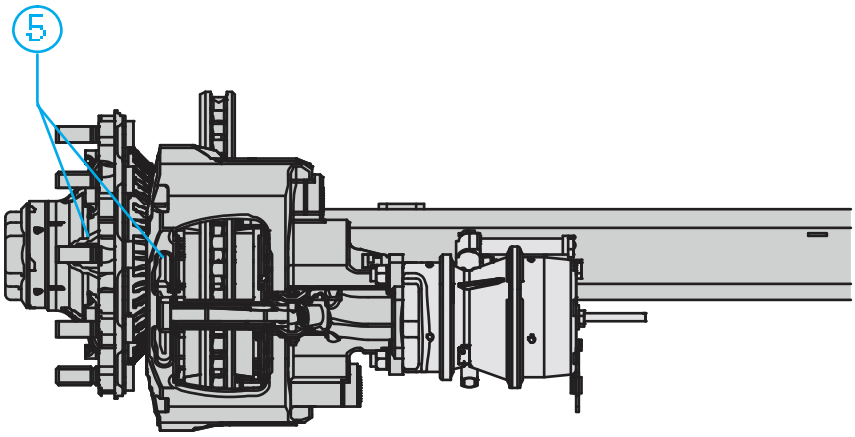
2) with the use under extreme conditions (e.g. extreme off-road use) more frequent lubrication with high pressure grease is necessary.




**Series H / KH / NH**



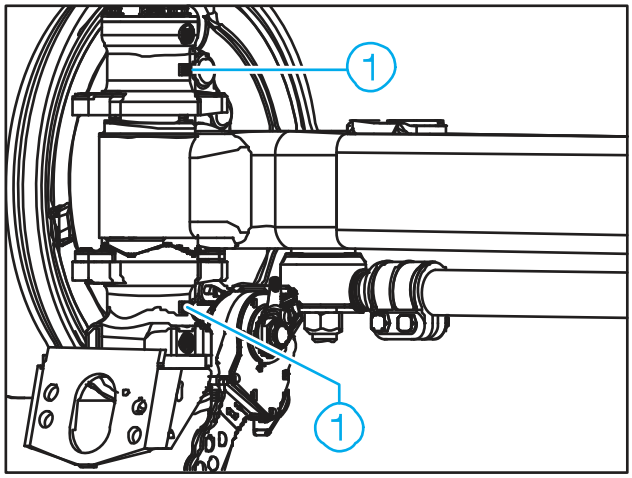

**Series ...LL**




**Series SH / SKH**

## Lubricate

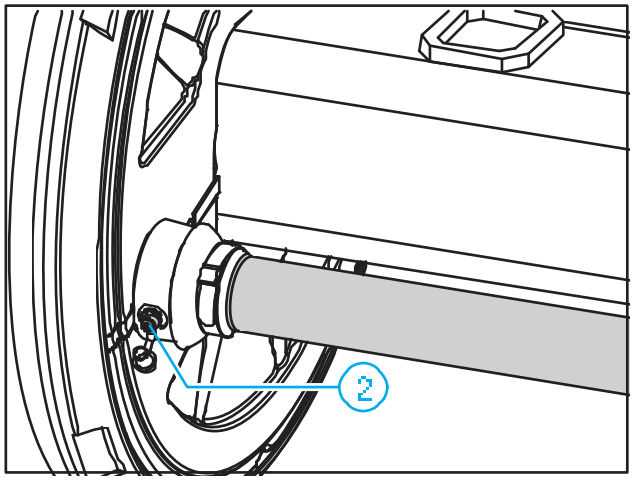
Note: After cleaning the vehicle with high-pressure cleaners, all lubrication points must be relubricated.




### (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.



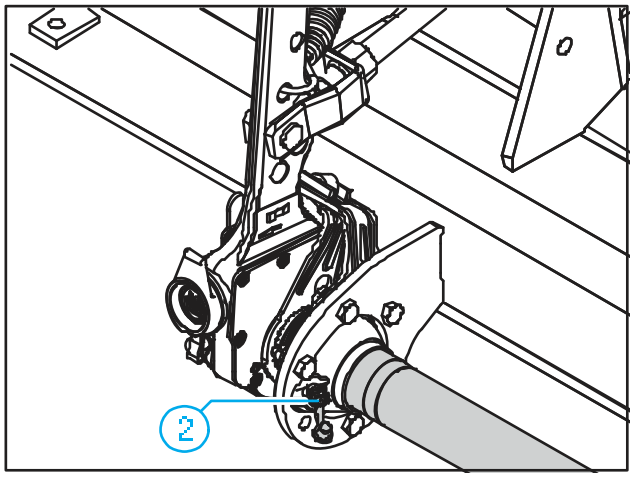

### (2) Brake camshaft bearing, outer and inner Low maintenance brake camshaft bearing (from year of manufacture 1993)

– 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

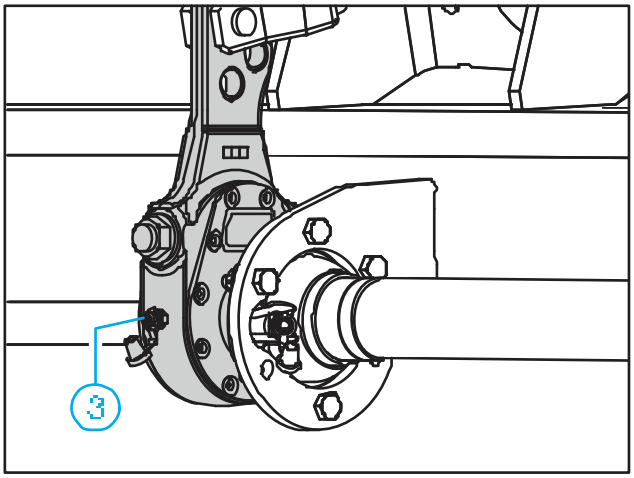
(up to year of manufacture 1992)
– quarterly –
(and prior to initial operation after a long idle period!)
Grease lubrication nipple with BPW special longlife grease **ECO-Li**$^{Plus}$ until fresh grease emerges from the bearing points.



### ③ Slack adjusters (manual)

– quarterly –

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

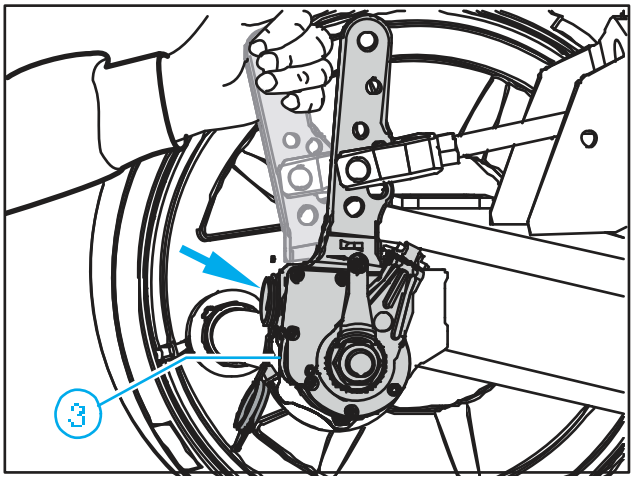



### ☞ Automatic slack adjuster ECO Master

(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 screw.




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.

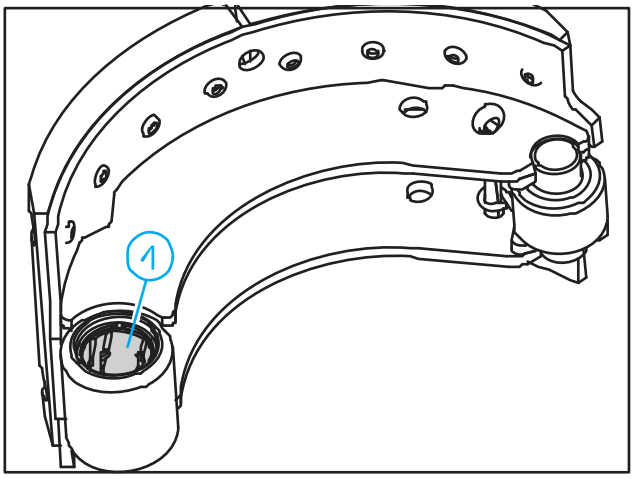
Once again only use BPW special longlife grease **ECO-Li**$^{Plus}$. Replace seal cap.

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.



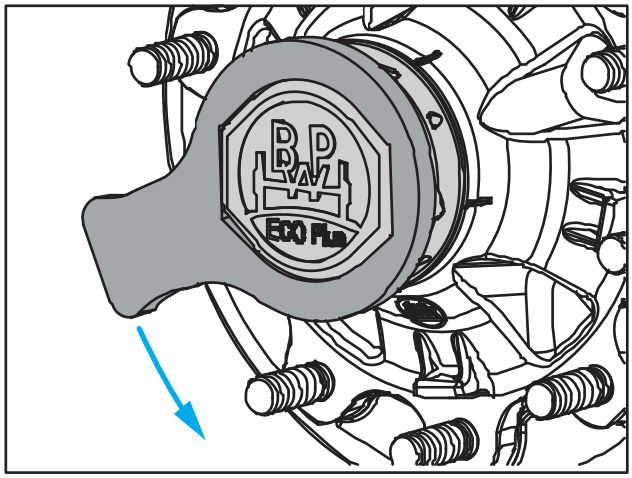
### (5) ECO Plus 2 Unit

– 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 –

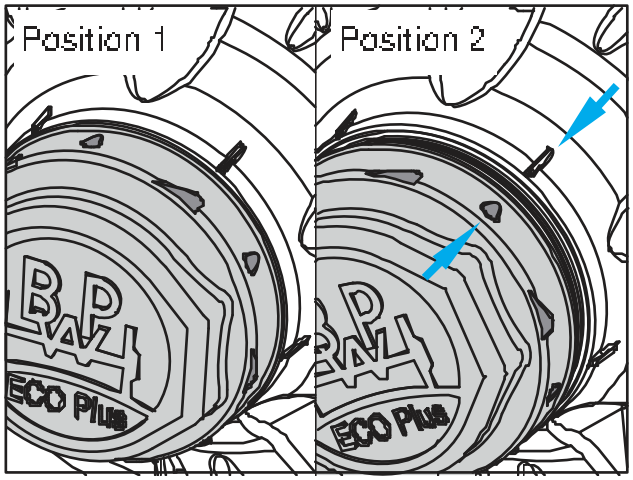
Prevent the vehicle from rolling away.
Remove the wheel.

Unscrew the cap with a 120 mm cap spanner.




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

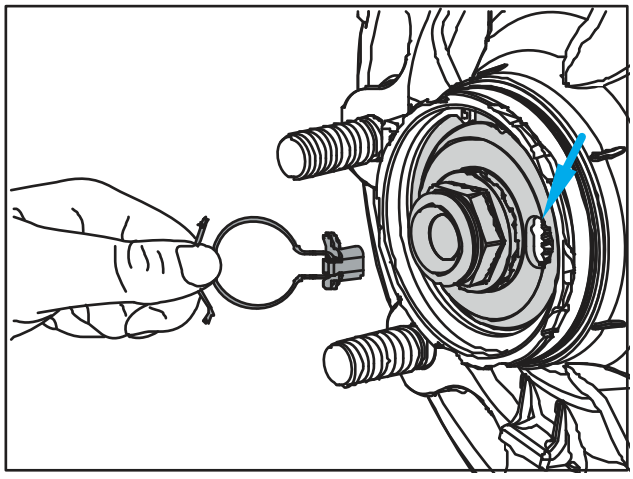
Undo the cap by turning it anti-clockwise by approx. 30° from position 1 to position 2.
When turned further the hub cap lifts clearly away from the ECO Unit and can be removed by pulling it away.




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.

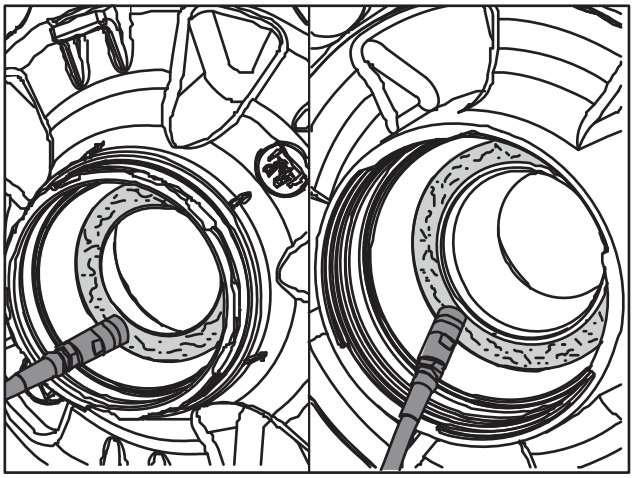


Clean the tapered roller bearings thoroughly (e.g. with diesel oil), dry them and check if they can be re-used. Fit a new shaft seal.

(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 bubbles or cavities.

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

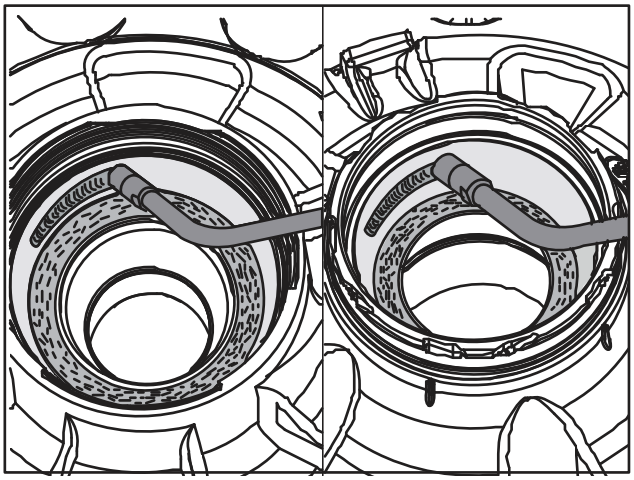


☞ When BPW grease applicators are used, there is no need to fill the grease cartridge or to apply the bead of grease.

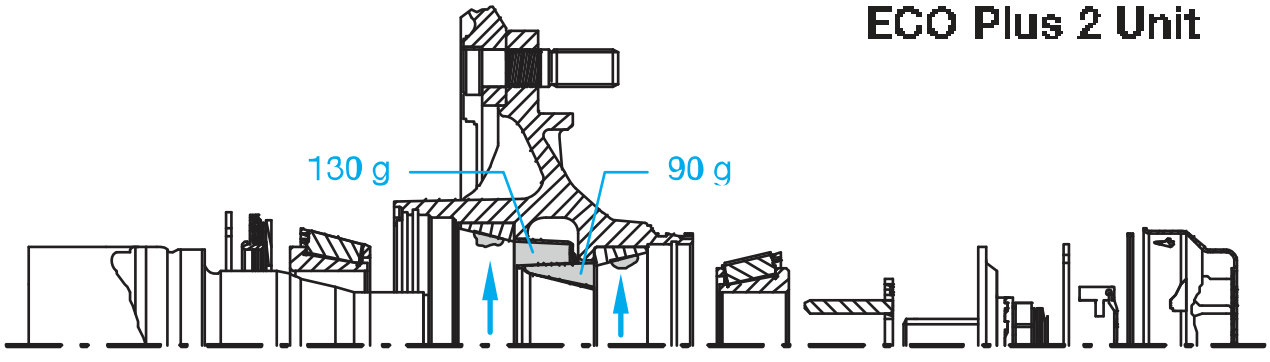
Mount the ECO Unit.

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). Spray with **BPW ECO Assembly and Protection Spray.**

Allow to dry for about 10 minutes until the film changes to a marked matt colour.



**ECO Plus 2 Unit**



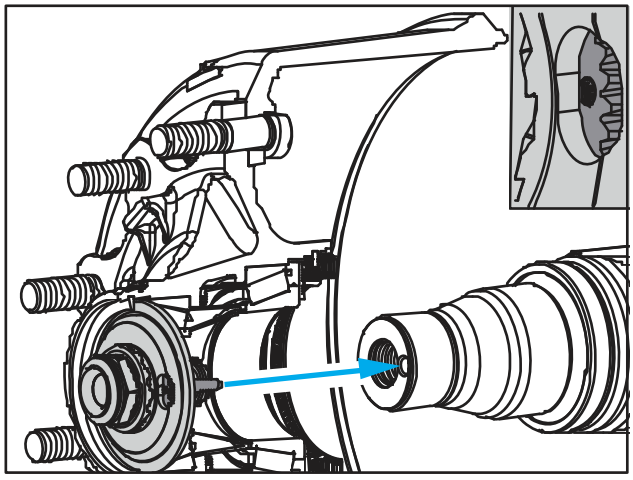
The threaded hole in the axle stub must only be lubricated with ECO-LiPv-s.

☞ **Important!**

**Do not apply too much grease!**

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

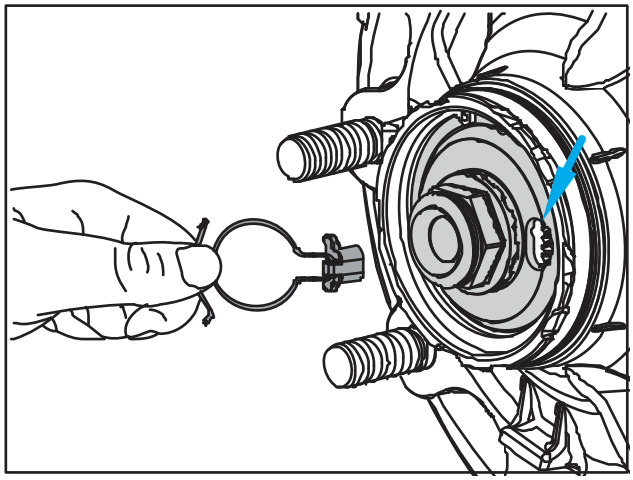
Mount the ECO Unit. Guide the toothed lock washer into the hole in the axle stub. The position of the pin can be seen by the punched-in BPW logo with the yellow dot in the recess of the axle bolt.



Tighten the axle bolt (46 mm) at the same time as turning the ECO Unit until the axle bolt torque limiter operates.
(Do not turn back the axle bolt.)

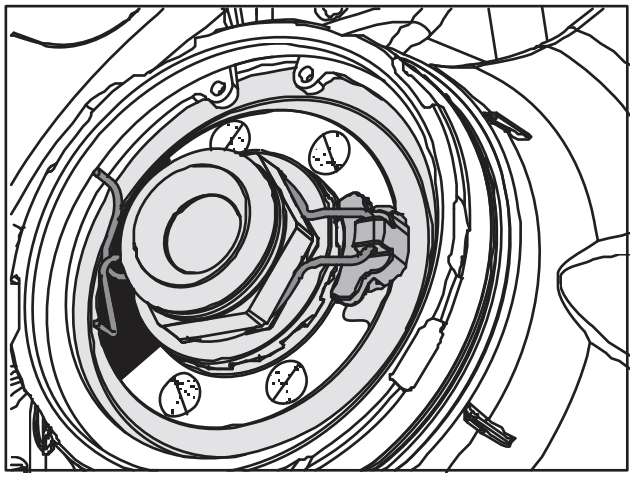
**Important!**
**Do not use an impact driver.**

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 clasped 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 long-life grease to the cap in the area of the bayonet fitting.

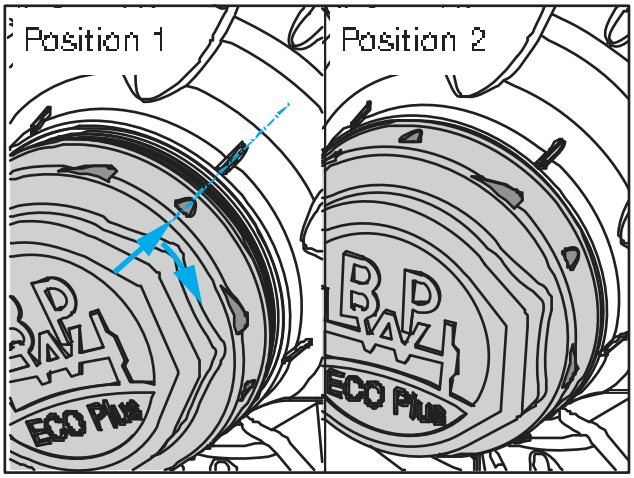
Screw on the cap with a 120 mm cap spanner.

**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.

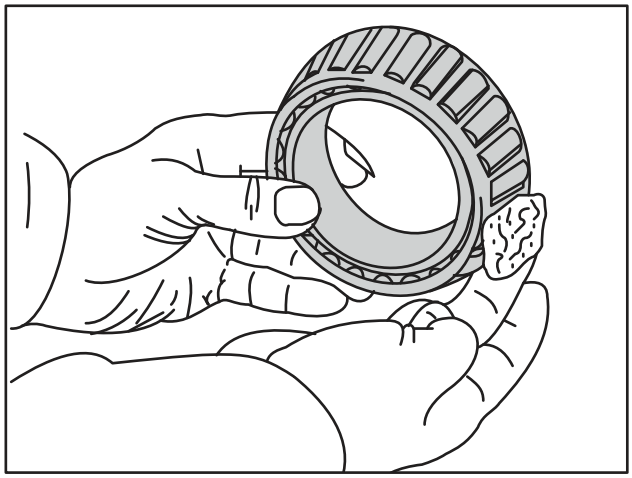


## ECO Plus Unit

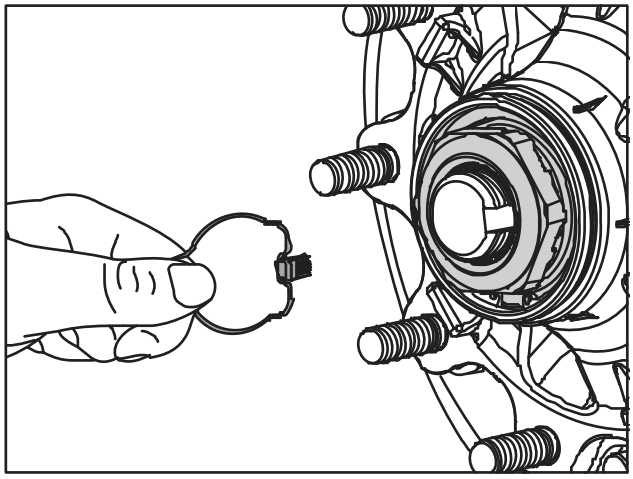
– for the first time after 5 years in on-road use, or every 3 years in off-road use in Europe, then at least every 3 years depending on operating conditions –

– every 2 years in on-road use or every year in off-road use outside Europe –

Clean taper roller bearings and seals (using e.g. diesel oil) thoroughly, dry and check for re-useability. Replace oil seal. (Recommendation: Renew the tapered roller bearings after 5 years in on-road use and after 3 years in off-road use.)

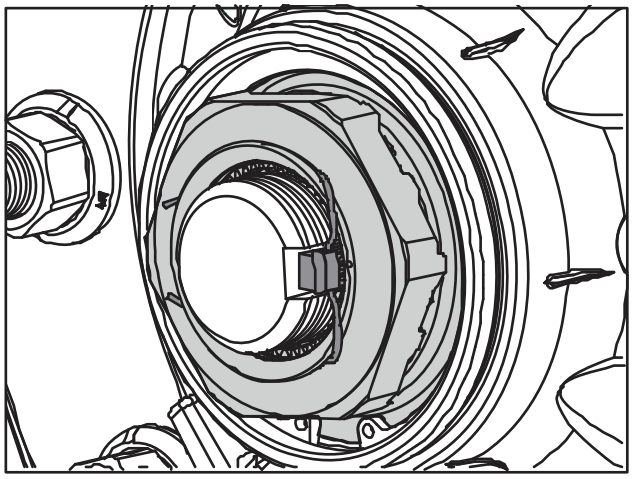


Work BPW special longlife grease **ECO-Li Plus** thoroughly into the cavities between the taper rollers and the cage in both taper roller bearings. (For grease quantity see illustration on page 13). Smear any residual grease into the hub's outer bearing race. Smear the lip of the new seal all round with BPW special longlife grease **ECO-Li Plus**.
Clean the bearing seats of the axle stub (metal must be bright, dry and free from grease). Spray with **BPW ECO Assembly and Protection Spray.** Allow to dry for about 10 minutes until the film changes to a marked matt colour.



Fit the ECO Unit, tighten the axle nut whilst at the same time turning the ECO Unit, until the axle nut torque limiter operates.

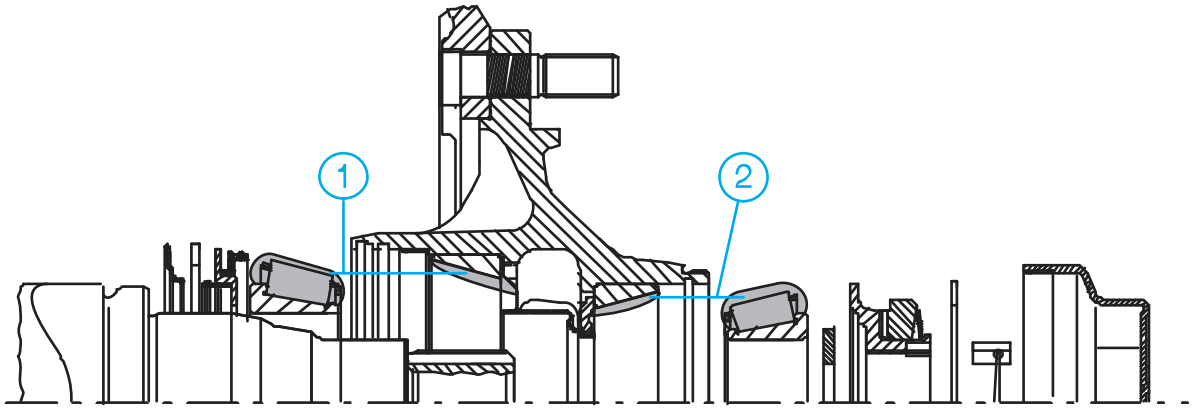
**Important!**
**Do not use an impact driver.**



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 |

## ☞ECO Unit

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

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

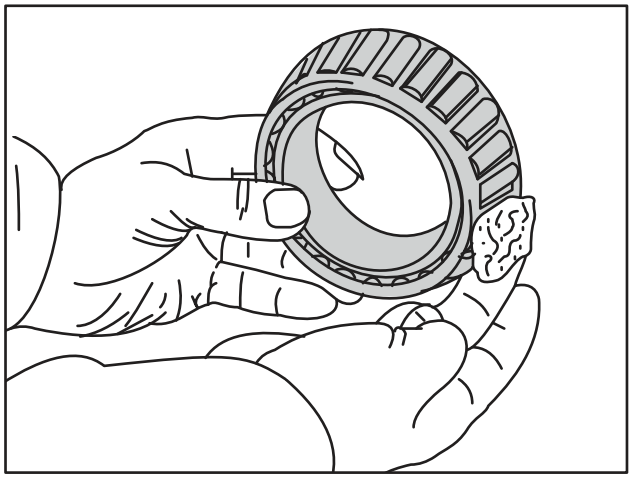
Work BPW special longlife grease **ECO-Li$^{Plus}$** thoroughly into the cavities between the taper rollers and the cage in both taper roller bearings. Comply with the total grease quantity in tables Ⓐ and Ⓑ .

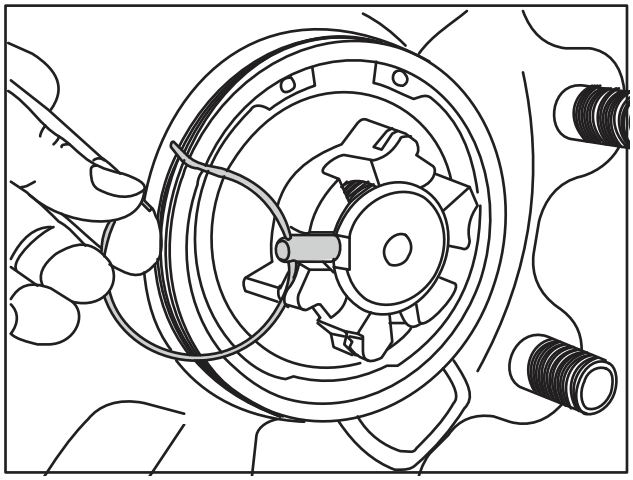
Smear any residual grease into the hub's outer bearing race. Smear the lip of the new seal all round with BPW special longlife grease ECO-Li$^{Plus}$.

Clean the bearing seats of the axle stub (metal must be bright, dry and free from grease). Spray with **BPW ECO Assembly and Protection Spray.**

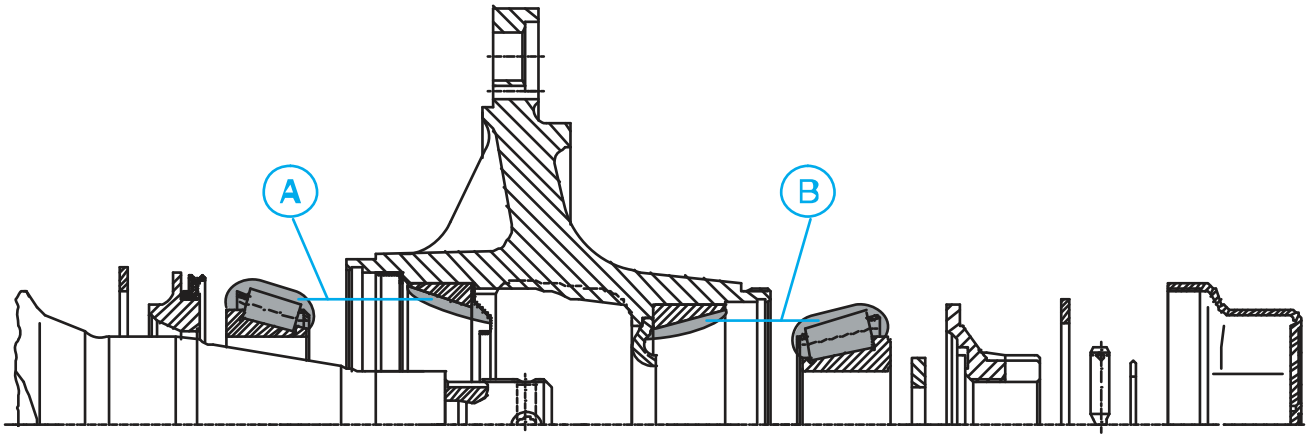
Fit the ECO Unit, tighten the axle nut using a torque wrench to 150 Nm while simultaneously turning the ECO Unit and turn back by a maximum of 15° to the next possible locking hole.

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<br>Grease quantity per taper roller bearing | |
|---|---|---|
| Axle load | (A) inner bearing | (B) outer bearing |
| 6000 - 9000 kg | 120 g | 120 g |
| 10000 - 12000 kg | 170 g | 120 g |
| 13000 - 14000 kg | 230 g | 150 g |

## ☞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.

Clean taper bearings (using e. g. diesel oil) thoroughly, dry and check for re-useability. Replace seals.

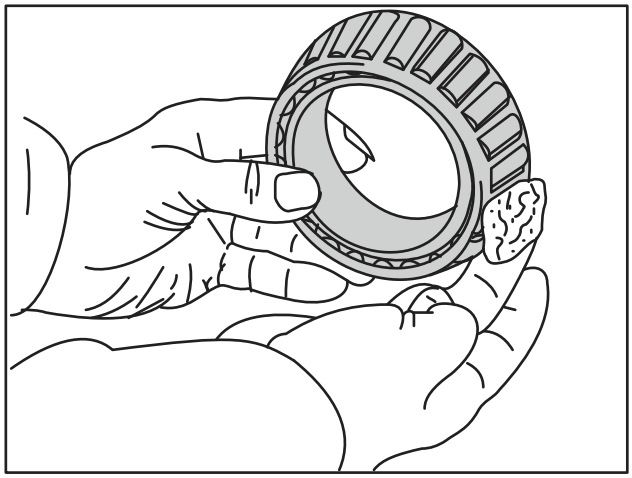
Work BPW special longlife grease ECO-LiPLUS into the cavities between the taper rollers and cage.

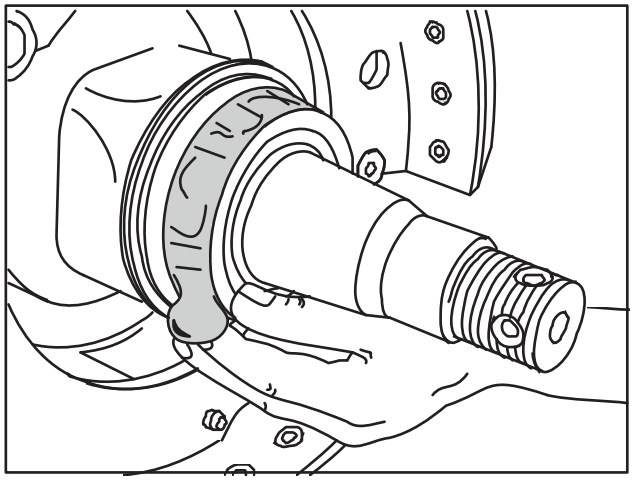
Comply with total grease quantity (table Ⓐ), smear any residual grease into the hub's outer bearing race.

Fit wheel hubs and adjust bearing play (see point 7 page 31).

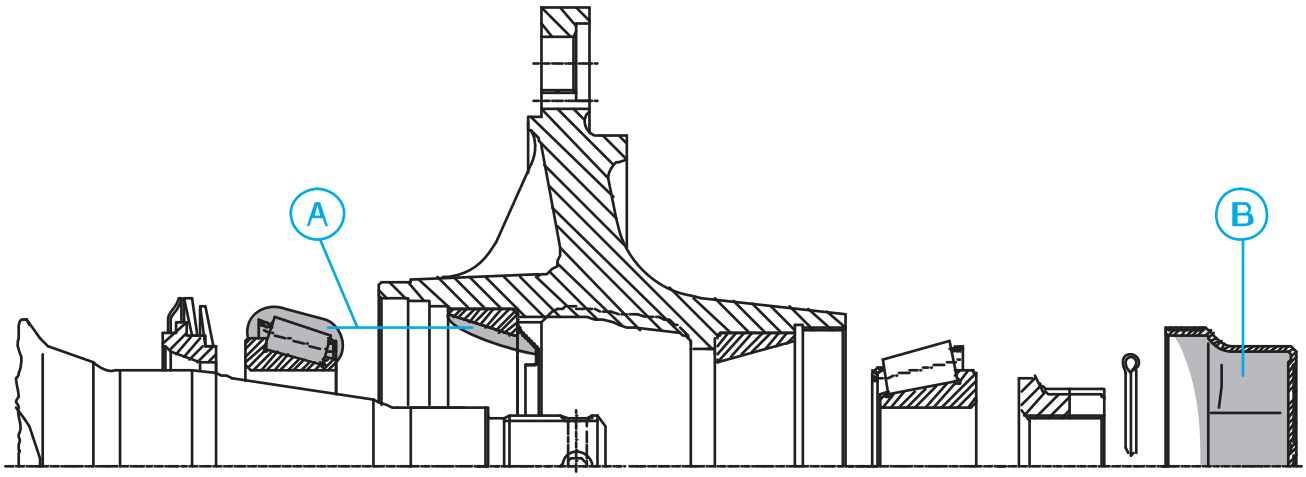
Fill hub caps with BPW special longlife grease ECO-LPLUS (table Ⓑ) and screw on.

For tightening torques see 5 page 25.





## Grease filling per wheel hub - Conventional wheel hub bearing




| | BPW special longlife grease ECO-Li Plus<br>Grease quantity per taper roller bearing | |
|---|---|---|
| Axle load (Series H, K, N, M) | (A) inner bearing | (B) 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 |

Valid: 01.10.2009

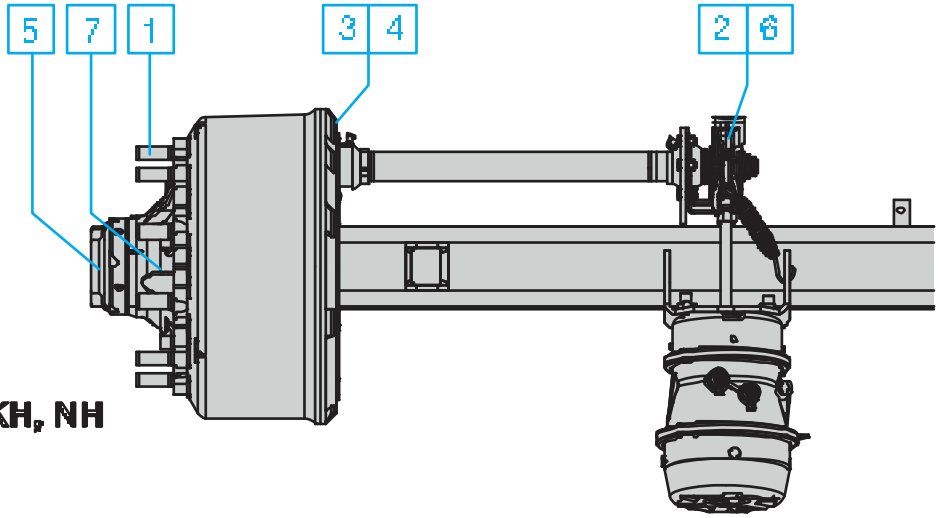
## Maintenance work and operation check

### Overview

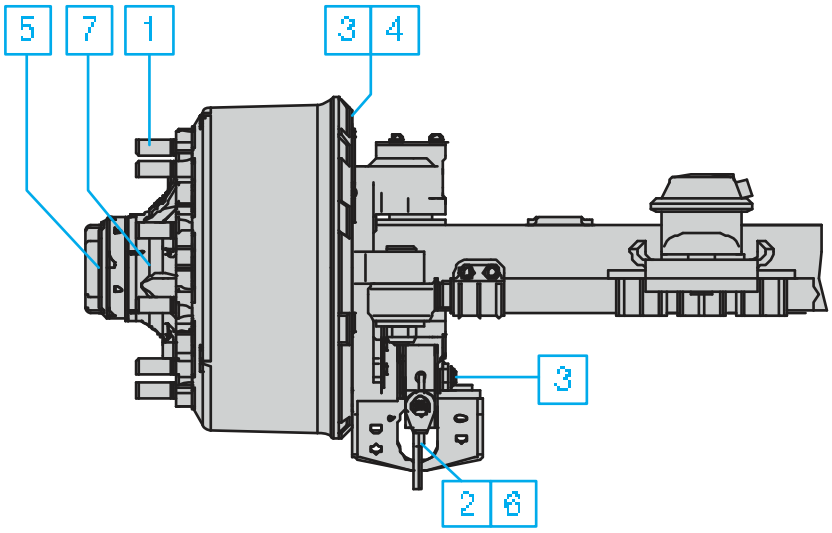
For detailed description, see pages 20 - 31
Disc brakes, see pages 32 - 55
Air suspension, see pages 56 - 70
Suspension, see pages 72 - 81

| Maintenance work - Drum brakes | initially | every 1 to 3 weeks | every 12 weeks | every 26 weeks [2] | at every brake lining replacement, latest annually [2] |
|---|---|---|---|---|---|
| 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 | |
| o Visual inspection of all component parts for damage and wear. | | | o [3] | o | |
| 7 Check wheel hub bearing play, adjust if necessary. - ECO Plus 2 and ECO$^{Plus}$ Unit | | | | | 7 |
| - ECO Unit, conventional bearing | | | | 7 | |

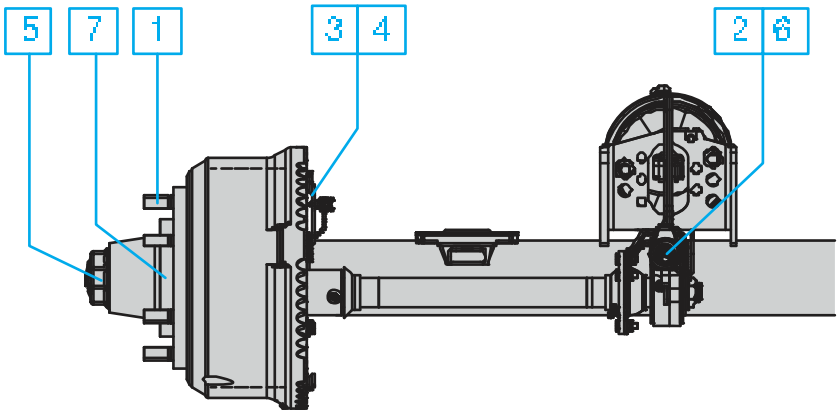
1) after the first run under load conditions, likewise after each wheel change.
2) under extreme conditions, increase frequency (e.g. construction sites and poor roads)
3) for use outside Europe




**Series H, KH, NH**




**Series LL**




**Series NE, NM, NR, M**

## Maintenance - Drum Brakes

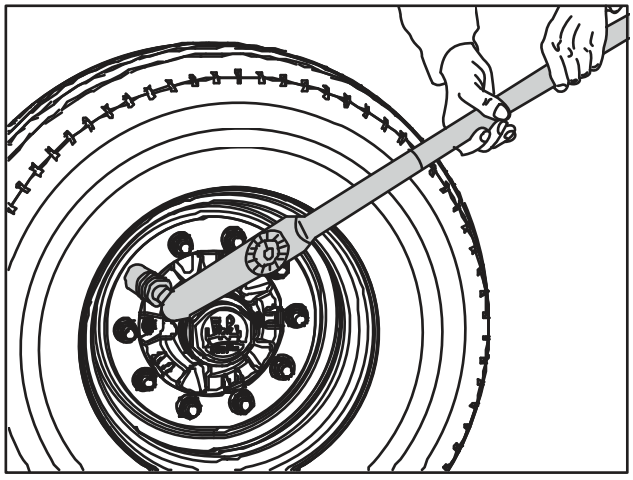
### 1 Check wheel nuts for tightness

– after the first run under load conditions, likewise after each wheel change –

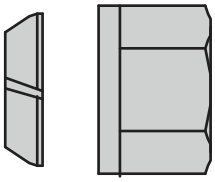
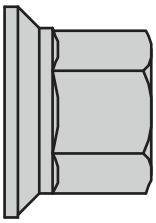
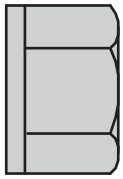
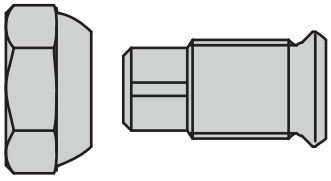
Tighten wheel nuts diagonally using a torque wrench to the tightening torque shown in the table.

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!)

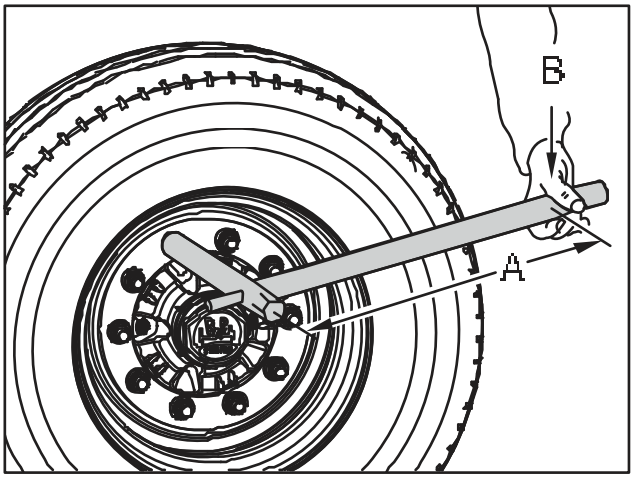


**Tightening torques for wheel nuts**

| Wheel stud arrangement | Tightening torque | |
|---|---|---|
| M 14 x 1.5<br>M 18 x 1.5<br>M 20 x 1.5<br>M 22 x 1.5<br>M 22 x 2 | **125 Nm** (120 - 130 Nm)<br>**290 Nm** (275 - 305 Nm)<br>**380 Nm** (360 - 400 Nm)<br>**510 Nm** (485 - 535 Nm)<br>**460 Nm** (435 - 485 Nm) |  |
| **Spigot arrangement** | | **Wheel nut with collar** |
| M 18 x 1.5<br>M 20 x 1.5<br>M 22 x 1.5<br>M 22 x 1.5 alloy wheels<br>M 24 x 1.5 | **350 Nm** (330 - 370 Nm)<br>**480 Nm** (455 - 505 Nm)<br>**630 Nm** (600 - 660 Nm)<br>**630 Nm** (600 - 660 Nm)<br>**860 Nm** (820 - 900 Nm) |  |
| **Trilex-wheels** | |  |
| M 18 x 2<br>M 20 x 2 | **285 Nm** (270 - 300 Nm)<br>**335 Nm** (320 - 350 Nm) | |
| **Japan connection** | |  |
| M 20 x 1.5<br>M 30 x 1.5 | **570 Nm** (540 - 600 Nm)<br>**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<br>350 mm<br>400 mm | 90 - 105 kg<br>78 - 89 kg<br>68 - 78 kg |
| 320 - 350 Nm | 350 mm<br>400 mm<br>450 mm<br>500 mm | 91 - 99 kg<br>80 - 88 kg<br>71 - 78 kg<br>64 - 70 kg |
| 360 - 400 Nm | 400 mm<br>450 mm<br>500 mm<br>600 mm | 90 - 99 kg<br>80 - 89 kg<br>72 - 80 kg<br>60 - 67 kg |
| 440 - 480 Nm | 500 mm<br>600 mm<br>700 mm | 88 - 96 kg<br>73 - 80 kg<br>63 - 69 kg |
| 480 - 540 Nm | 600 mm<br>700 mm<br>800 mm | 80 - 90 kg<br>67 - 77 kg<br>60 - 67 kg |
| 600 - 660 Nm | 700 mm<br>800 mm<br>900 mm<br>1000 mm | 85 - 95 kg<br>75 - 83 kg<br>67 - 73 kg<br>60 - 66 kg |
| 820 - 900 Nm | 1000 mm | 82 - 90 kg |

## Maintenance and Visual Inspection - Drum Brakes

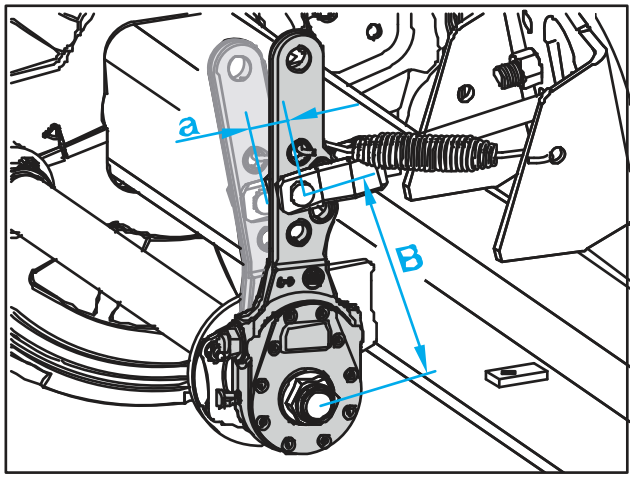
**2 Check and adjust wheel brake play with manual slack adjusters**

– 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.

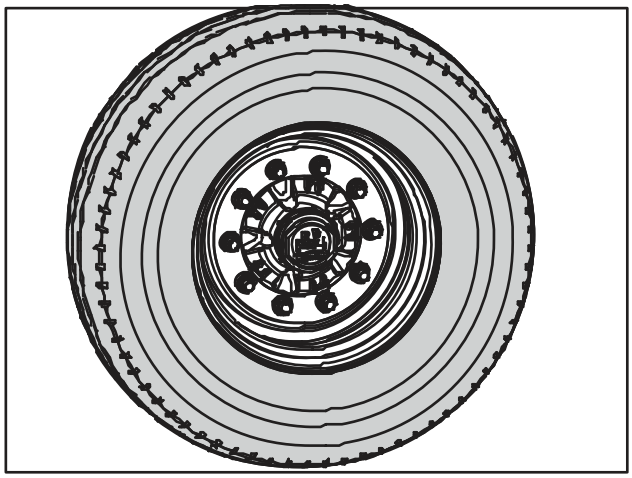
Adjust the play "a" to 10 -12% of the connected brake lever length "B", e.g. lever length 150 mm = 15 - 18 mm of play.

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.**

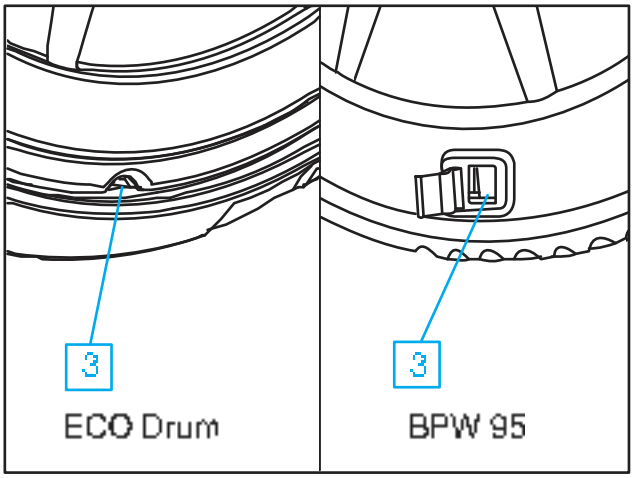
– quarterly –



## 3 Check brake lining thickness

– quarterly –

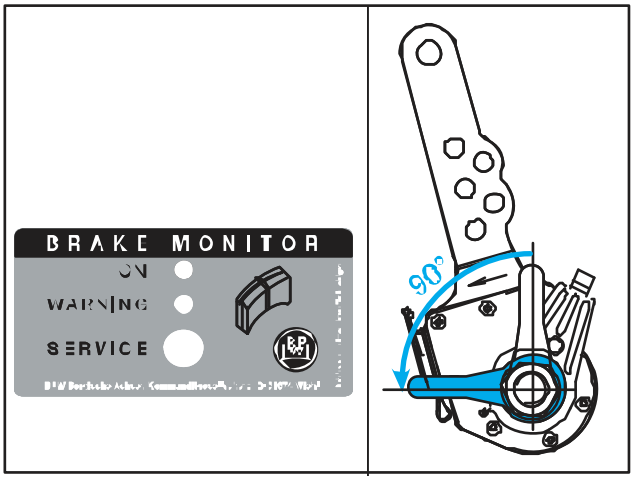
Open inspection hole by folding back the rubber flap (not required with ECO Drum brakes). The brake lining should be replaced at a residual lining thickness of 5 mm (check with slide gauge) or on reaching the bottom of the indicator machined into the edge of the lining. Re-insert the rubber flap.

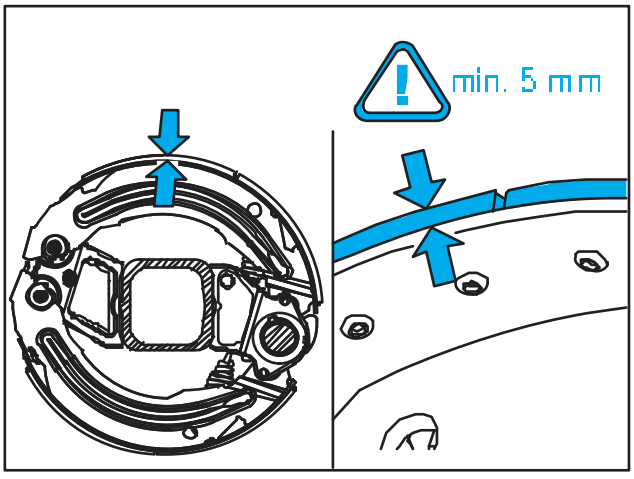



If brake lining wear indicators are fitted to the slack adjusters, the minimum thickness of the brake linings is indicated by the horizontal position of the lever (when the brake is released).

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.



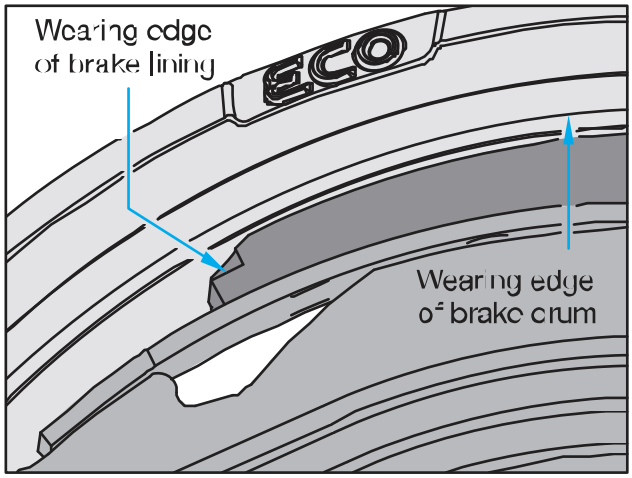



## Maintenance and Visual Inspection - Drum Brakes

### 4 Check the brake drum for cracks and check the internal diameter

– quarterly –

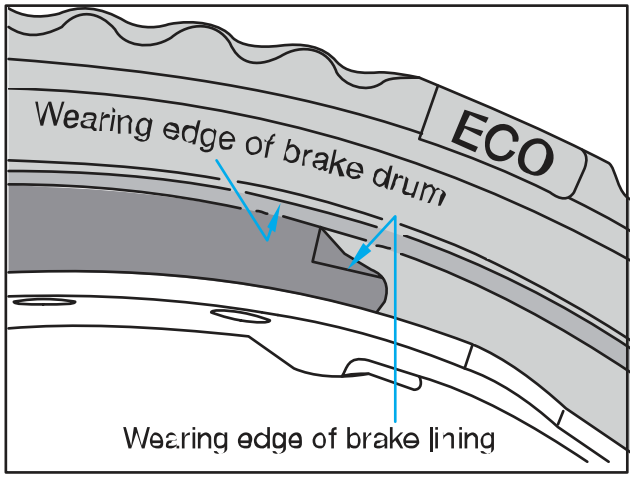
Check the condition of the brake drum and that there is adequate remaining thickness.
If the wear is approaching the wear edge, measure the brake drum and renew it if the maximum permitted amount of wear has been reached.



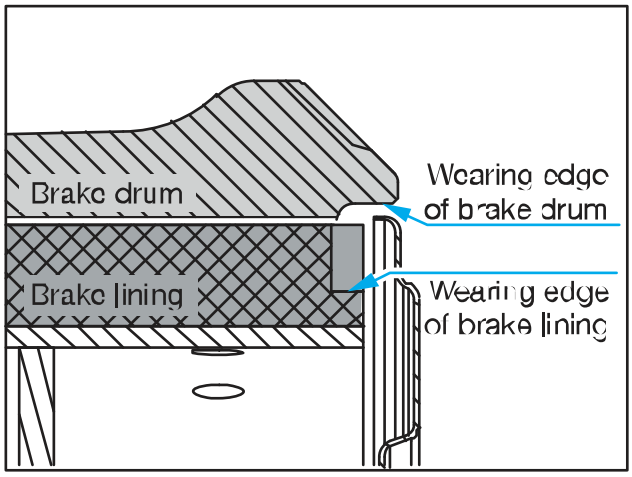

ECO Drum

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 |




BPW 95



## 5 Check caps for firm seating

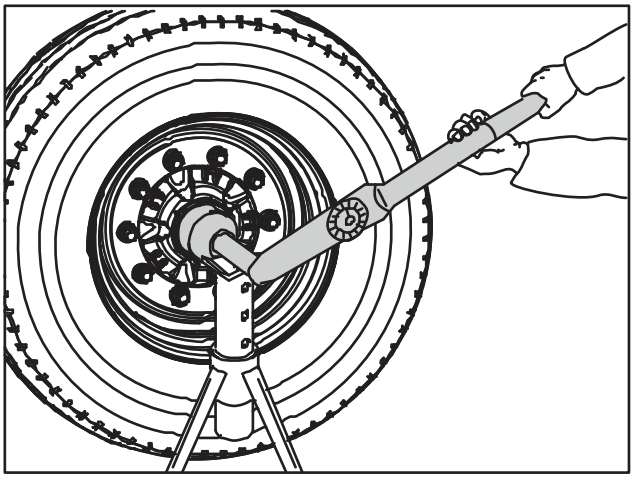
– every 6 months –
(not necessary with ECO Plus 2 and ECO$^{Plus}$ axles)

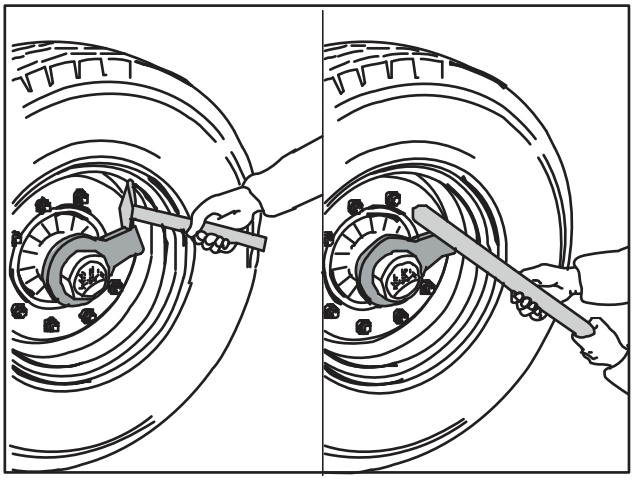
Check caps for tightness using a torque wrench or power tool.
Tightening torques:

| | | | |
|---|---|---|---|
| | Cap for ECO and ECO$^{Plus}$ 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 - 12 t | 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.**

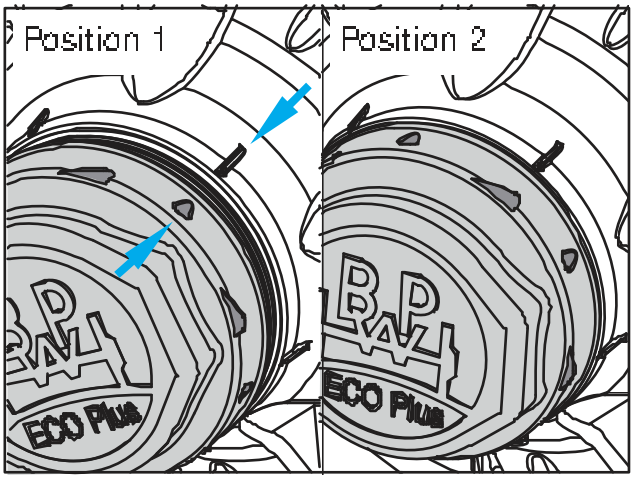




☞ Caps on ECO Plus 2 axles are provided with a bayonet fitting. Check for firm seating.

Position 1: Hub cap seated loosely on the unit.

Position 2: Hub cap seated firmly on the unit.



## Maintenance and Visual Inspection - Drum Brakes

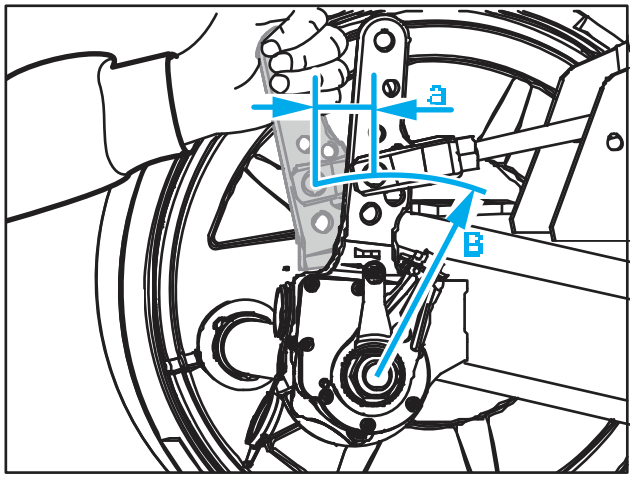
### Check operation of the automatic slack adjuster

– 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.**

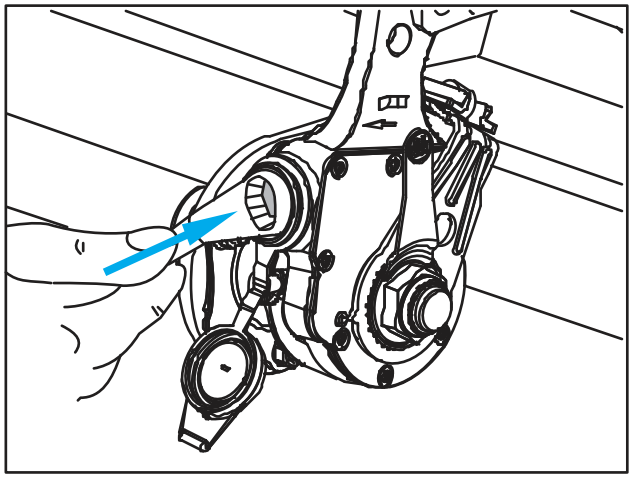
Idle stroke test:

Operate the slack adjuster by hand or with 0.8 bar. In this case, the idle stroke „a" corresponds to 10 - 15 % of the connected brake lever length „B", e.g. brake lever length 150 mm = idle stroke 15 - 22 mm.




Check the adjustment if the idle stroke is not within tolerance:

Remove rubber seal cap. Turn back adjustment screw, 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 screw turns slightly in a clockwise direction.
Grease with ECO-LiPlus, *see also* (3) on page 7. **Fit seal cap.**
Adjust the brake, *see* relevant workshop manual.



### Visual inspection

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

Check all components for damage and wear.

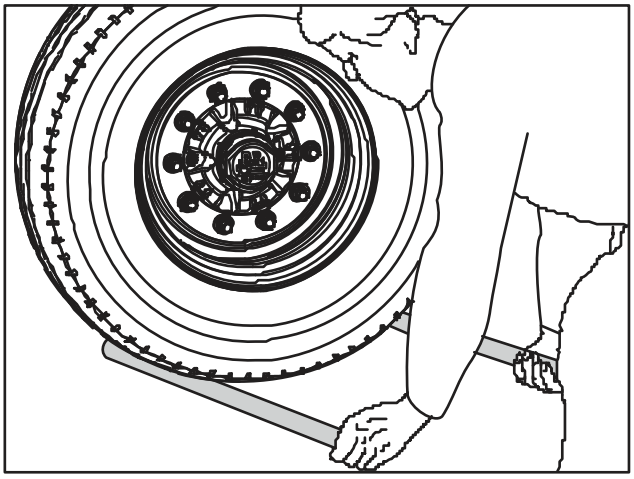
## 7 Check wheel hub bearing play

– 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.

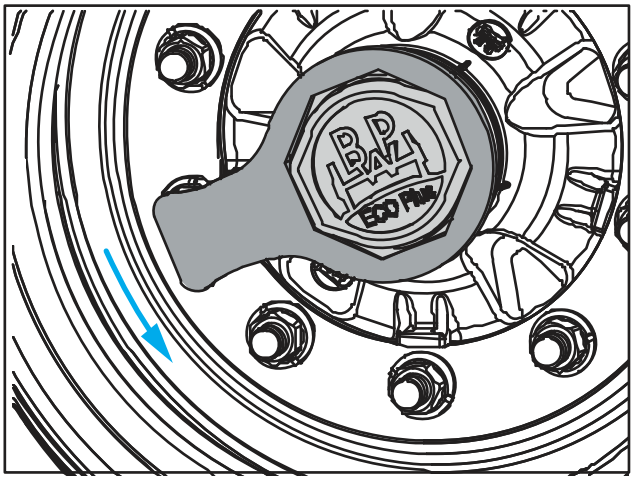


If bearing play is detected -
**ECO Plus 2 Unit:**

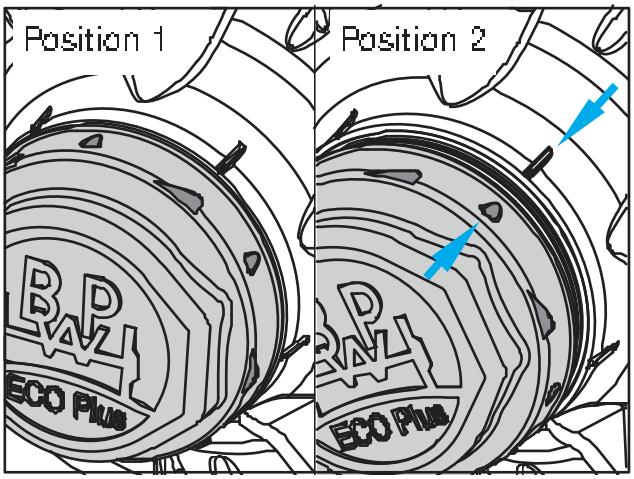
<u>Adjust the bearing play</u>

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.**



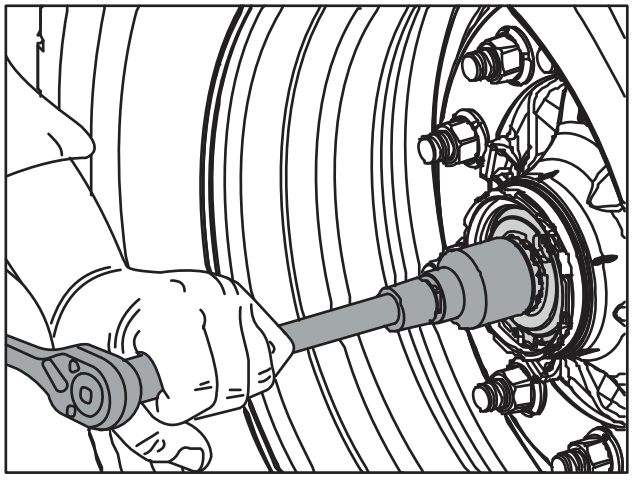

2. Remove the hooked spring ring with a wedge from the axle nut.



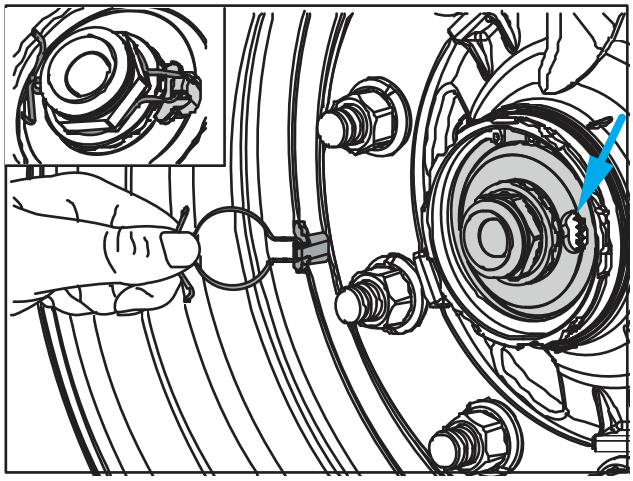
## Maintenance and Visual Inspection - Drum Brakes

3. Tighten the axle bolt at the same time as turning the ECO Unit with a 46 mm hexagon spanner until the gearing slips over the axle bolt.

**Important!**
**Do not use an impact driver.**



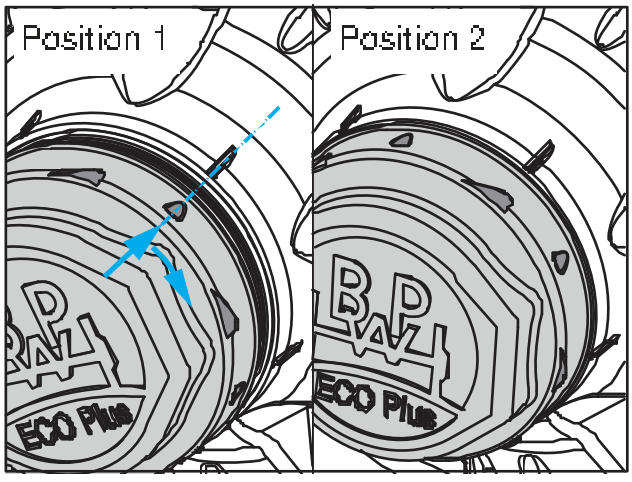
4. Insert the retaining key into the recess in the axle bolt and the gearing of the toothed lock washer. (Do not turn back the axle bolt.)
5. Insert the hooked spring ring into the groove of the hexagon profile of the axle bolt. Make sure that the clasped spring ring assembly is correctly seated in the 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-LP$^{vs}$ special long-life grease to the hubcap in the area of 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.



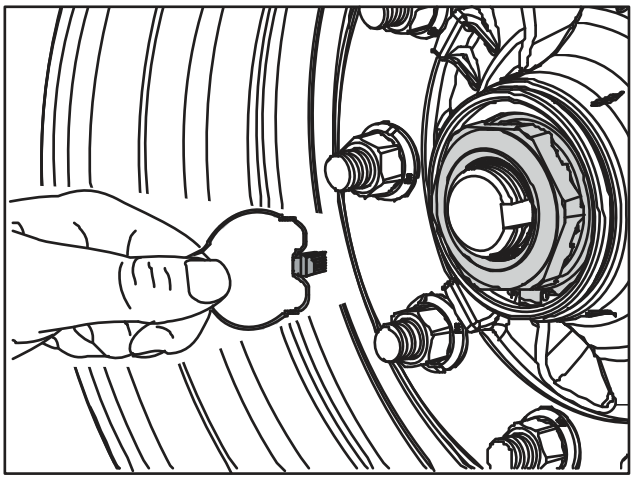
If bearing play is detected -
**ECO Plus Unit:**

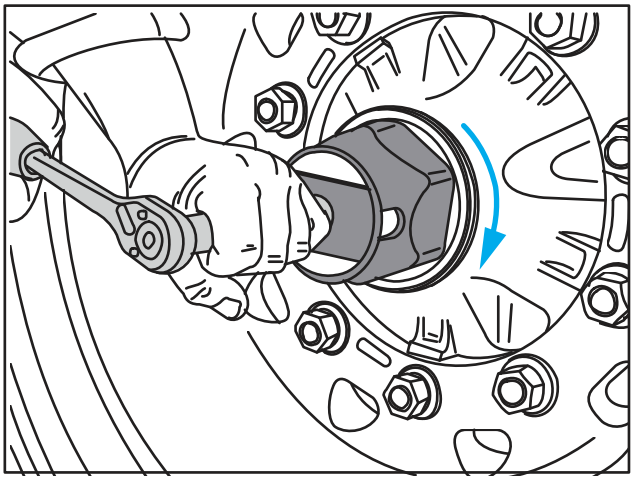
Adjust the bearing play

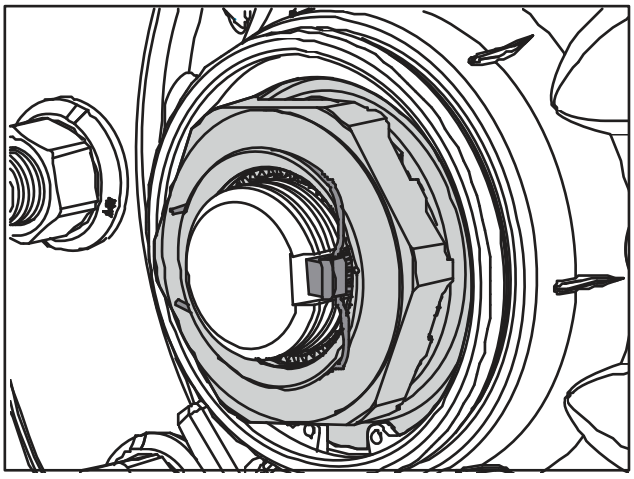
1. Unscrew the cap.
2. Remove the hooked spring ring with a wedge from the axle nut.
3. Use a spanner to tighten the axle nut whilst at the same time turning the ECO Unit, until the axle nut torque limiter operates.

**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.



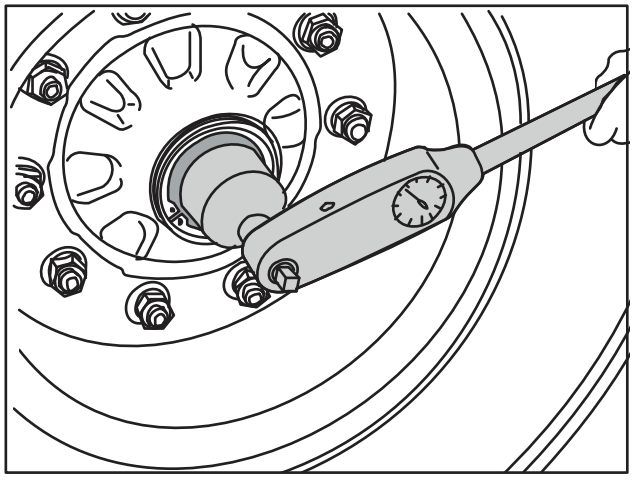


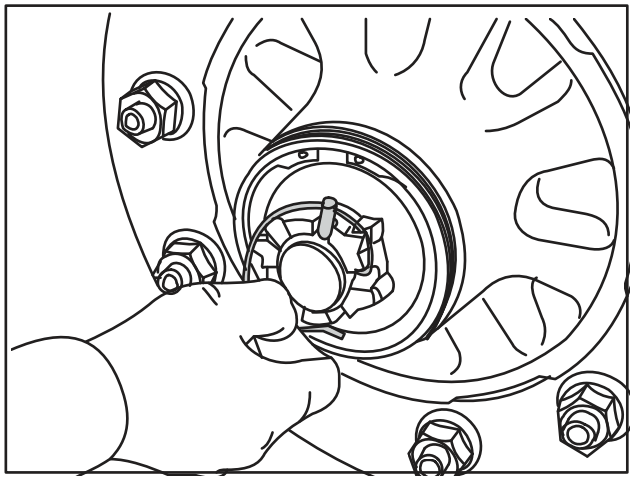


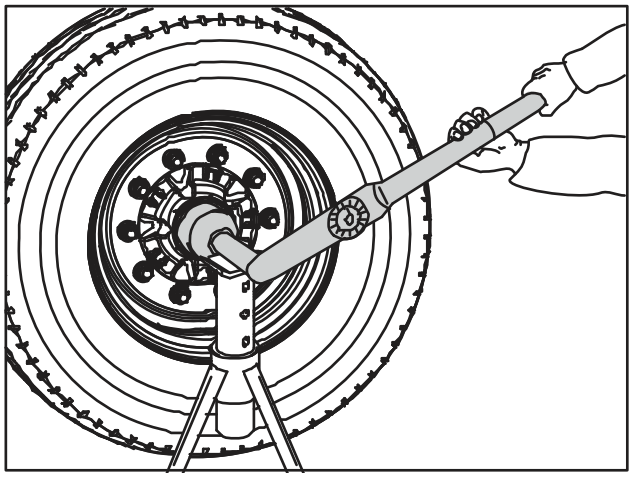
## Maintenance and Visual Inspection - Drum Brakes

If bearing play is detected -
**ECO Unit**:
Adjust the bearing play

1. Unscrew the cap.
2. Loosen axle nut.
3. Tighten axle nut with torque wrench while simultaneously turning the ECO Unit with a tightening moment of 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

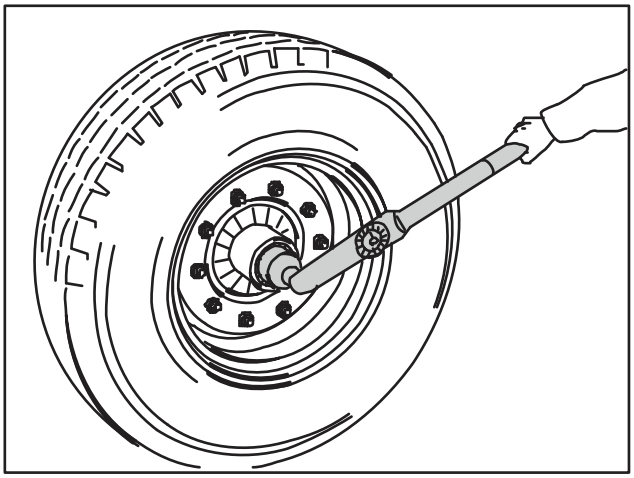


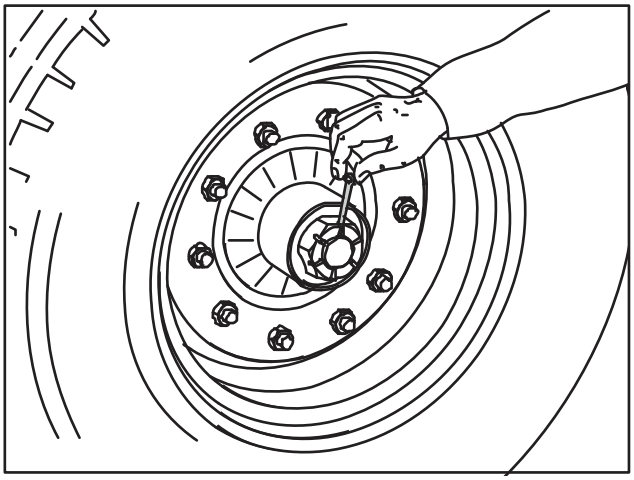


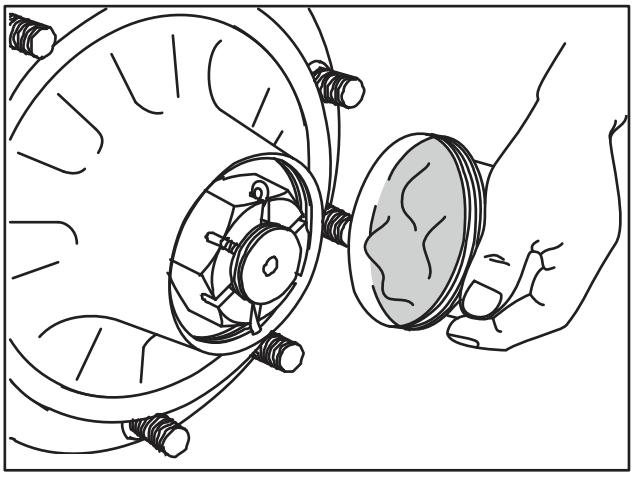


If bearing play is detected -
**conventional hub bearing:**
Adjust the bearing play

1. Unscrew the cap.
2. Remove the split pin from the axle nut.
3. Tighten using a torque wrench whilst simultaneously turning the wheel.
   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 25.







Valid: 01.10.2009

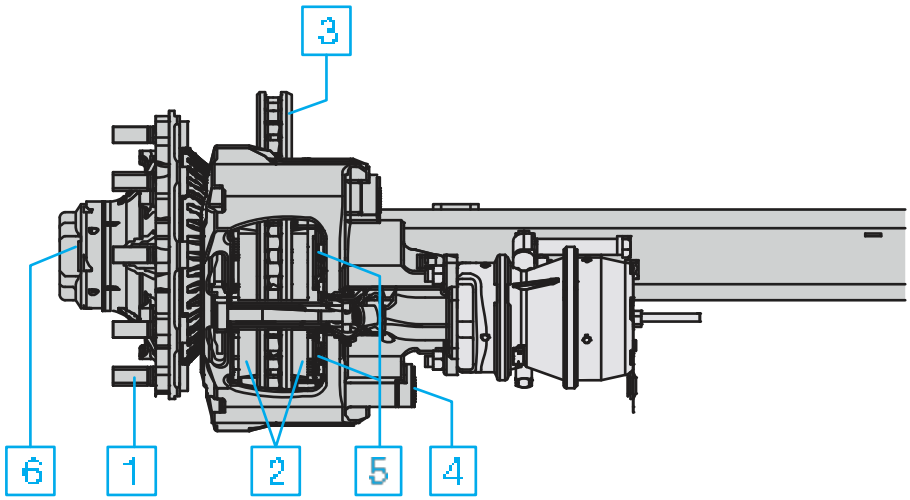
## Maintenance work and visual inspection

**Overview**

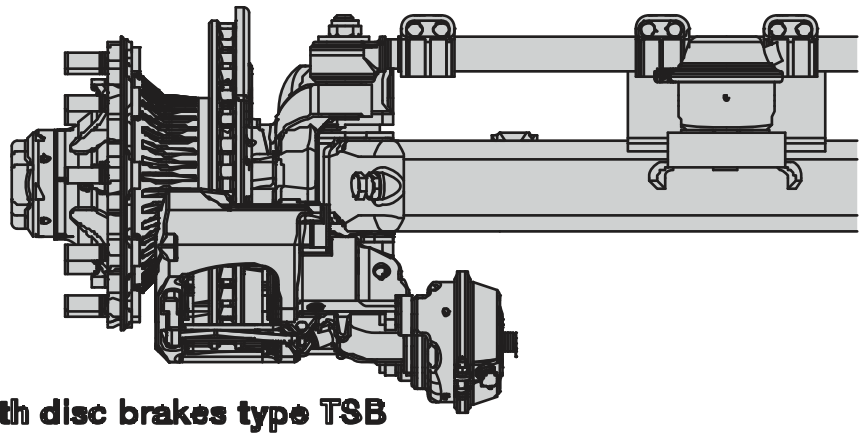
For detailed description see pages 34 - 41
Disc brakes type SB, see pages 42 - 55
Air suspension, see pages 56 - 70
Suspension, see pages 72 - 81

| Maintenance work - Disc brakes<br>Brake type: TSB 3709, TSB 4309, TSB 4312 | initially | every 12 weeks 1) | every 26 weeks 1) | at every brake lining replacement, latest annually |
|---|---|---|---|---|
| 1 Check wheel nuts for tightness. | 1 2) | | | |
| 2 Check brake pad thickness. | | 2 | | |
| - Visual check, check all components 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




**Series SH with disc brakes type TSB**



**Series LL with disc brakes type TSB**

## Maintenance and Visual Inspection - Disc brakes type TSB

### Premature brake pad wear on the disc brake

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.

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.

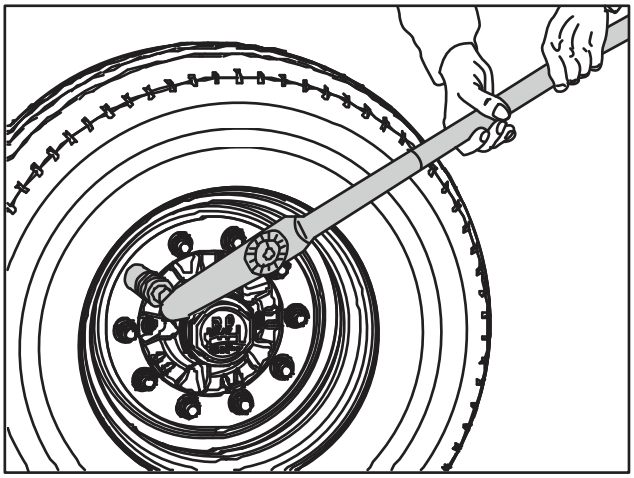
The disc brake's response is so good that a pressure lead is not necessary or should be restricted to a max. 0.2 bar.

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).

## 1 Check wheel nuts for tightness

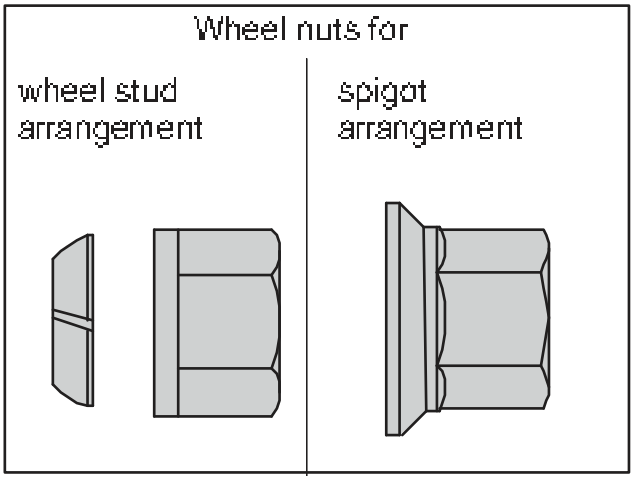
– after the first loaded journey or
after a wheel change –



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

Tightening torques for wheel nuts
M 22 x 1.5:
Wheel 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)!



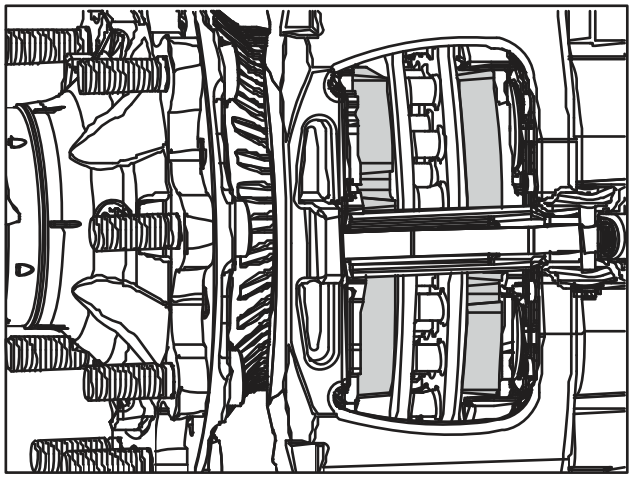
## Maintenance and Visual Inspection - Disc brakes type TSB

### 2 Check brake pad thickness

– quarterly –

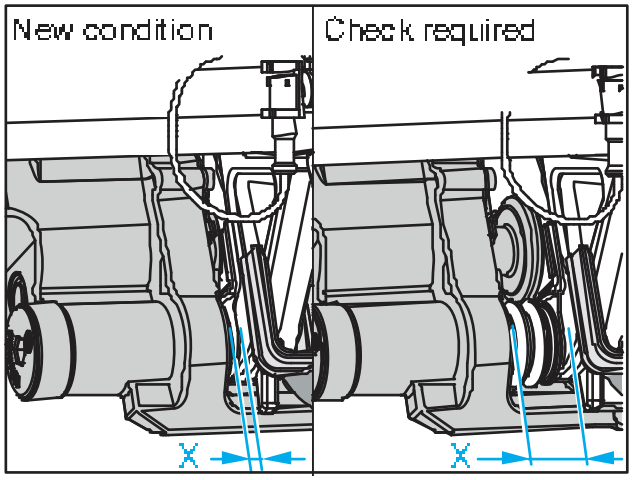
The brake pad thickness must be checked regularly, e.g. during the tyre inflation pressure check. The intervals must not be more than 3 months.

The brake pad thickness can be checked where the brake caliper meets 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 |
| 30 mm | => max. permissible brake pad wear, 21 mm |
| 34 mm | => max. permissible wear for brake pad and brake disc |

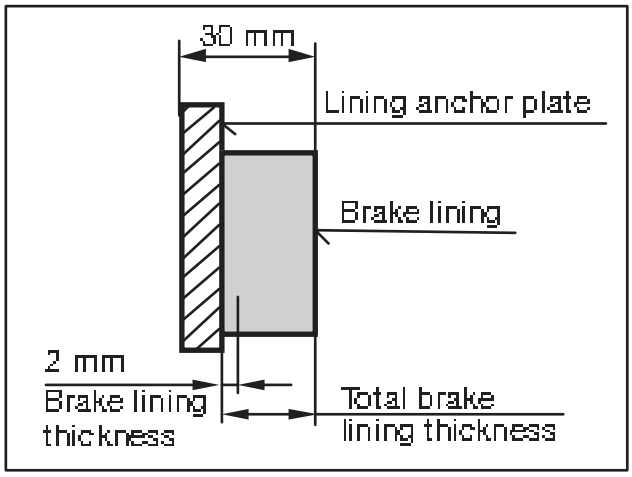



The brake pads must be removed to inspect them more closely, see relevant workshop manual.

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

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

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




### – Visual inspection

– every six months –

Check all components for damage, wear and corrosion.

## 3 Brake disc

Check the condition of the brake disc
– every 6 months when used within Europe, quarterly when used outside Europe –

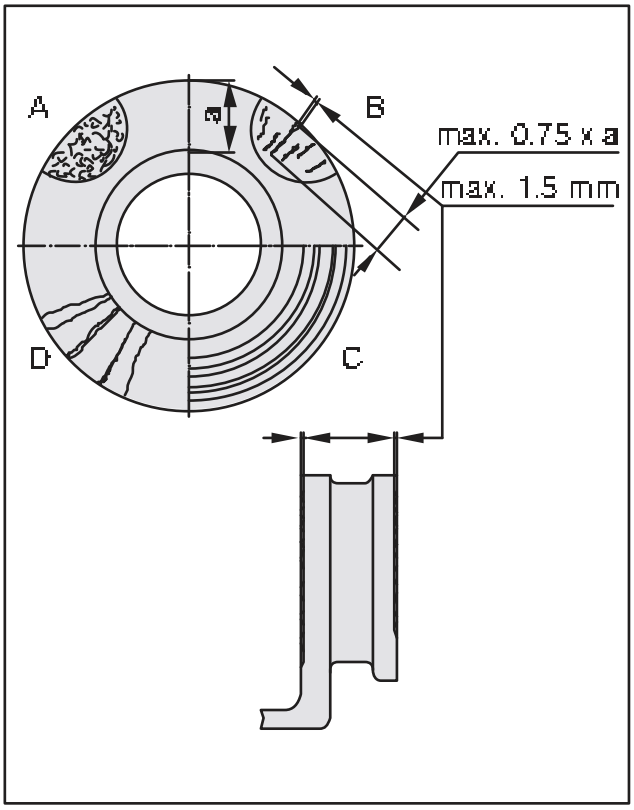
Sections A - D (see fig.) show the possible conditions of the disc surface:

**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)

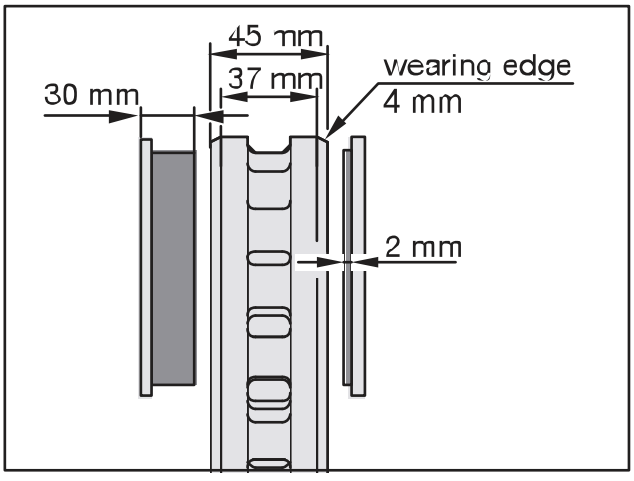
In the case of surface conditions **A** - **C**, the brake disc can be used until the minimum permissible disc thickness has been reached.

☞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.



## Maintenance and Visual Inspection - Disc brakes type TSB

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

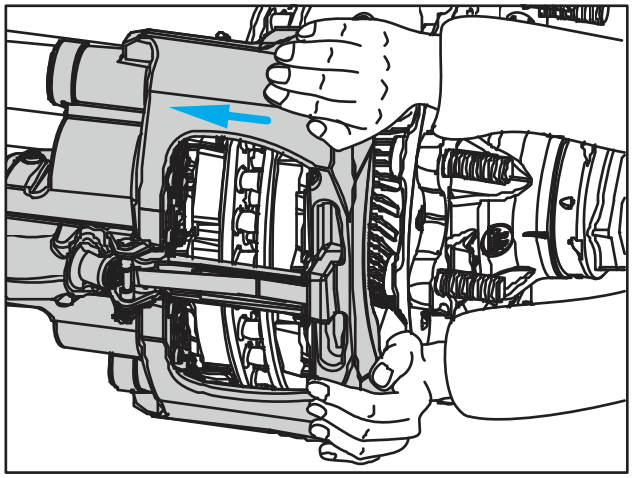
– every 6 months when used within Europe, quarterly when used outside Europe – (e.g. within the scope of the statutory checks)

Prevent the vehicle from rolling away.

Release the service and parking brakes. The brake cylinder and fasteners for the brake pads can remain fitted.

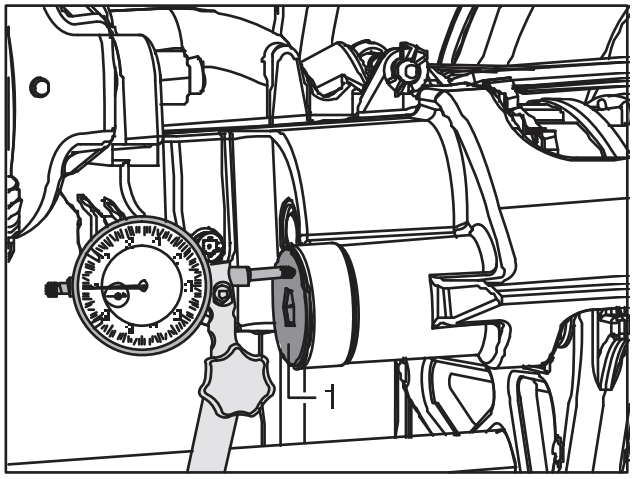
Forcefully push the sliding caliper in the axle direction. The caliper must move approximately 0.5 to 1.0 mm (play).

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.

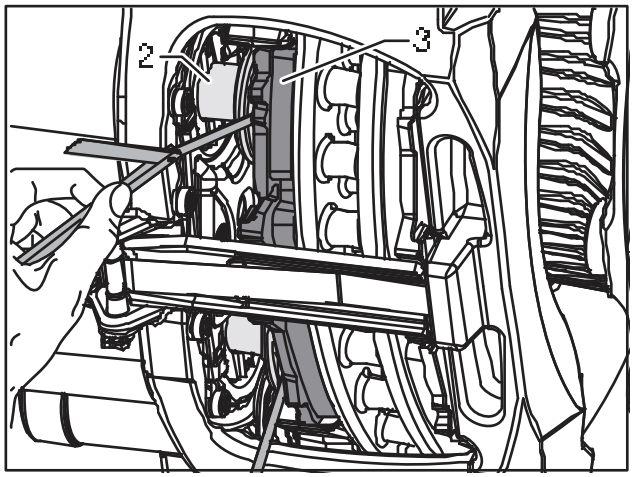



For close inspection of play with wheels removed:

Check the play using two feeler gauges.

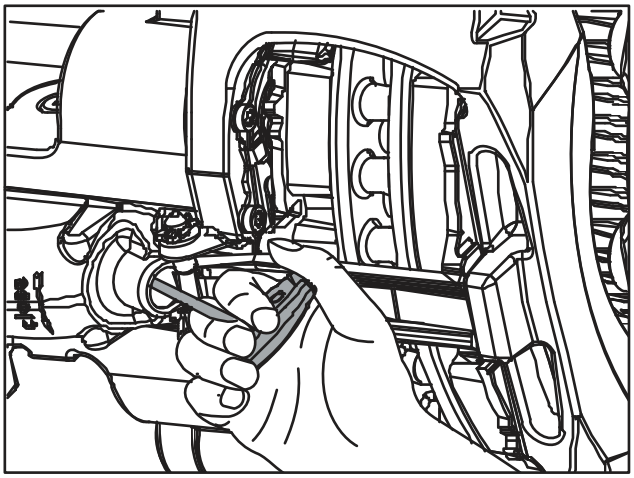
Forcefully push the sliding caliper toward the centre of the axle and insert the gauges between the pressure plates (2) and pad backing plate (3).

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



Set play and check adjustment

1. Remove the plug.
2. Using a torx wrench (T25), depress the return spring and turn **clockwise** until it skips 3 to 4 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 0.5 and 1 mm. **Adjustment is correct if play is within this tolerance.**
5. Reinsert the plug.



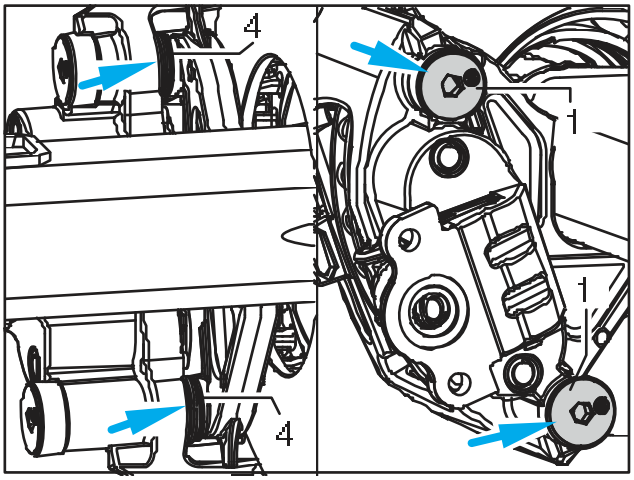
Check brake caliper guide:

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 screw plugs for cracks, damage, and proper seating and replace if necessary. **Screw plugs that have been removed must be replaced, not re-used.**

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



## Maintenance and Visual Inspection - Disc brakes type TSB

### 5 Check coarse dirt seals at the tappets

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

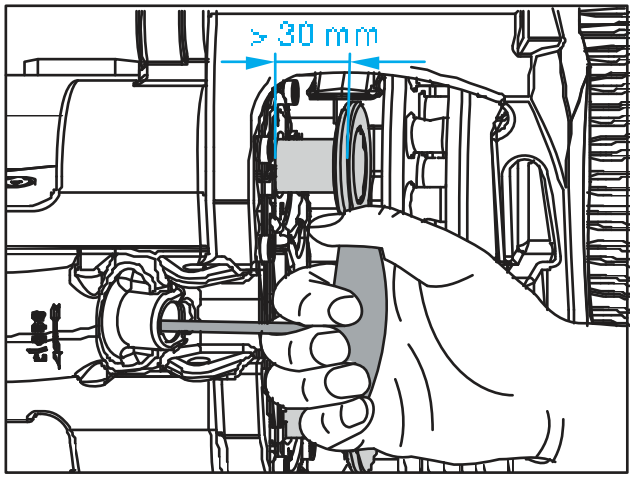
Prevent the vehicle from rolling away.

Release the service and parking brakes.

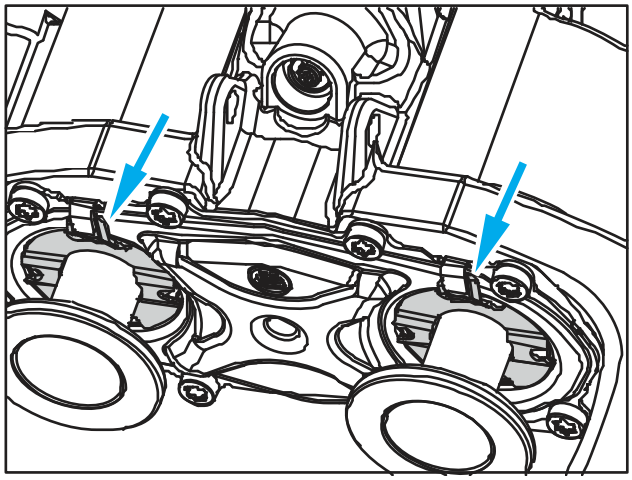
See workshop manuel ECO Disc for information on how to remove the brake pads. The service brake and spring actuator must be released.

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

Ensure proper seating. (Visual inspection)



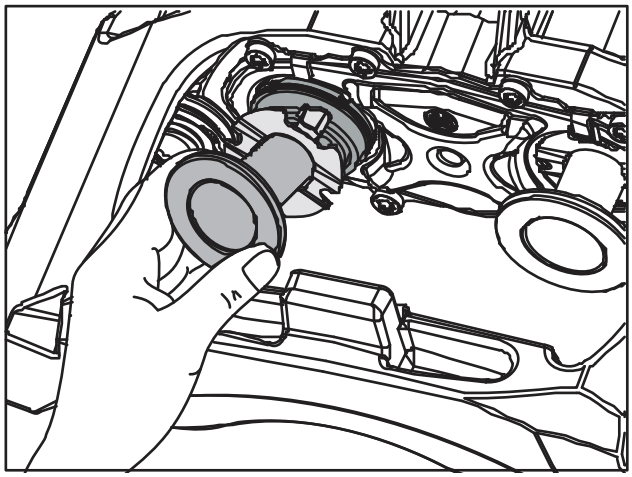

Repair guide:
Penetrating dirt and damp cause corrosion and affect the operation of the clamping mechanism and adjustment.



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 manuel ECO Disc for information on how to replace the bellows.

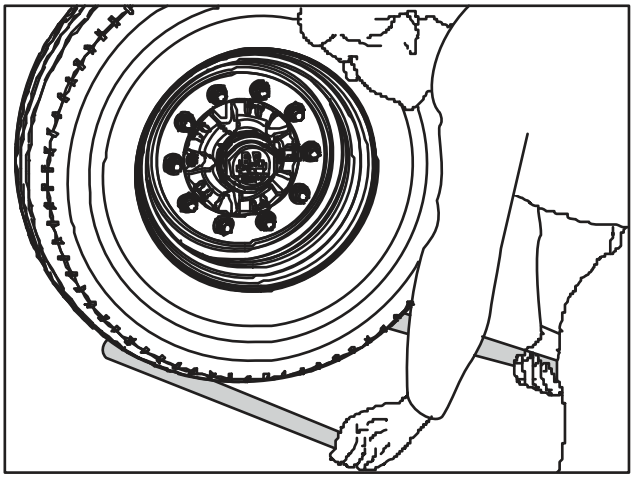


## Check the bearing play of the ECO Unit

– 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 27 to 29.

Valid: 01.10.2009

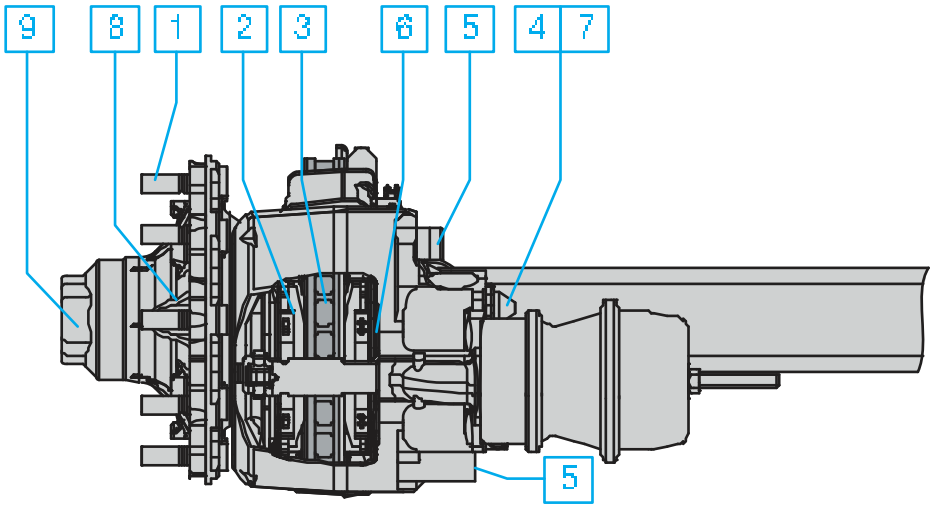
## Maintenance work and visual inspection

### Overview

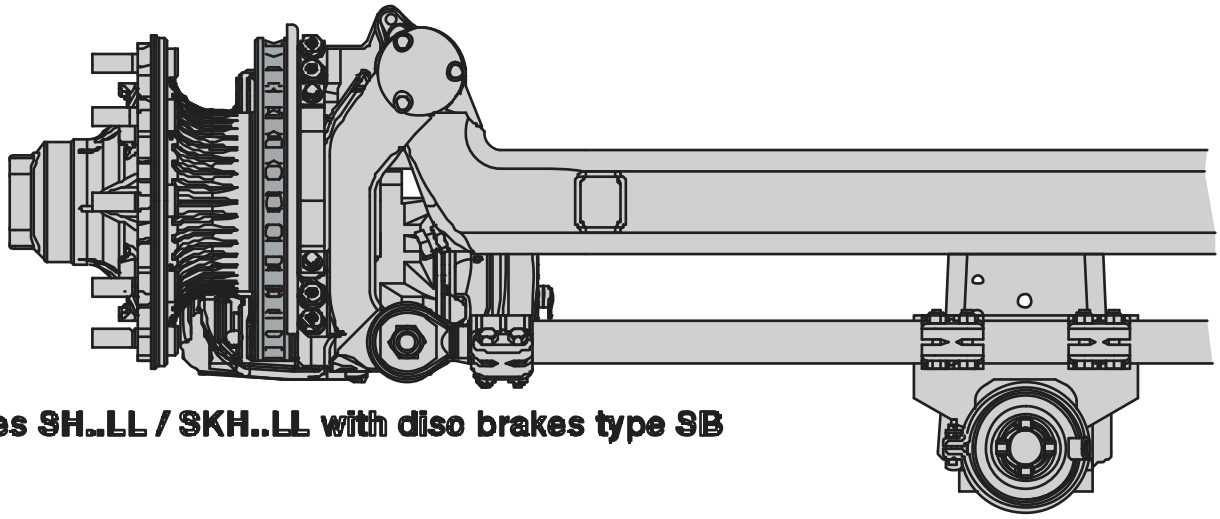
For detailed description, see pages 44 - 55
Disc brakes type TSB, see pages 32 - 41
Air suspension, see pages 56 - 71
Suspension, see pages 72 - 81

| Maintenance work - Disc brake<br>Brake type: SB 3308, SB 3745, SB 4309, SB 4345 | initially | every 12 weeks | every 26 weeks [2] | at every brake lining replacement, latest annually [2] |
|---|---|---|---|---|
| 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 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 | | | 6 [3] | 6 |
| - ECO axles and axles with conventional hub bearing | | | 6 | |
| 7 Check caliper unit. | | | | |
| - ECO Plus 2 and ECO$^{Plus}$ axles | | | 7 [3] | 7 |
| - ECO axles and axles with conventional hub bearing | | | 7 | |
| 8 Check wheel hub bearing play, adjust if necessary. | | | | |
| - ECO Plus 2 and ECO$^{Plus}$ Unit | | | | 8 |
| - ECO Unit and conventional hub bearing | | | 8 | |
| 9 Check caps for tightness. (not necessary with ECO Plus 2 and ECO$^{Plus}$ axles) | | | 9 | |

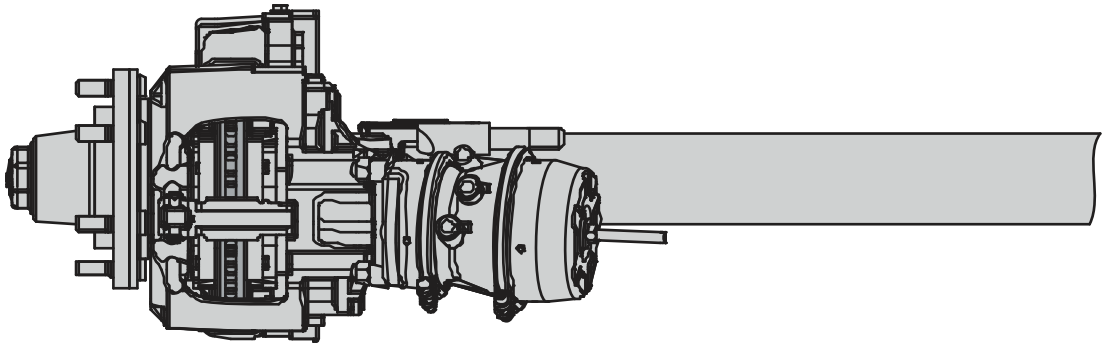
1) after the first run under load conditions, likewise after each wheel change.
2) under extreme conditions, increase frequency (eg. construction sites and poor roads)
3) for use outside Europe




**Series SH / SKH with disc brakes type SB**



**Series SH..LL / SKH..LL with diso brakes type SB**



**Series SNR with disc brakes type SB**

## Maintenance and Visual Inspection - Disc brakes type SB

### Premature brake pad wear on the disc brake

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.

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 5000 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.

The disc brake's response is so good that a pressure lead is not necessary or should be restricted to a max. 0.2 bar.

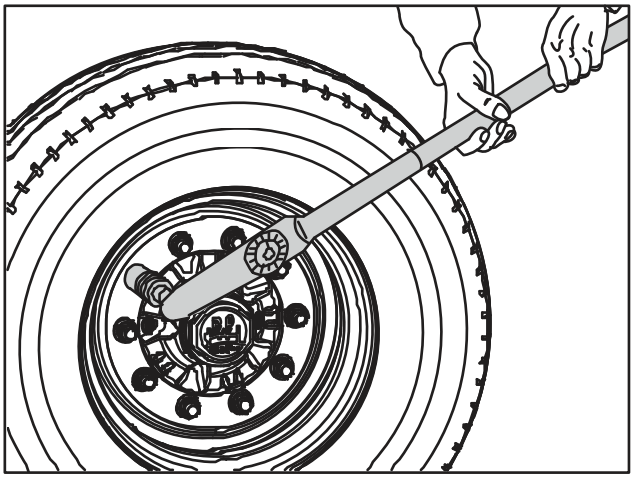
Other possible solutions to premature brake pad wear:

- 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).

## 1 Check wheel nuts for tightness

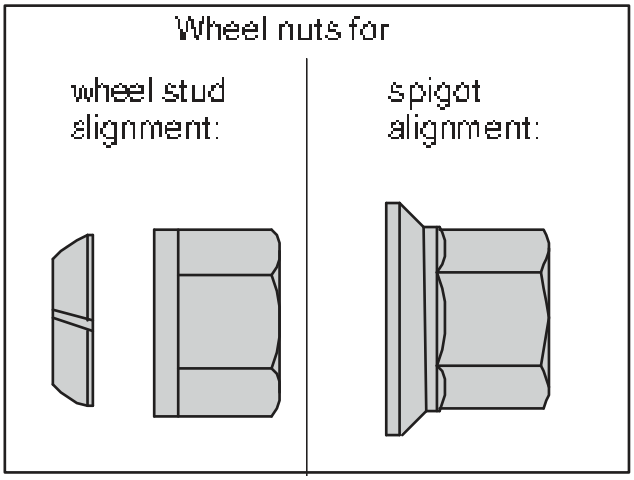
– after the first loaded journey or
after a wheel change –

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



Tightening torques for wheel nuts
M 18 x 1.5:
Wheel stud alignment:
**290 Nm** (275 - 305 Nm)
Spigot alignment:
**350 Nm** (330 - 370 Nm)

M 22 x 1.5:
Wheel 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)!

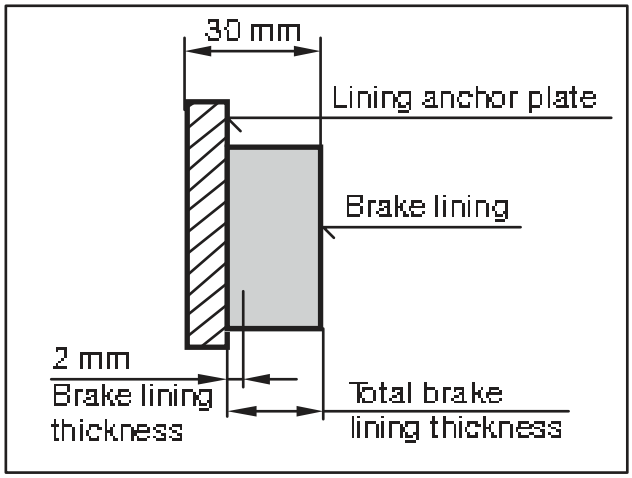
## Maintenance and Visual Inspection - Disc brakes type SB

### 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.

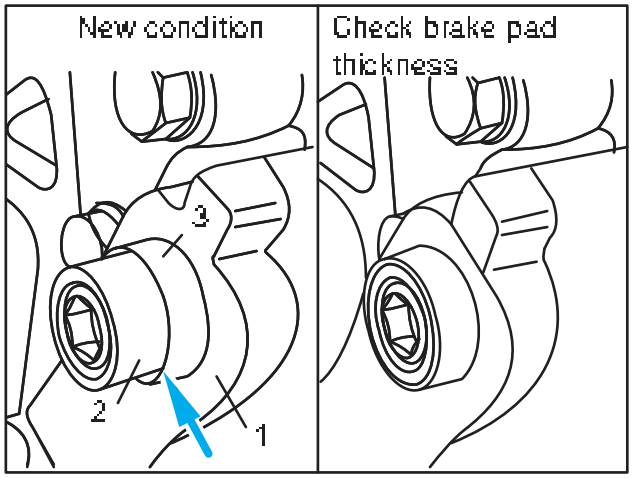
The thickness of the remaining pad must **not be less than 2 mm** (check with slide gauge).




☞Open bearing:

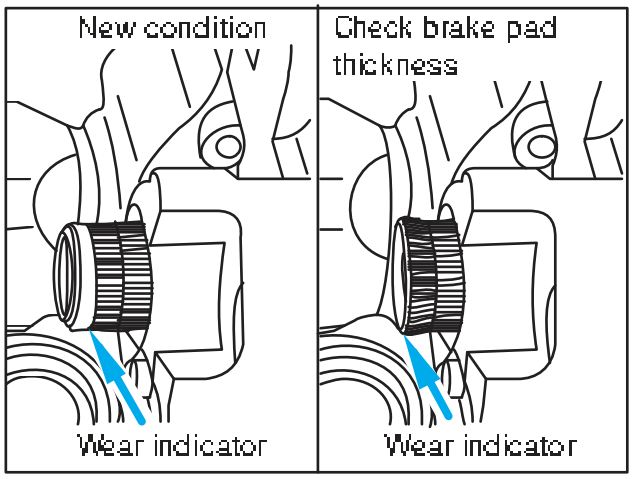
The thickness of the brake pad can be checked by the position of the brake caliper (1) in relation to the guide rod (2) (rough indication of wear).

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.

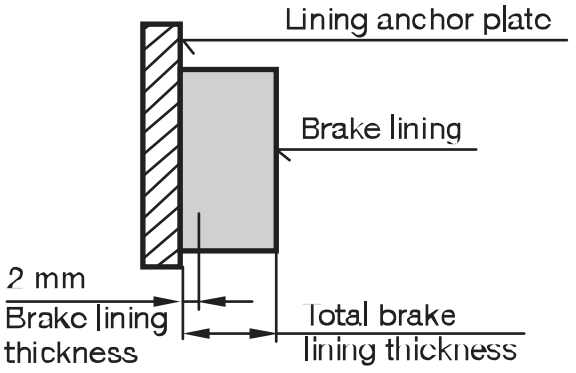


## Check brake pad thickness SB 3308

– 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.

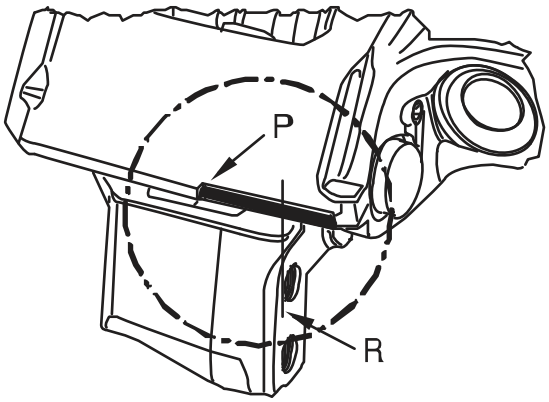
The thickness of the remaining pad must **not be less than 2 mm** (check with slide gauge).



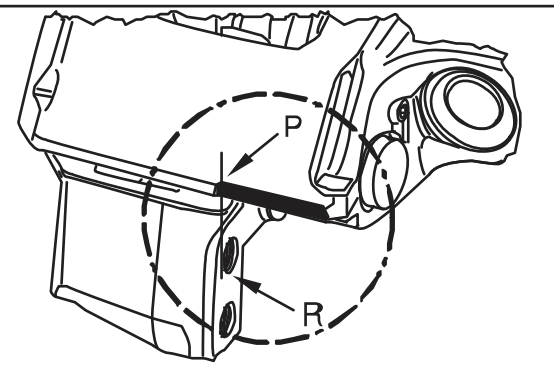

The brake pad thickness can be checked with the wheels attached by means of the position of the brake caliper marking (P) in relation to the fixed brake carrier flange (R).

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

## Maintenance and Visual Inspection - Disc brakes type SB

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

– quarterly –

**Visual inspection**

– every six months –

Check all components for damage, wear and corrosion.

**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:

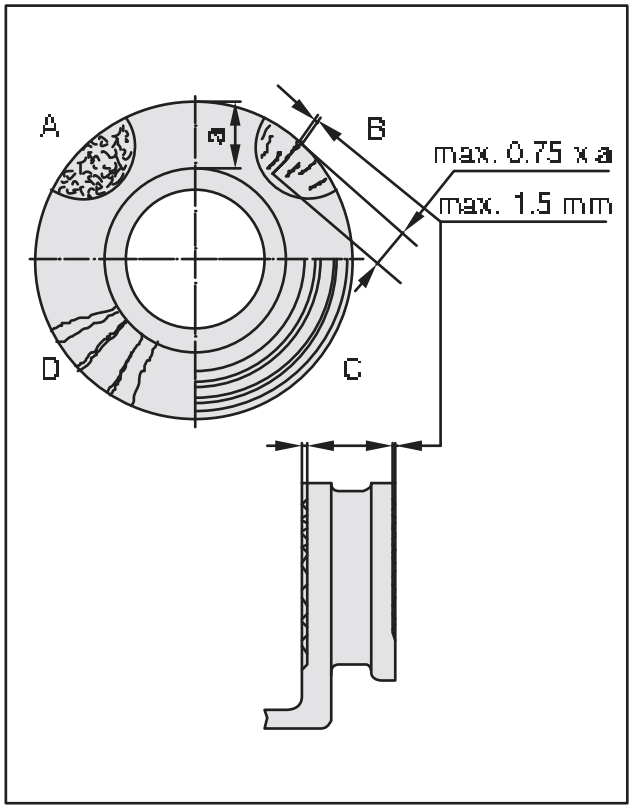
**A:** Network-type tears = permissible

**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!

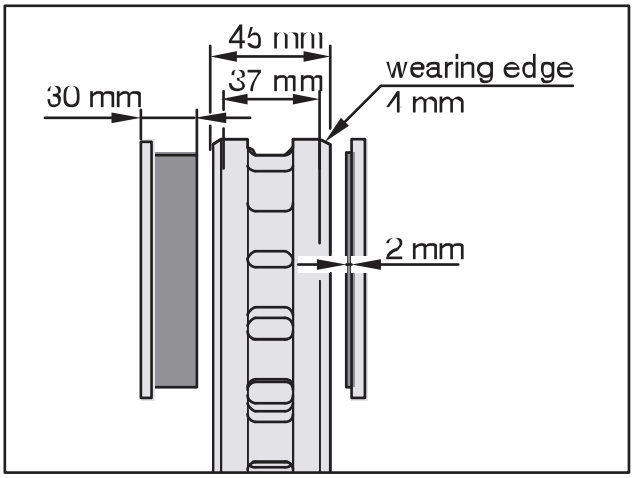
To prevent damage to the brake discs, the brake pads should be replaced when their thickness (excluding backing plate) is **2 mm** or less.

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

**SB 3745 / SB 4309 / SB 4345**

Technical details:

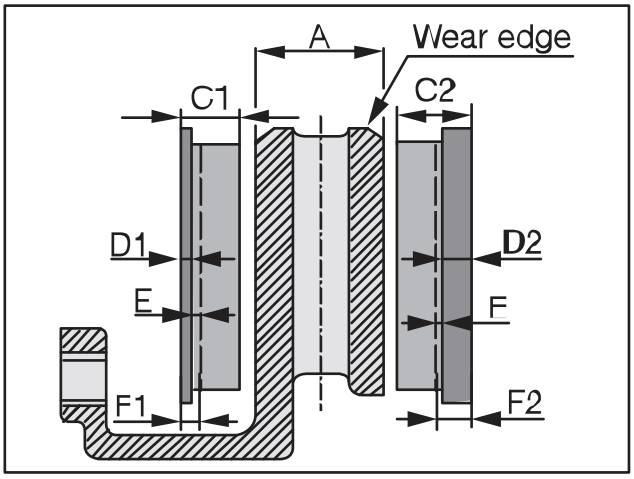
- disc thickness, new = 45 mm
- minimum permissible disc thickness (check with slide gauge) = 37 mm




**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 |

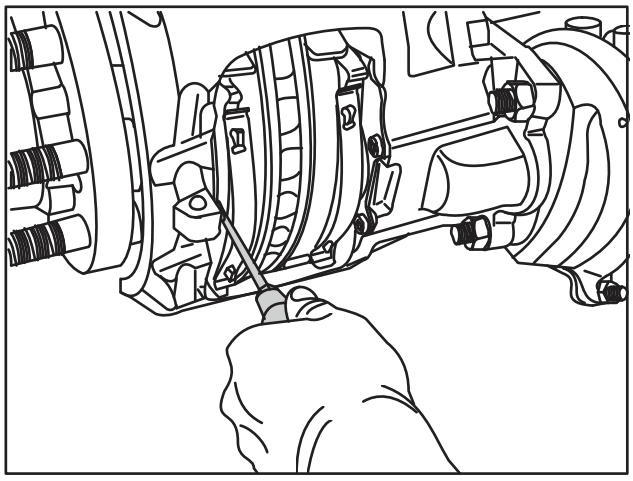


## Maintenance and Visual Inspection - Disc brakes type SB

### 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.

☞NB!

If the air gap is too large, the braking effect may fail.

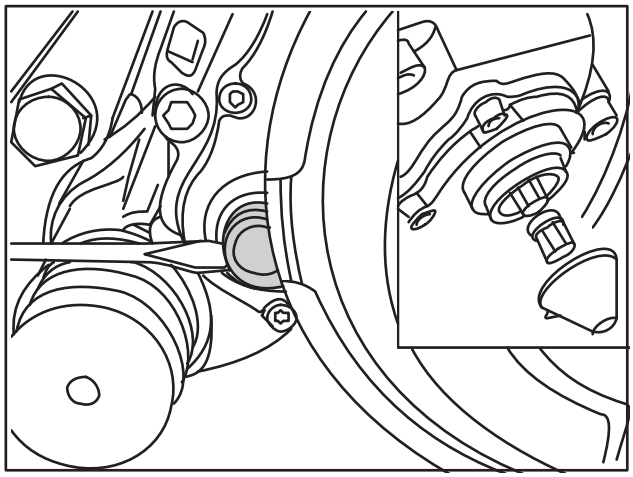
If the air gap is too small the brake may overheat and cause further damage.

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

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.

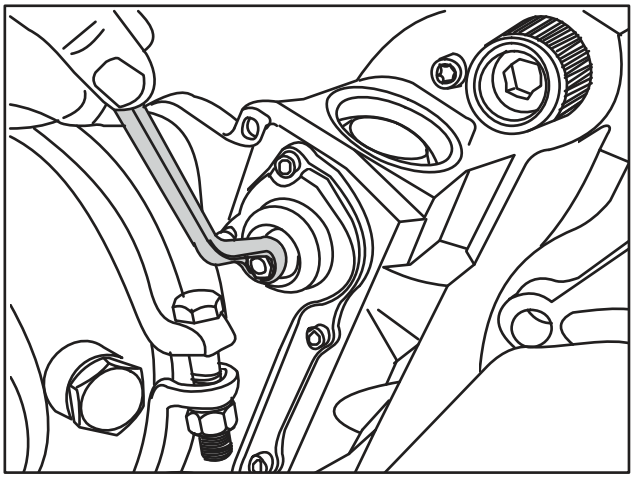
Remove ring spanner.

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.

If the following faults occur:

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.



## Maintenance and Visual Inspection - Disc brakes type SB

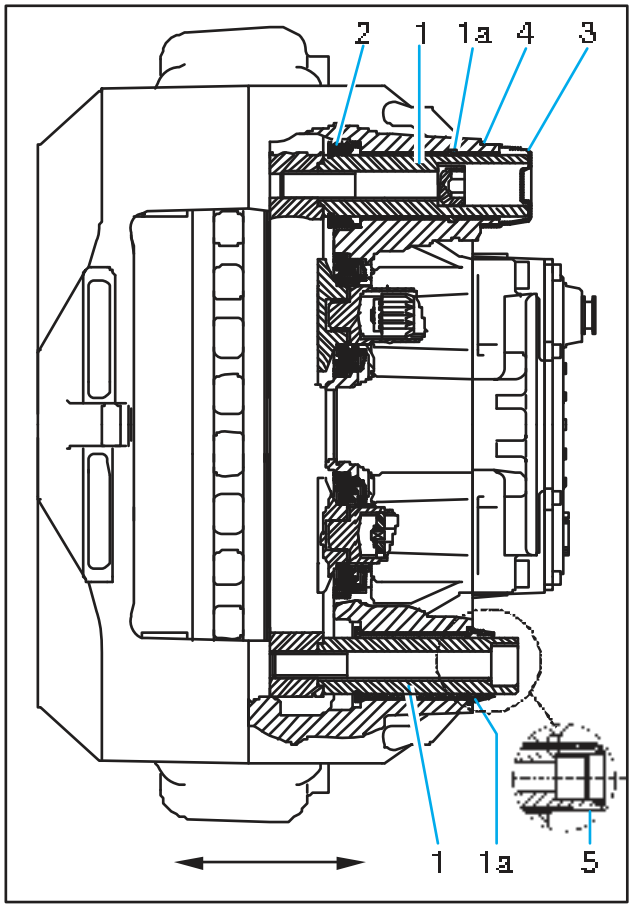
### 5 Check the brake caliper guide system

– 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 hand-brake.

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**

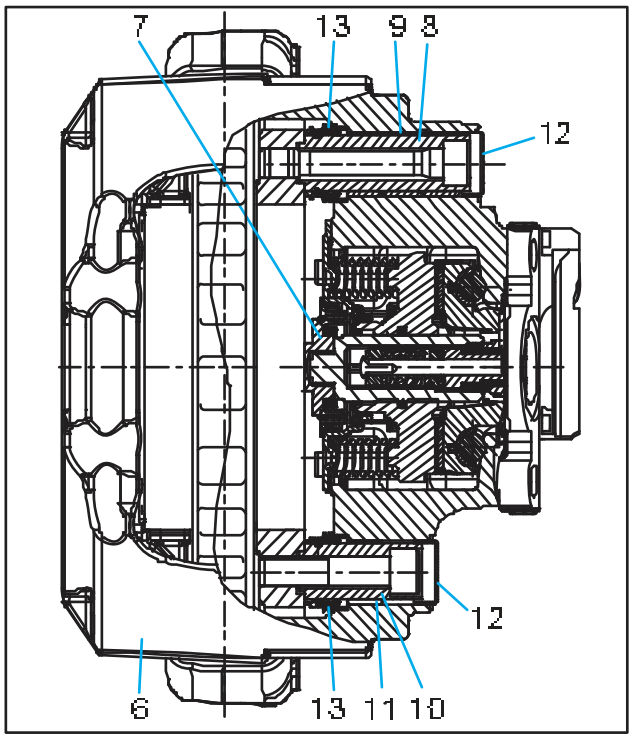
<u>Ability of the caliper to slide to the full extent of the caliper guides:</u>

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 calliper (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.

<u>Check caliper guide seals:</u>

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.



## Bellows on the thrust tappets

– 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.

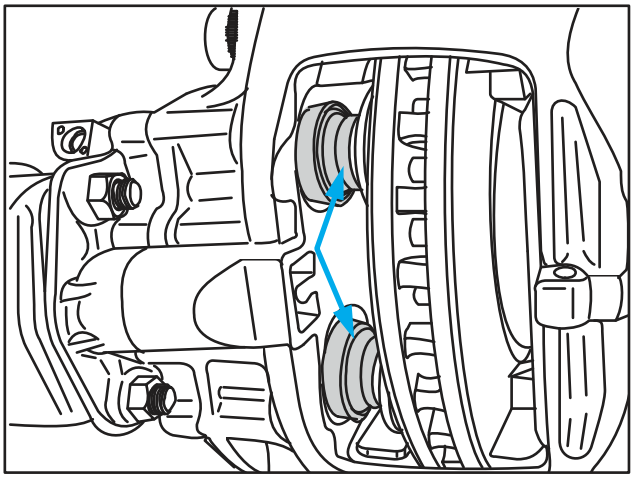
Remove the brake pads, if necessary.
The service brake and the spring-loaded parking brake must be in the released state. Use the adjuster to extend the pressure pad,
SB 3745 / SB 4309 / SB 4345 max. 30 mm,
SB 3308 max. 40 mm,
until the bellows seal is clearly visible.

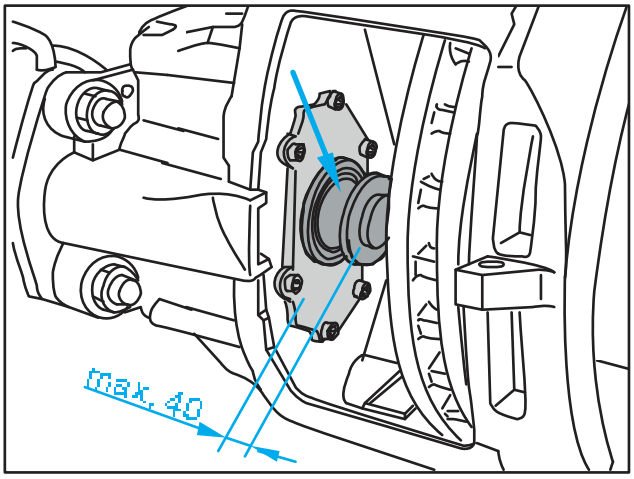
The bellows on the tappets (arrow) must have no splits or damage.

Check for correct fitting.

**Advice: 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

## Maintenance and Visual Inspection - Disc brakes type SB

### 7 Check the caliper

– 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 –

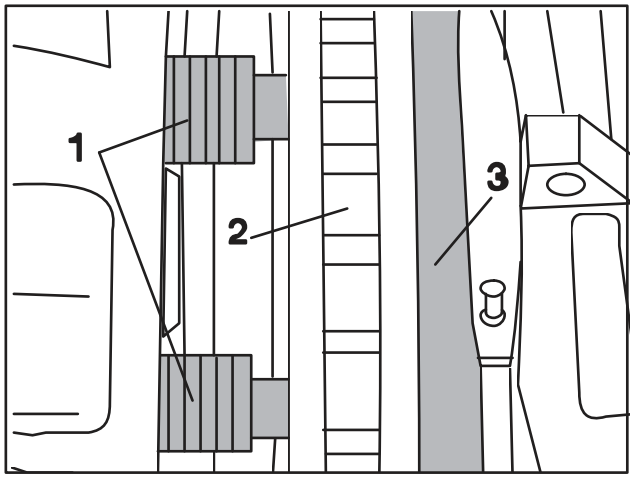
If damage to the parts becomes visible on the thrust tappet when the bellows are checked, both bellows must be dismantled. The parts which have been removed must be replaced by new ones.

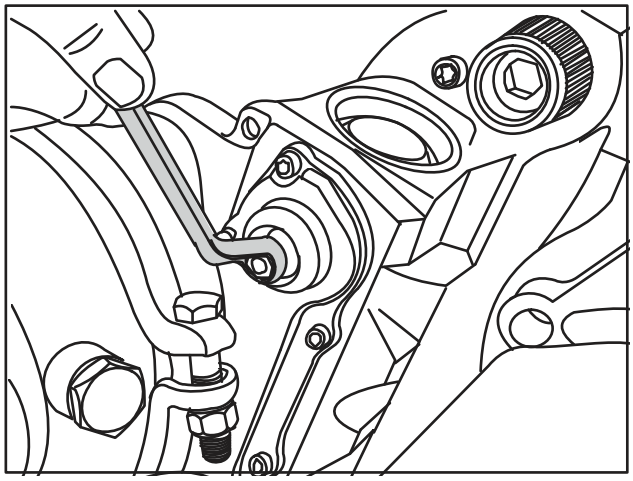
Before the new parts are fitted, check that the adjusting unit is free of corrosion and operates smoothly.

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).

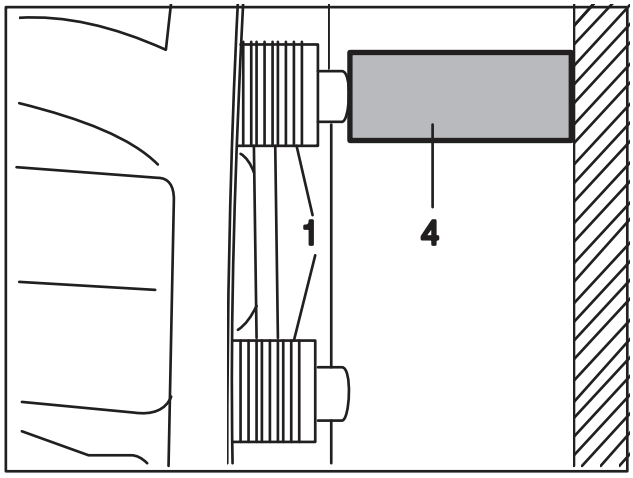
The threads of the threaded tubes (1) can be checked during the turning process for corrosion damage.

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



☞Advice:
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.



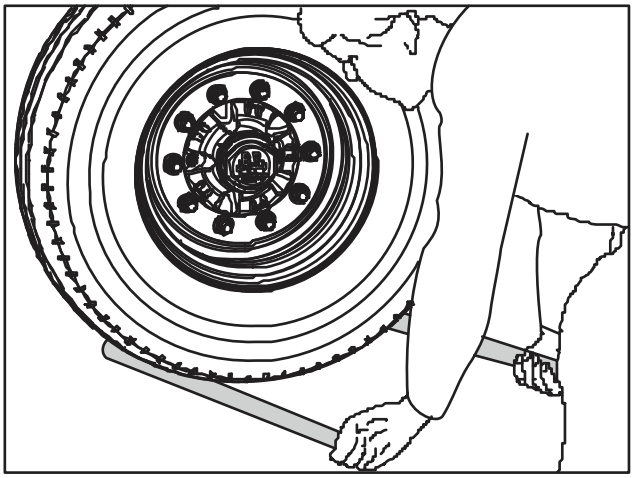

☞To prevent the threaded tubes from being wound completely out of the caliper when working on a work bench, insert a separator (approx. 75 mm, in the case of SB 3308, approx. 60 mm) between the tubes and the caliper housing.

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

## 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 27 - 31.



## 9 Check caps for tightness

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

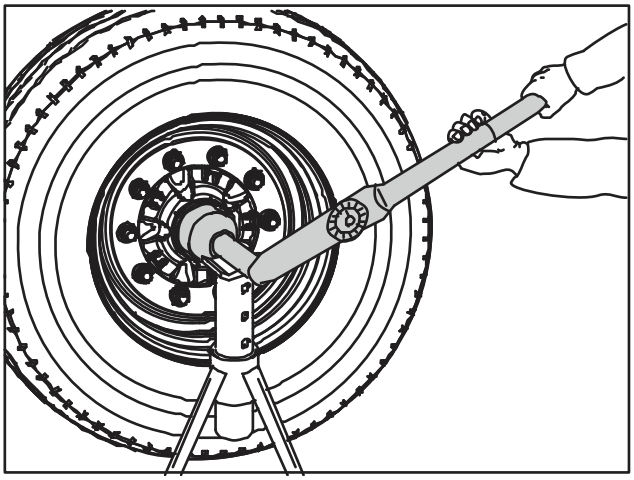
– every 6 months and/ or as part of any other service inspection –

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 |

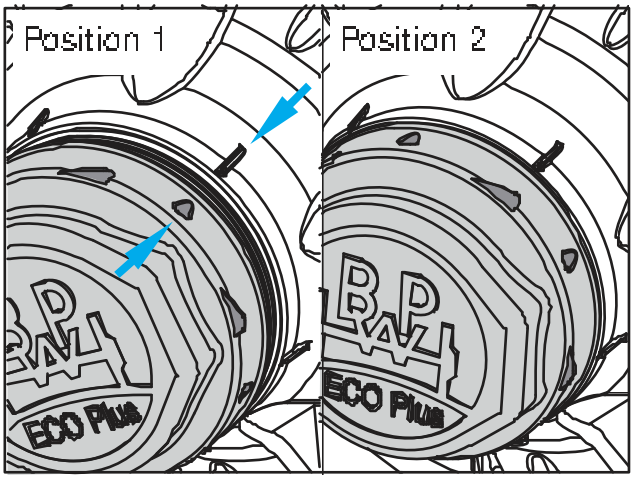
In an emergency the caps can be tightened using a normal cap spanner (vehicle tool kit) by striking the latter with a hammer, or also with the aid of a piece of tubing, inserted into the spanner.
Caps with integrated hubodometers must be fitted and dismantled using only torque controlled (not impact!) 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.



Valid: 01.10.2009

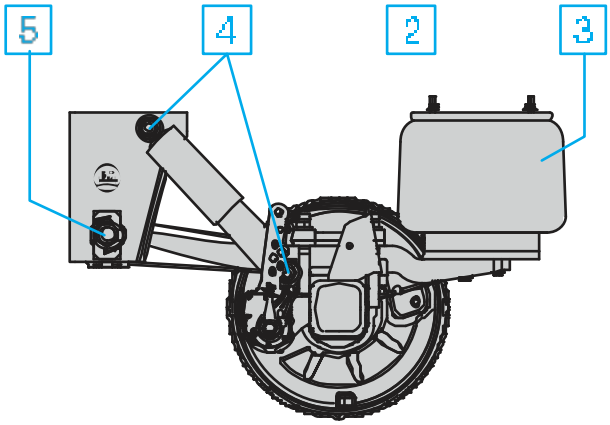
## Lubrication and maintenance work

### Overview

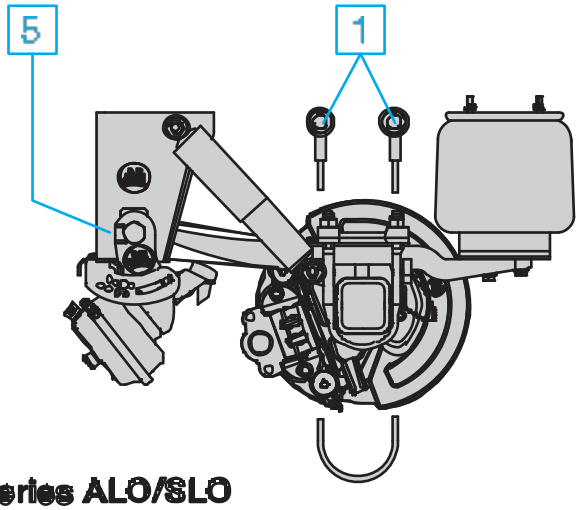
For detailed description, see pages 62 - 70
Suspension, see pages 72 - 81

| | within 2 weeks of first journey under load, latest after 2000 km. [1] | Visual checks during the guarantee 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-LiPus and check for wear. | ◯ | | ◯ [3] |
| – Visual inspection, check all component parts 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:<br>M 20 (SW 30) M = **320 Nm** (300 - 350 Nm)<br>M 24 (SW 36) M = **420 Nm** (390 - 460 Nm)<br>for aluminium hanger brackets<br>M 24 (SW 36) M = **320 Nm** (300 - 350 Nm) | ☐ | ☐ | ☐ |
| 5 Check spring pivot bolts for tightness. Tightening torque with a torque wrench:<br>Hanger brackets and channel crossmember Airlight II from 09/2007:<br>M 24 (SW 36) M = **650 Nm** (605 - 715 Nm)<br>Hanger brackets from 8/2001:<br>M 30 (SW 46) M = **900 Nm** (840 - 990 Nm)<br>Hanger brackets up to 7/2001:<br>M 30 (SW 46) M = **750 Nm** (700 - 825 Nm)<br>Channel crossmember:<br>M 30 (SW 46) M = **900 Nm** (840 - 990 Nm) | ☐ | ☐ | ☐ |

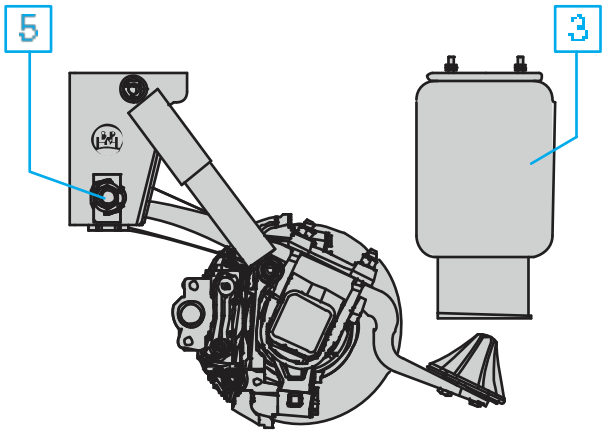
[1] ECO Plus Units with Airlight II and Airlight Direct air suspension are maintenance-free in on-road applications and do not need to be retightened (see warranty documents ECO Plus)
[2] under extreme conditions, with more frequency.
[3] check twice annually



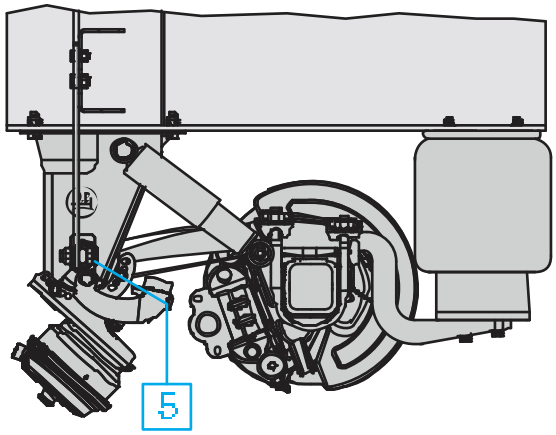

**Series ALO/SLO**



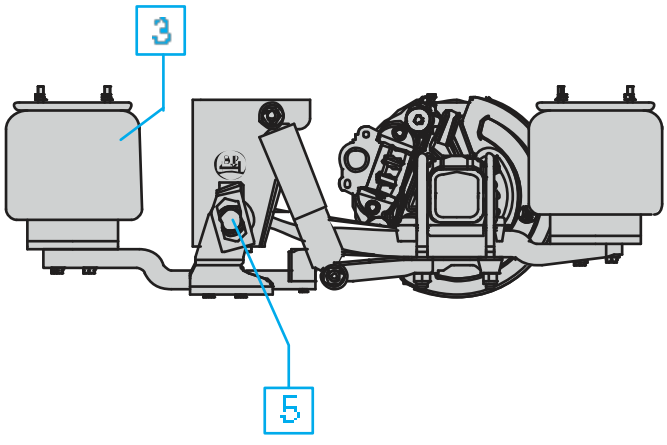

**Series ALO/SLO with two-sided axle lift**



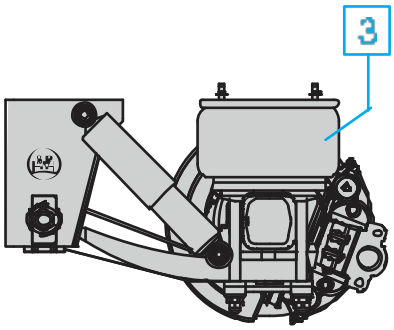

**Series ALM/SLM with Kombi-Air Bag II**




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




**Series ALU/SLU with sidewise mounted axle lift**




**Series DLU - Airlight Direct**

Valid: 01.10.2009

## Lubrication and maintenance work

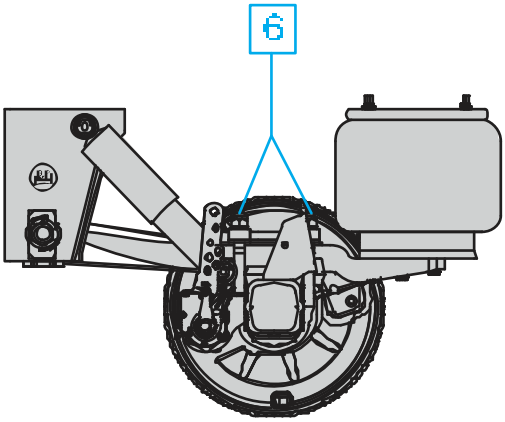
### Overview

For detailed description, see pages 62 - 70
Suspension, see pages 72 - 81

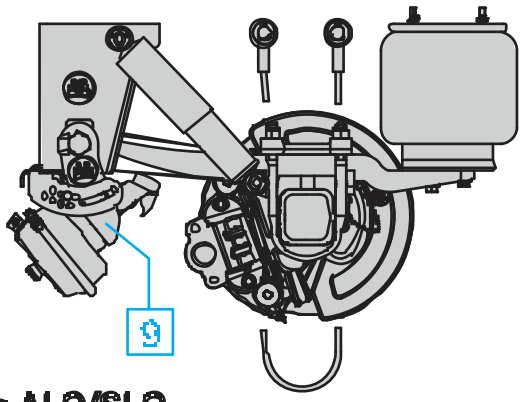
| | within 2 weeks of first journey under load, latest after 2000 km. [1] | Visual checks during the guarantee period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months. | annually [2] |
|---|---|---|---|
| 6 Check spring mounting kit for tightness.<br>Tightening torque with a torque wrench:<br>M 20 (SW 30) M = **340 Nm** (315 - 375 Nm)<br>M 22 (SW 32) M = **550 Nm** (510 - 605 Nm)<br>M 24 (SW 36) M = **650 Nm** (605 - 715 Nm)<br>when mounting new spring mounting kits for Airlight II M 22 (SW 32):<br>M = 550 Nm + 90° tightening angle | ☐ | ☐ | ☐ |
| 7 Check the bolt connection between the air suspension hanger bracket and the longitudinal member for tightness.<br>Tightening torques with a torque wrench:<br>M 16 M = **260 Nm** (240 - 285 Nm) | ☐ | ☐ | ☐ |
| 8 Tighten the spring bolt to gusset plate connecting bolt.<br>Tightening torques with a torque wrench:<br>M 18 x 1.5 M = **420 Nm** (390 - 460 Nm) | ☐ | ☐ | ☐ |
| 9 Check axle lift for tightness.<br>Tightening torques with a torque wrench:<br>Cylinder<br>M 16 M = 180 - 210 Nm<br>Supporting arm<br>M 16 M = 230 Nm<br>Axle lift for bolted-on air suspension hanger bracket<br>M 12 (SW 24) M = 120 Nm<br>M 12 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)

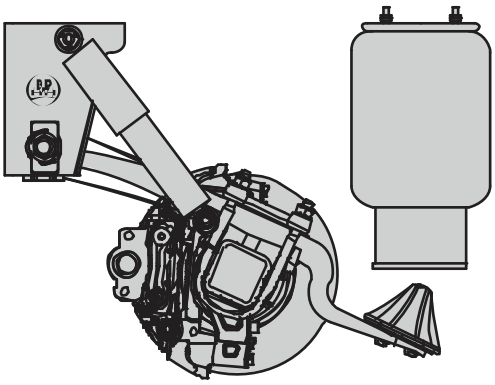
[2] under extreme conditions, with more frequency.



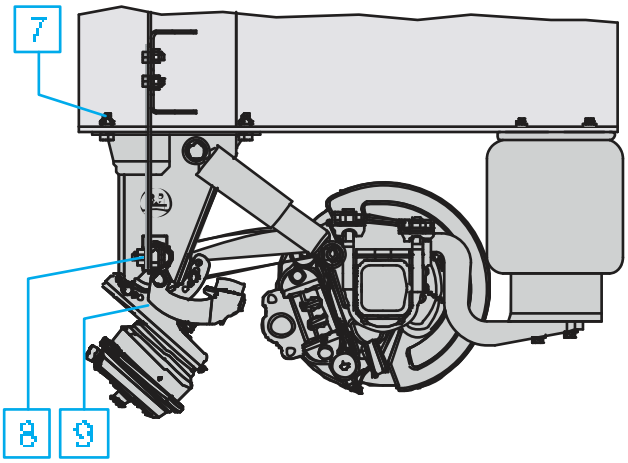

**Series ALO/SLO**



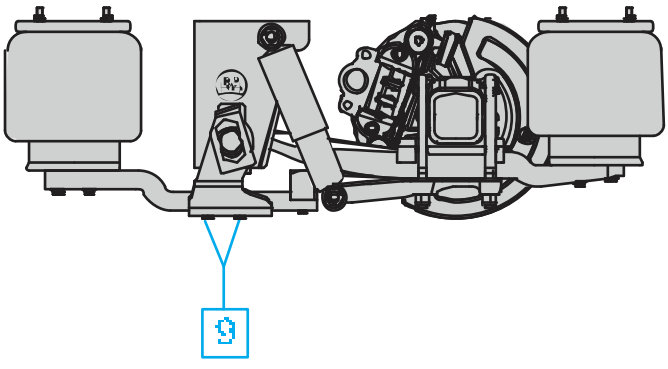

**Series ALO/SLO with two-sided axle lift**



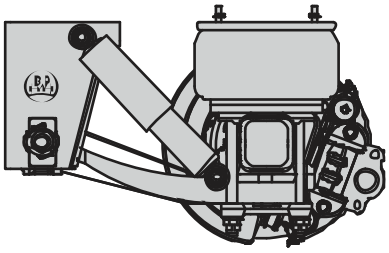
**Series ALM/SLM with Kombi-Air Bag II**




**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**

Valid: 01.10.2009

## Lubrication and maintenance work

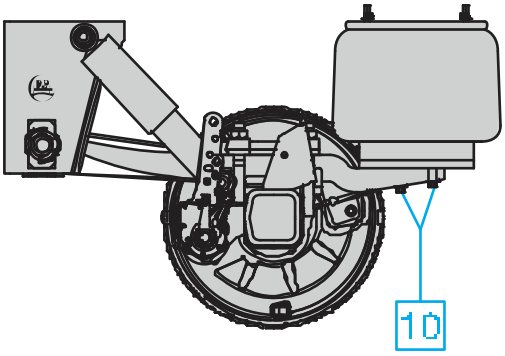
### Overview

For detailed description, *see pages 62 - 70*
Suspension, *see pages 72 - 81*

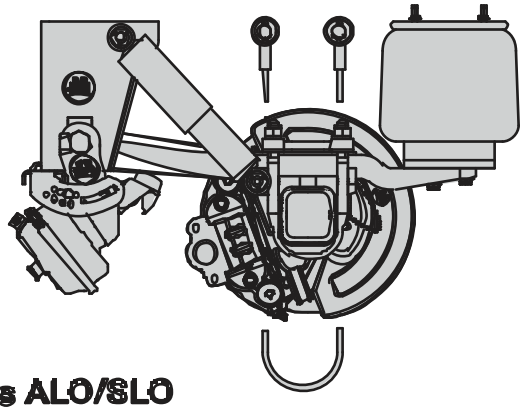
| | within 2 weeks of first journey under load, latest after 2000 km. [1] | Visual checks during the guarantee period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months. | annually [2] |
|---|---|---|---|
| 10 Check air bag fastening for tightness.<br>Tightening torques with a torque wrench:<br>M 12 M = 66 Nm<br>M 16 M = 230 Nm | ☐ | ☐ | ☐ |
| 11 Check stabilizer fastenings.<br>Tightening torques with a torque wrench:<br>M 10 M = 53 Nm<br>M 30 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)

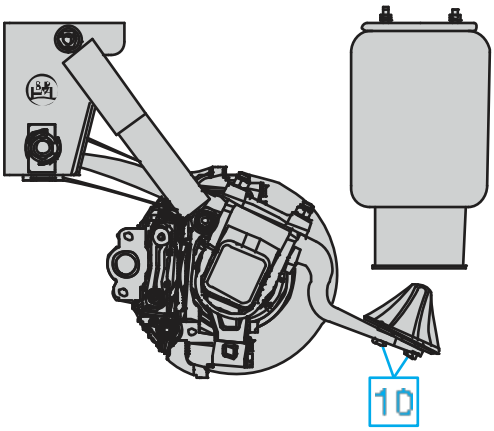
[2] under extreme conditions, with more frequency.



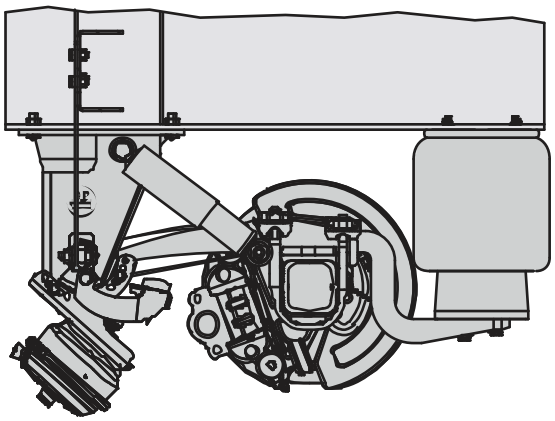

**Series ALO/SLO**



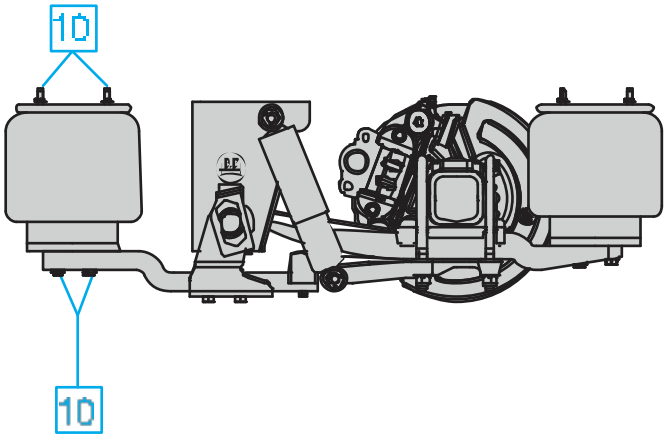
**Series ALO/SLO with two-sided axle lift**



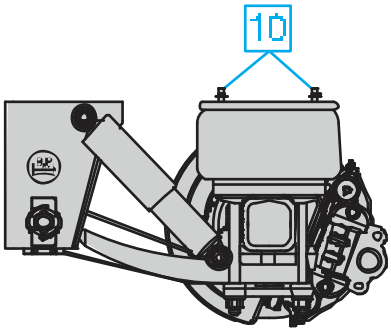

**Series ALM/SLM with Kombi-Air Bag II**



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




**Series ALU/SLU with sidewise mounted axle lift**



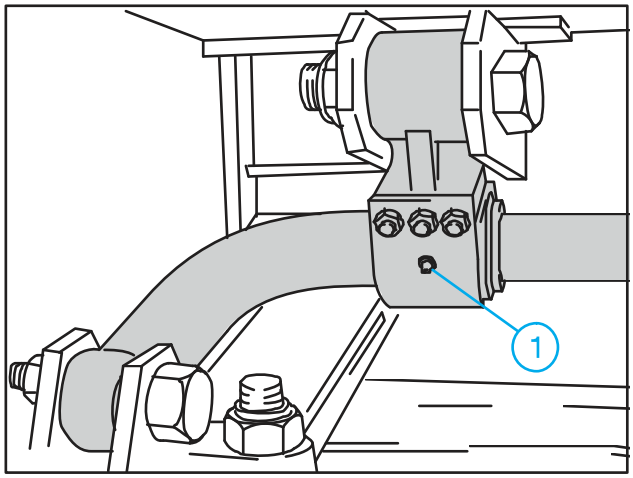

**Series DLU - Airlight Direct**

## Maintenance and Visual Inspection

### 1 Stabilizer bearing bushes

– Service intervals as shown on page 56 –

Grease stabilizer bearing bushes with BPW special longlife grease ECO-LiPlus and check for wear.




### – Visual inspection

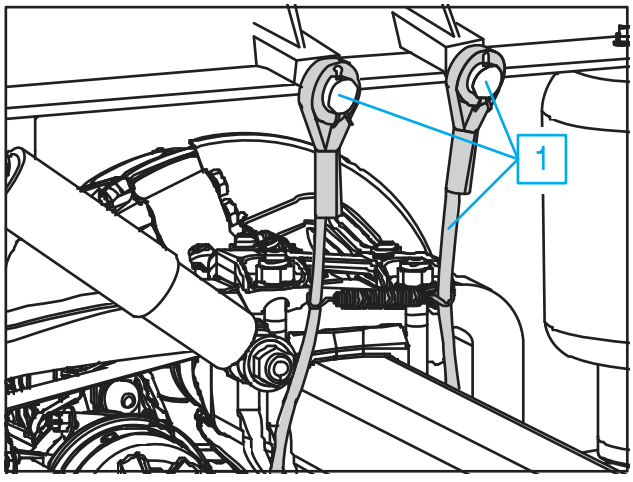
– Service intervals as shown on page 56 –

Check all component parts for wear and damage.

### 1 Check straps

– Service intervals as shown on page 56. –

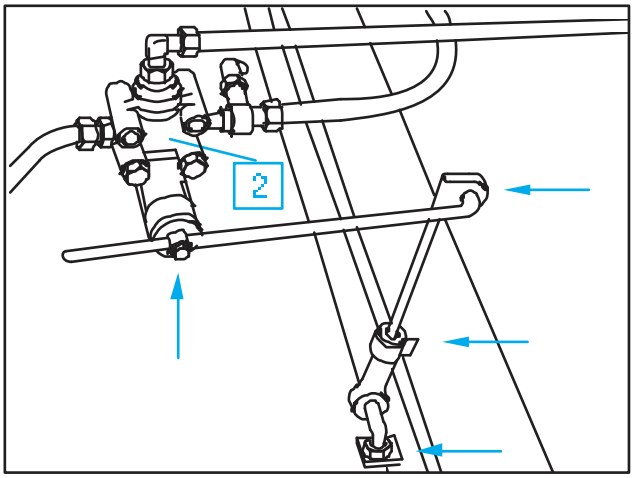
Examine checkstraps and attachment. Replace if necessary.



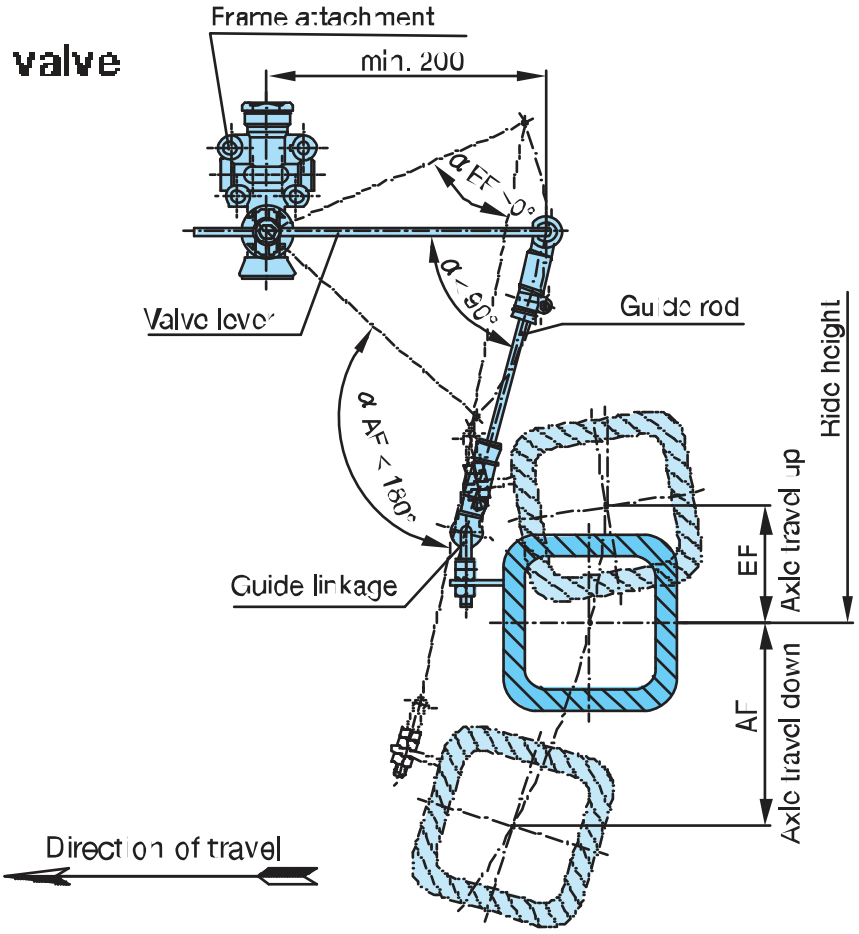
## 2 Air installation circuit

– Service intervals as shown on page 56 –

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

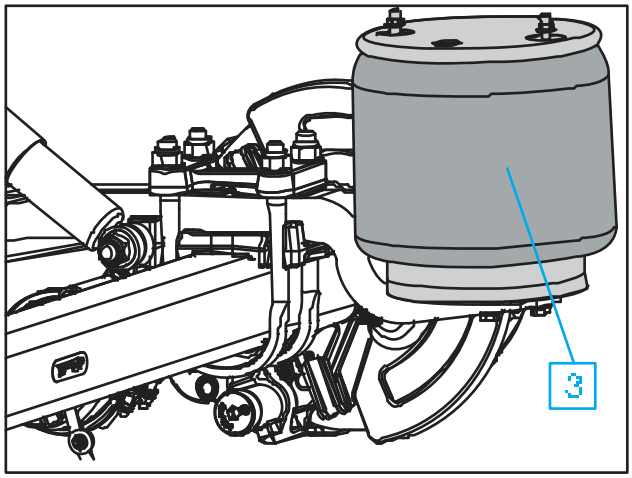


## Maintenance and Visual Inspection

### 3 Air bags

– Service intervals as shown on page 56 –

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



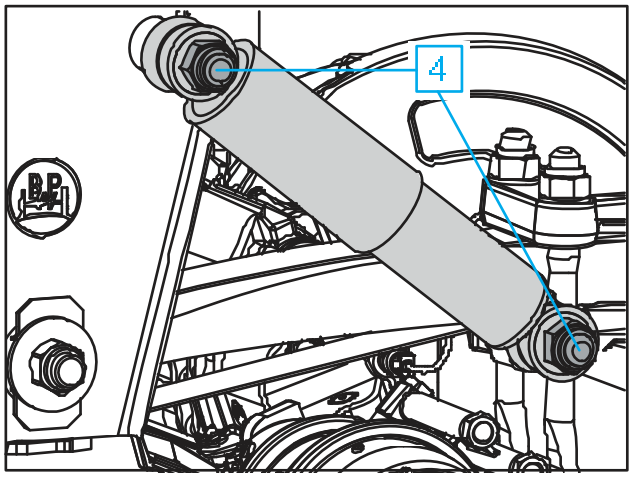

**Safety notice**

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 56 –

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)

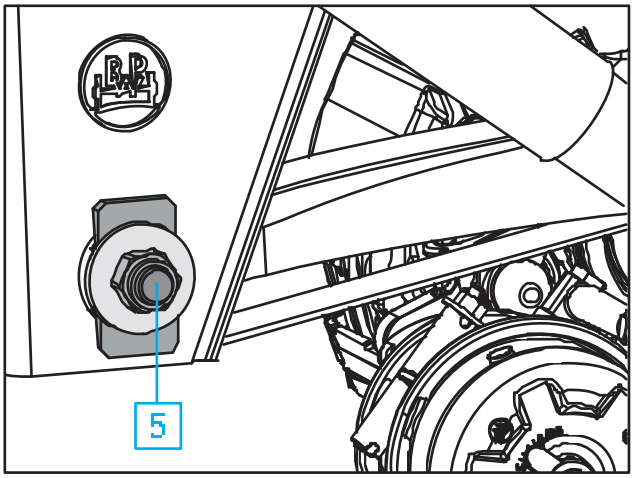


## 5 Spring pivot bolts

– Service intervals as shown on page 56 –

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.



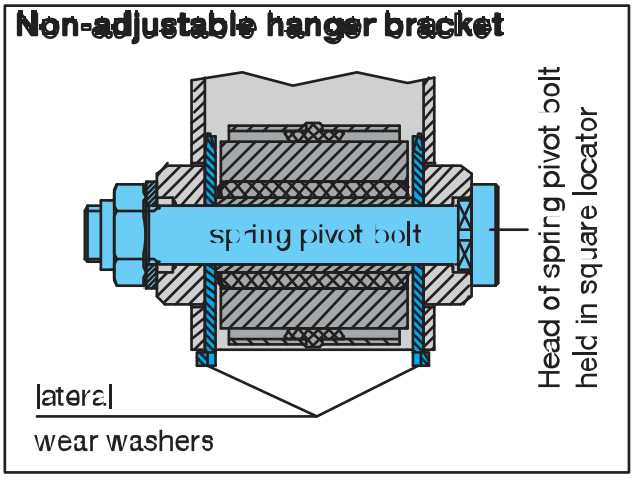

Tightening torque with a torque wrench:

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

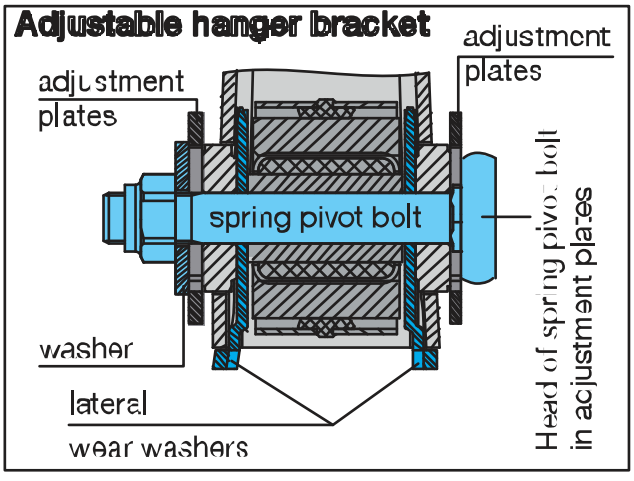
Hanger brackets from 08/2001
M 30 (SW 46) M = **900 Nm** (840 - 990 Nm)

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.



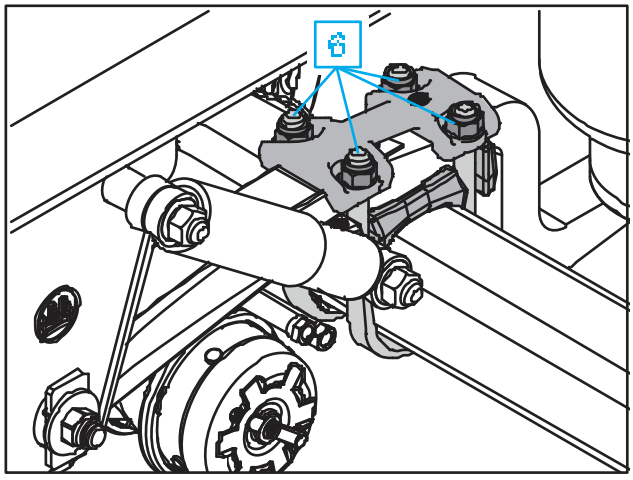
## Maintenance and Visual Inspection

### 6 Spring mounting kit

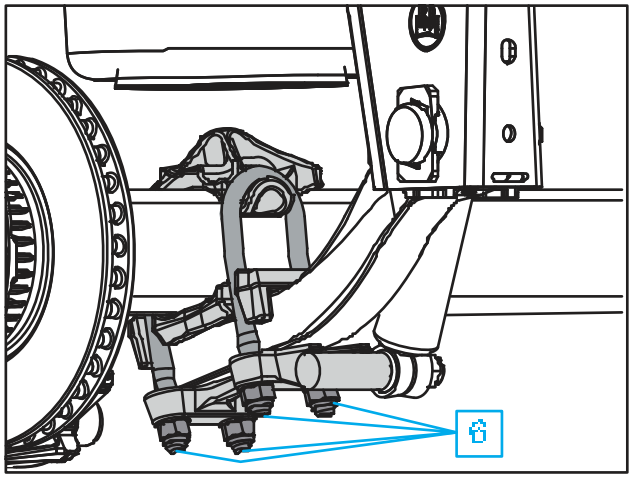
–Service intervals as shown on page 58 –

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.



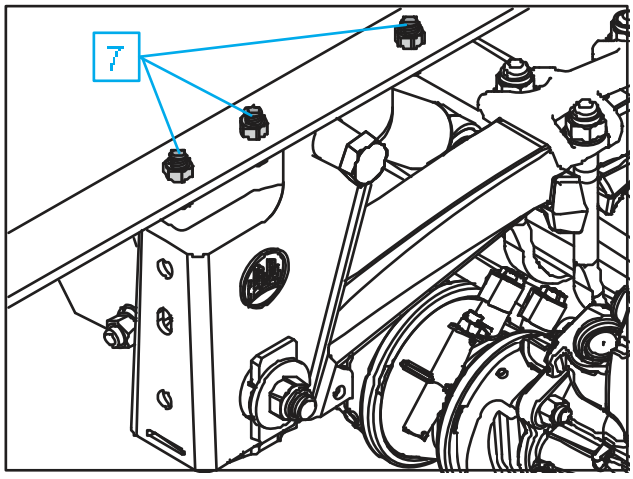

☞Note:
No welding should be performed on the trailing arm spring!




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

–Service intervals as shown on page 58 –

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

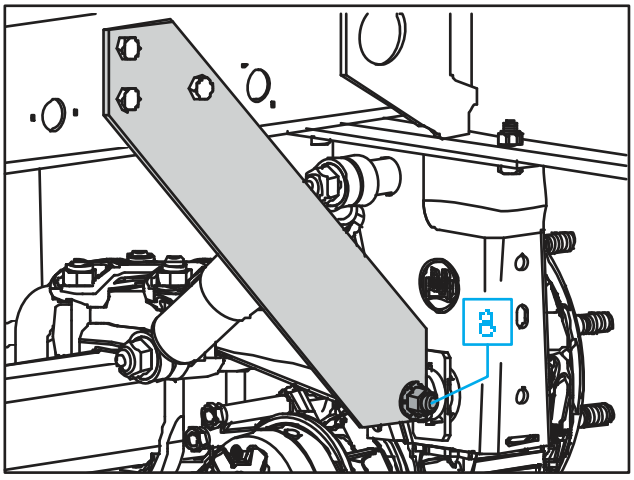
– Service intervals as shown on page 58 –

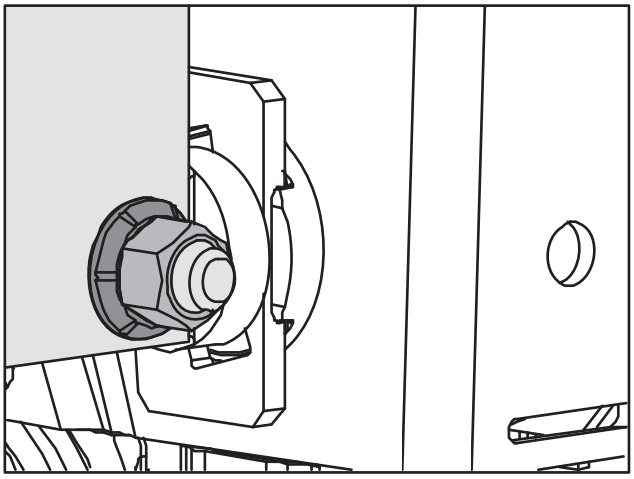
Check the mounting bolts of the gusset plates on the spring bolts are firmly tightened, and retighten with a torque wrench if necessary. Tightening torque:

M 18 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.



## Maintenance and Visual Inspection

### 9 Axle lift

– Service intervals as shown on page 58 –

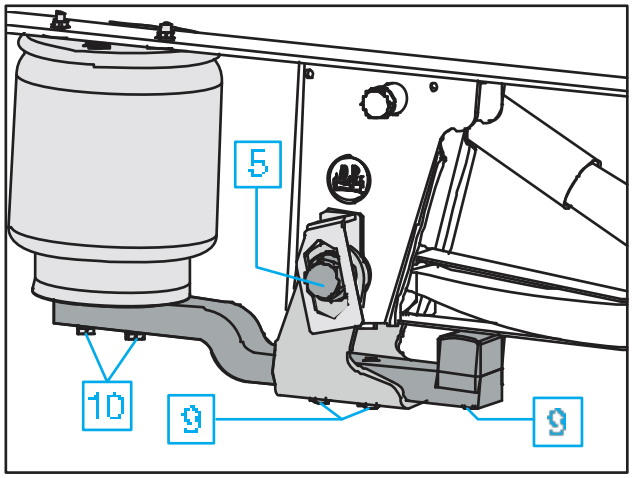
Single-sided lift:

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 M = 230 Nm

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

M 10 M = 25 Nm
M 12 M = 66 Nm



Single-sided lift

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 M = 180 - 210 Nm

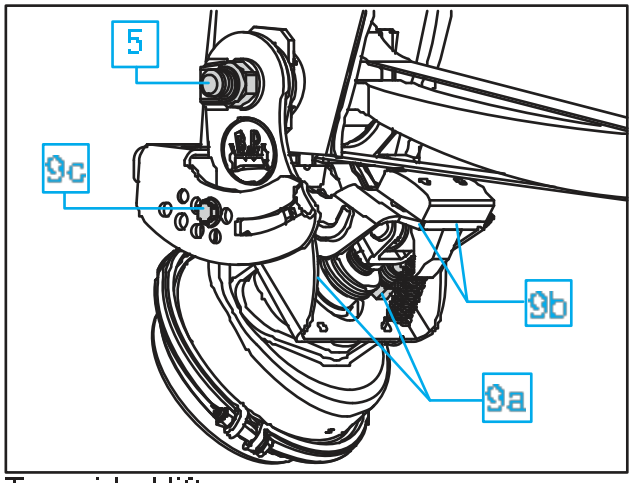
b) Check the bump stop on the lever arm for wear, and that the M 6 attachment bolts are firmly tightened.

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:

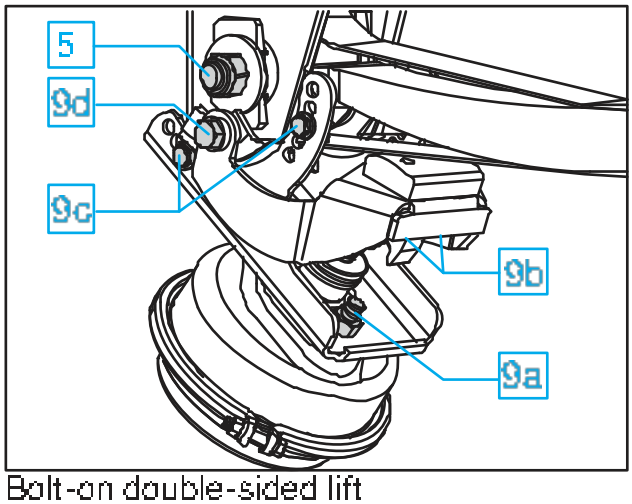
M 12 M = 75 Nm

d) In the case of the bolt-on two-sided lift, check that the locknuts on the 24 mm hexagon bolts for attaching the lever to the bracket (mount) are tight. Tightening torque:

M 12 M = 120 Nm



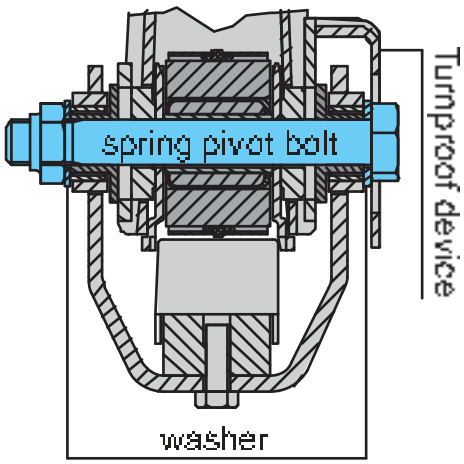
Two-sided lift



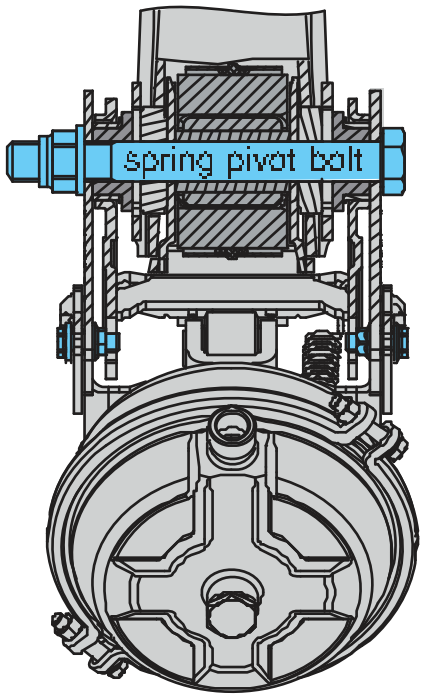
Bolt-on double-sided lift

## Spring pivot bolt bearing with axle lift

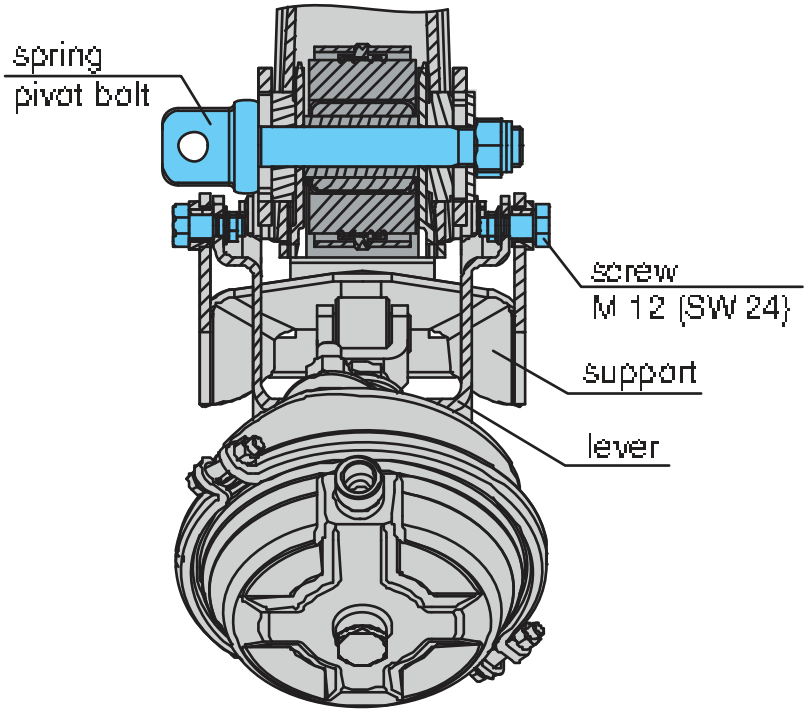
Single-sided lift




Two-sided lift




Bolt-on double-sided lift



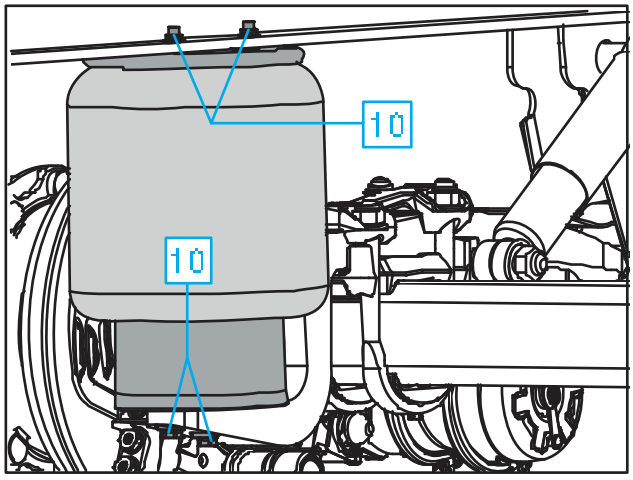
## Maintenance and Visual Inspection

### 10 Air bag fastenings

– Service intervals as shown on page 60 –

Check air bag fixing bolts or nuts for tightness.
Tightening torques with a torque wrench:

M 12 M = 66 Nm
M 16 M = 230 Nm

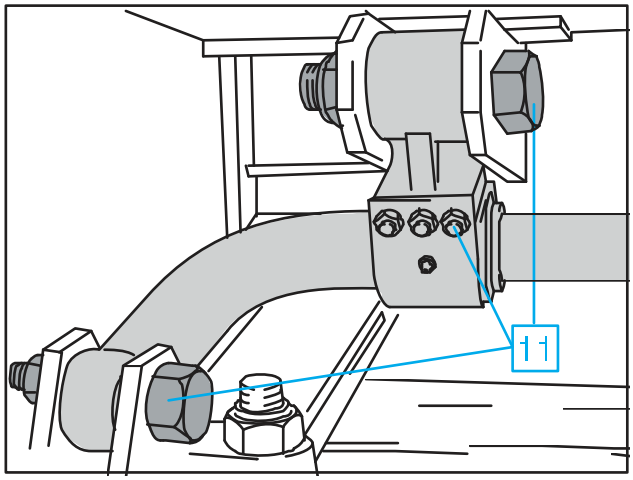



### 11 Stabilizer

– Service intervals as shown on page 60 –

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

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



Valid: 01.10.2009

## Lubrication and Maintenance Work

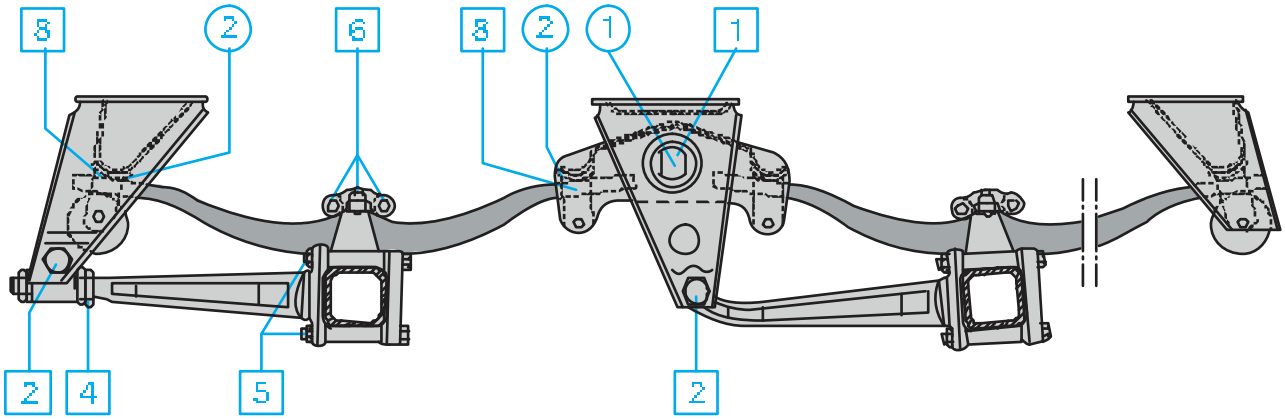
### Overview

For detailed descriptions, see pages 74 - 77

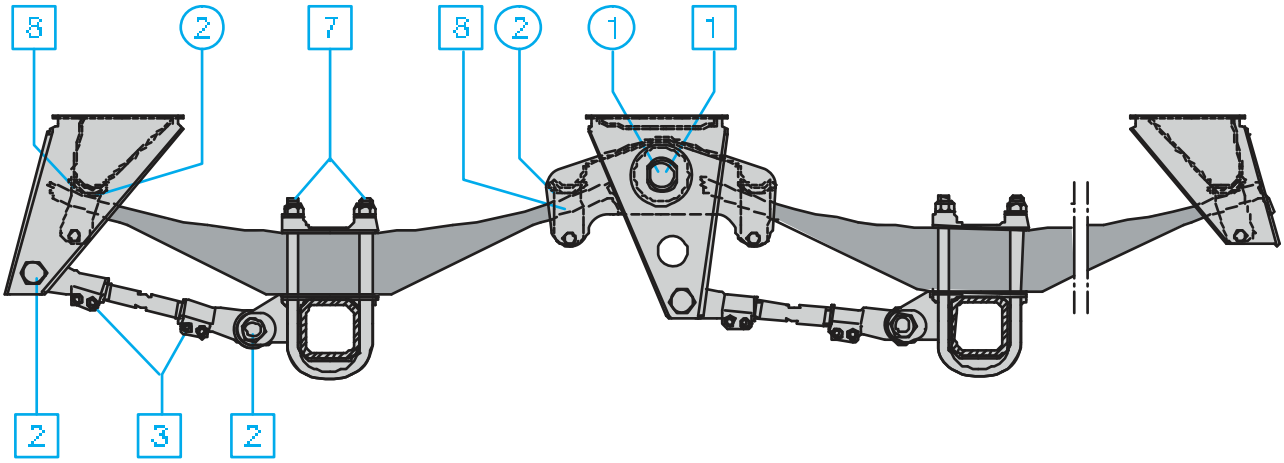
| | initially after 2 weeks | every 6 weeks | every 26 weeks (twice annually) [1] |
|---|---|---|---|
| (1) Grease bearings (suspension type E) with BPW special longlife grease ECO-LiPv3. (Not applicable in the case of rubber/steel bushes) | ○ [1] | ○ [1] | |
| (2) Slightly grease the slide elements/slide ends of springs. | ○ | ○ | |
| – Visual inspection, check all component parts for wear and damage. | | | ☐ |
| 1 Check threaded bolts on floating arm bearings for tightness.<br>VG M 24 M = 325 Nm<br>VA / VB up to an axle load of 12 tonnes<br>M 42 x 3 M = 1100 Nm<br>VA / VB from an axle load of 13 tonnes<br>M 42 x 3 M = 1700 Nm | | | ☐ |
| 2 Check axle guide linkage screws for tightness using a torque wrench.<br>M 24 (VG) M = 325 Nm<br>M 30 M = 725 Nm<br>M 36 M = 1425 Nm | ☐ | | ☐ |
| 3 Check connecting rod clamping screws for tightness.<br>M 12-8.8 M = 66 Nm<br>M 14-8.8 M = 140 Nm | | | ☐ |
| 4 Check axle guide linkage nuts for tightness. See point 4 on page 75. | ☐ | | ☐ |
| 5 Check axle fastening screws for tightness using a torque wrench.<br>Lock nut M 20 M = 400 Nm<br>Castellated nut M 22 M = 320 Nm<br>Lock nut M 24 M = 570 Nm<br>Check rubber plates for wear. | ☐ | | ☐ |
| 6 Check spring shackles for tightness.<br>M 14-10.9 M = 195 Nm<br>M 16- 8.8 M = 163 Nm<br>M 14- 8.8 M = 140 Nm (rubber roller) | ☐ | | ☐ |
| 7 Check spring U-bolts for tightness using a torque wrench.<br>M 24 M = 600 - 650 Nm | ☐ | | ☐ |
| 8 Check slide elements for tightness.<br>M 14-8.8 M = 140 Nm<br>M 20-8.8 M = 320 Nm | | | ☐ |

For BPW trailer axles / self steering axles, see pages 4 - 55

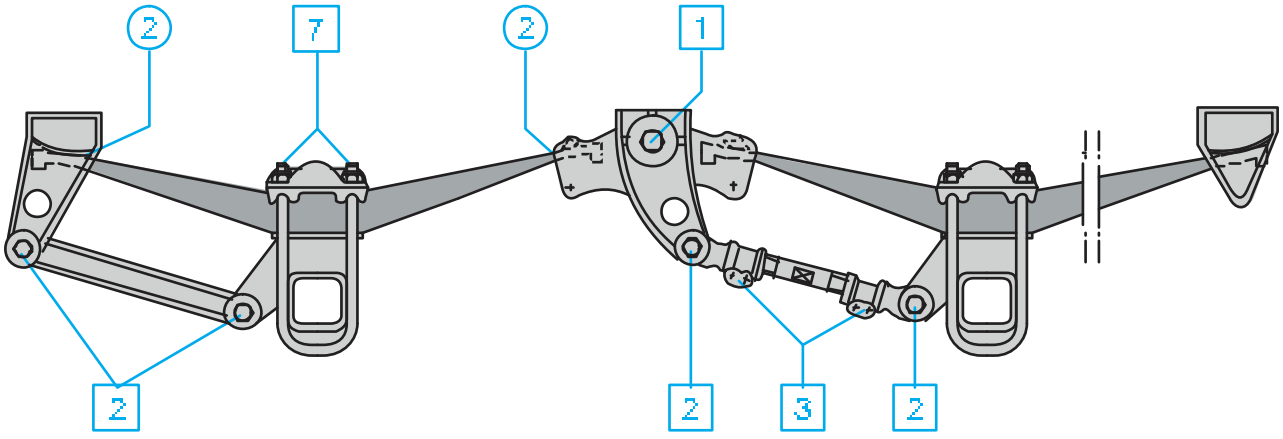
[1] **under extreme conditions, with more frequency.**




**Series VA**




**Series VB**




**Series VG**

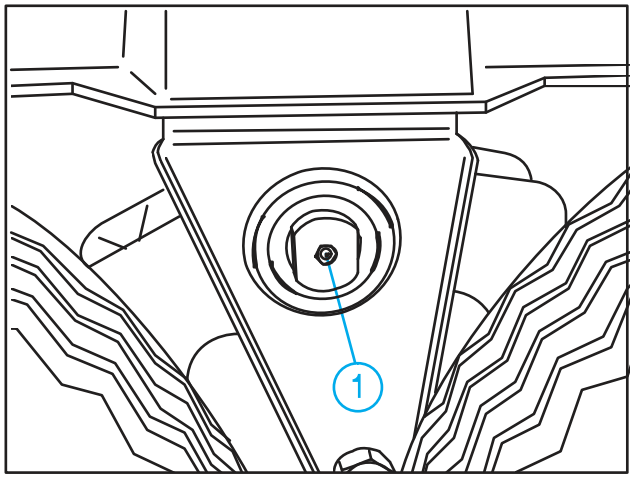
## Lubrication

## Visual Inspection and Maintenance

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

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

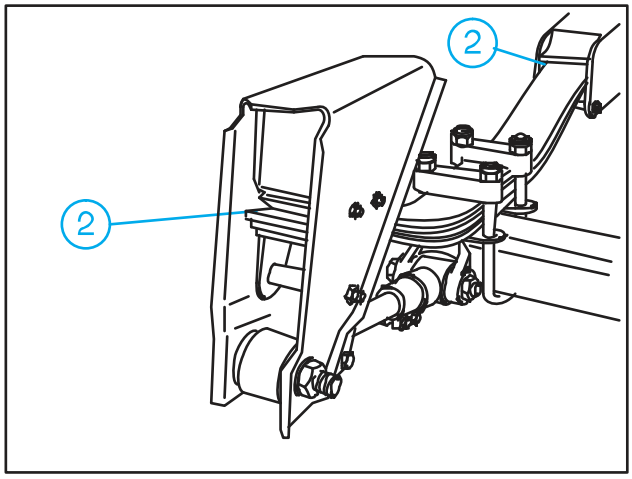
☞ Lift trailer to take pressure off equalizer arm bearings.
Grease bronze bush bearing via the grease nipple in the heads of the threaded bolts with BPW special longlife grease ECO-LiPlus until fresh grease emerges.
(Not applicable to rubber/steel bushes).




(2) **Slide elements**

– every 6 weeks, initially after 2 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.




– **Visual inspection**

– twice annually –

Check all component parts 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.

## 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:

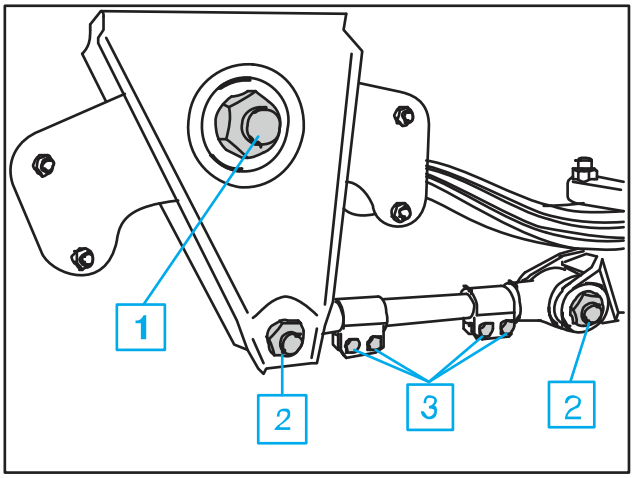
| | | |
|---|---|---|
| VG | M 24 | M = 325 Nm |

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:

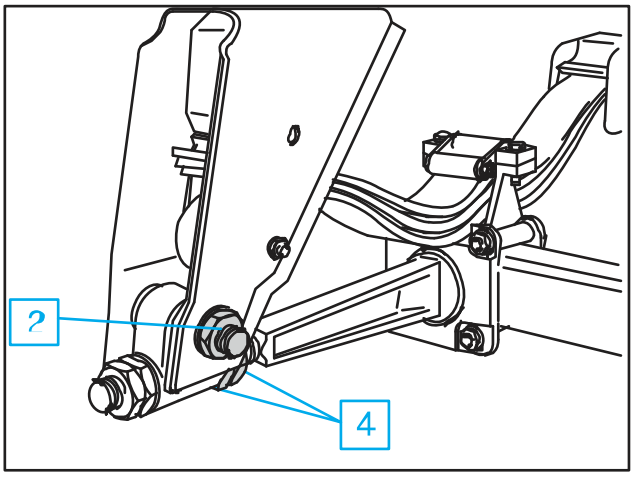
| | |
|---|---|
| M 12-8.8 | M = 66 Nm |
| M 14-8.8 | M = 140 Nm |

## 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).



## Maintenance

### 5 Axle fastenings (VA)

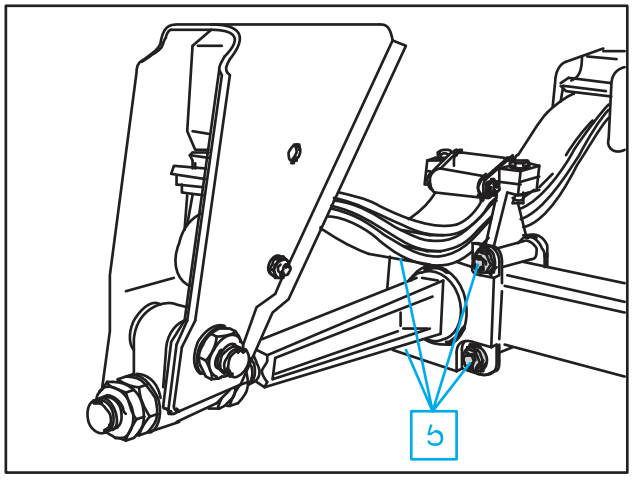
– twice annually, initially after 2 weeks –

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.



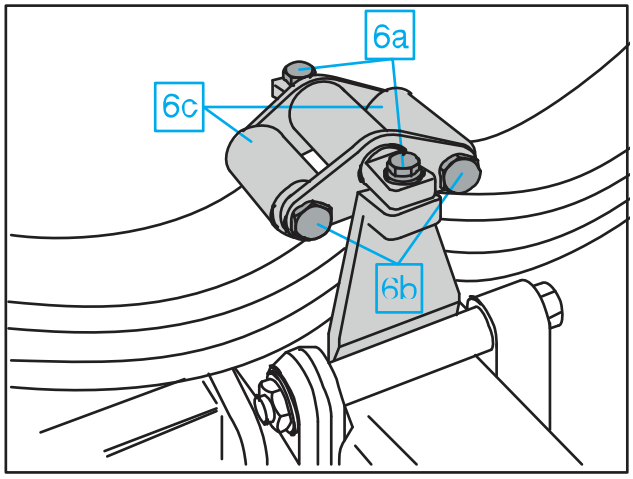

### 6 Spring shackle (VA)

– twice annually, initially after 2 weeks –

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.



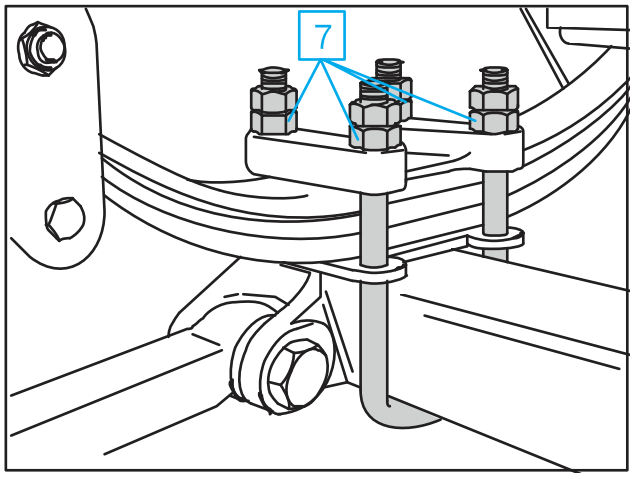

### 7 Spring U-bolts

– twice annually, initially after 2 weeks –

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

Tightening torques:

| | |
|---|---|
| M 24 | M = 600 - 650 Nm |



## 8 Slide elements

– twice annually –

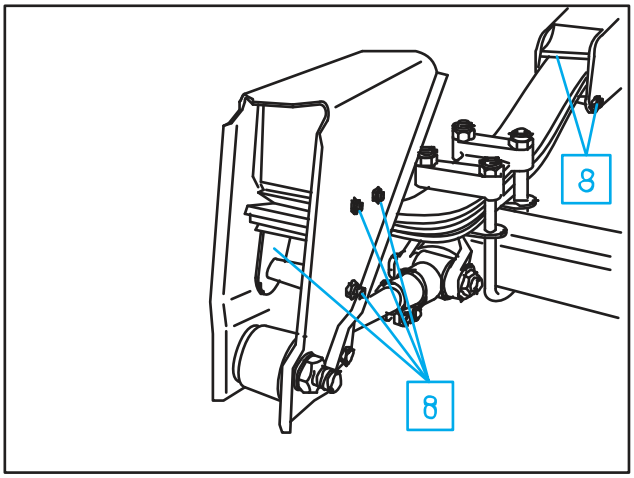
Check slide elements and lateral wear plates in the shackle and equalizer arm for wear and the fastening screws for tightness.

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.



Valid: 01.10.2009

## Lubrication and Maintenance Work

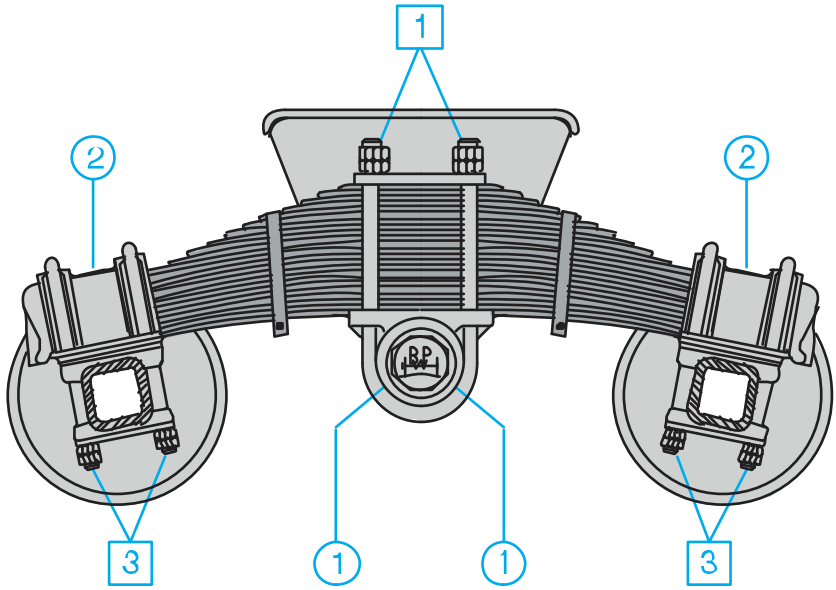
**Overview**

For detailed description, see pages 80 - 81

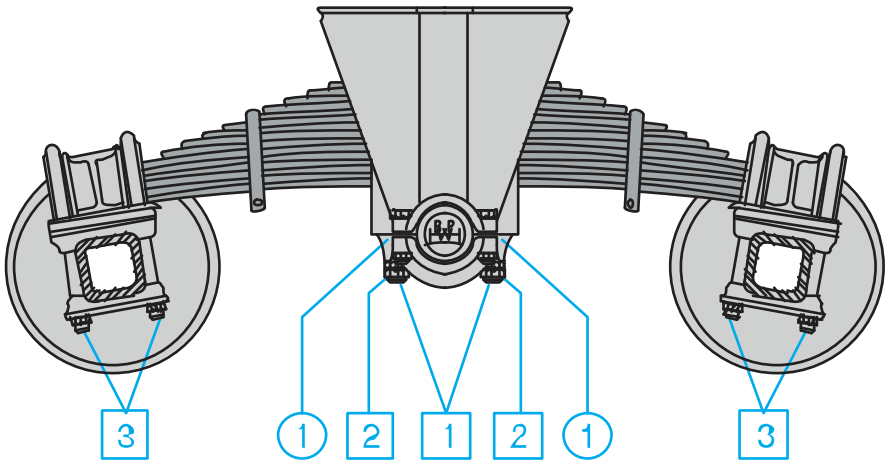
| | initially after 2 weeks | every 6 weeks | every 26 weeks (twice annually) [1] |
|---|---|---|---|
| (1) Grease axle support bearing series W, BW using BPW special longlife grease ECO-LP$^{plus}$. | ◯ [1] | ◯ [1] | |
| (2) Grease spring tension casing series W using BPW special longlife grease ECO-LP$^{plus}$. | ◯ | ◯ | |
| – Visual inspection, check all component parts for wear and damage. | | | ☐ |
| 1 Check spring U-bolt of support axle for tightness.<br>M 30 x 2-8.8 M = 980 Nm<br>M 36-8.8 M = 1555 Nm | ☐ | | ☐ |
| 2 Check fastening screws on the bearing covers for tightness.<br>M 20-8.8 M = 320 Nm<br>M 24-8.8 M = 570 Nm | | | ☐ |
| 3 Check spring U-bolts on the spring tension casings for tightness.<br>M 20-8.8 M = 320 Nm<br>M 20-10.9 M = 450 Nm<br>M 24-8.8 M = 570 Nm<br>M 24-10.9 M = 700 Nm | ☐ | | ☐ |

BPW trailer axles / self steering axles, see pages 4 - 55

[1] **under extreme conditions, with more frequency**




**Series W**



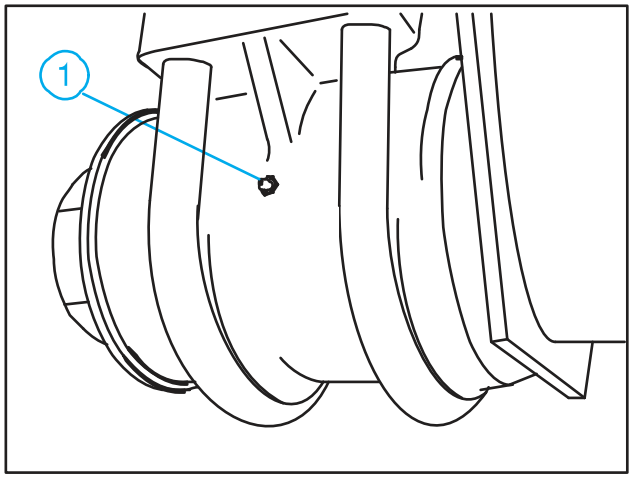

**Series BW / GW**

## Lubrication
## Visual Inspections and Maintenance

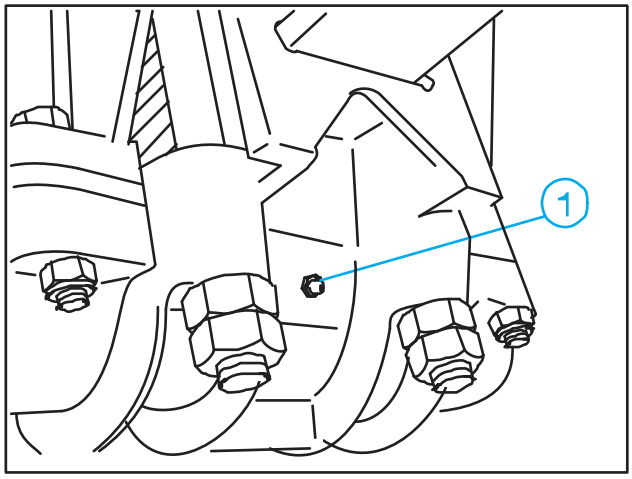
### (1) Support axle (series W, BW)

– every 6 weeks, initially after 2 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-LP$^{v3}$ until fresh grease emerges (not applicable to axle assembly series GW = rubber bush)




Series W

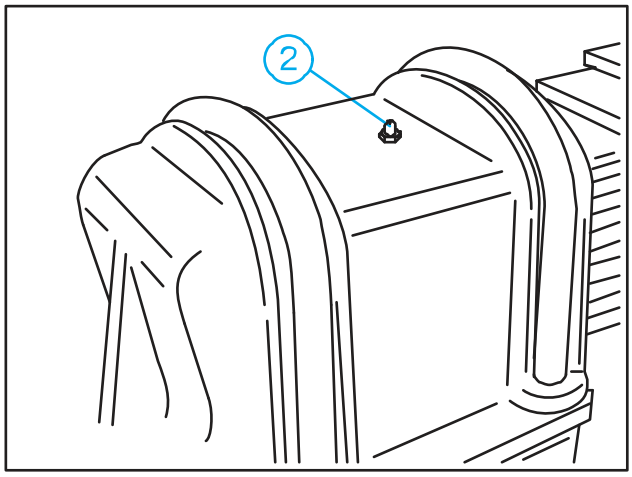



Series BW

### (2) Spring tension casing (series W)

– every 6 weeks, initially after 2 weeks –

Grease lubrication nipples on the spring tension casing using BPW special longlife grease ECO-LiP$^{v3}$.




Series W

## – Visual inspection

– twice annually –

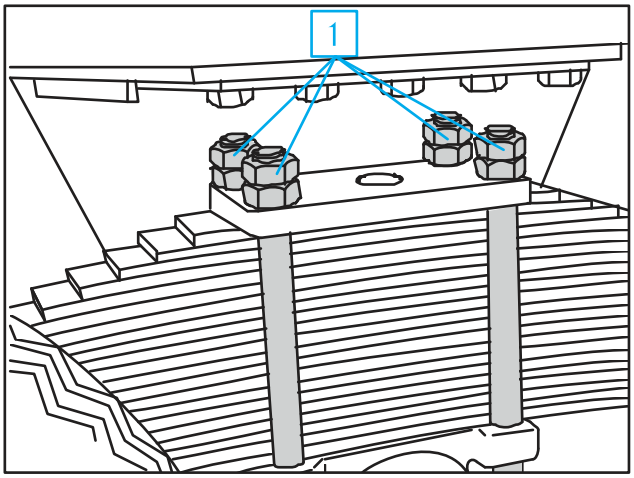
Check all components for wear and damage.

## 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 |

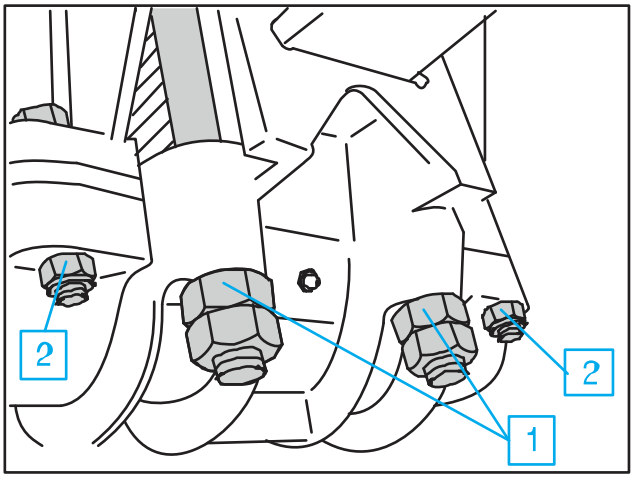



## 2 Fastening screws on the cover plates

– 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 |

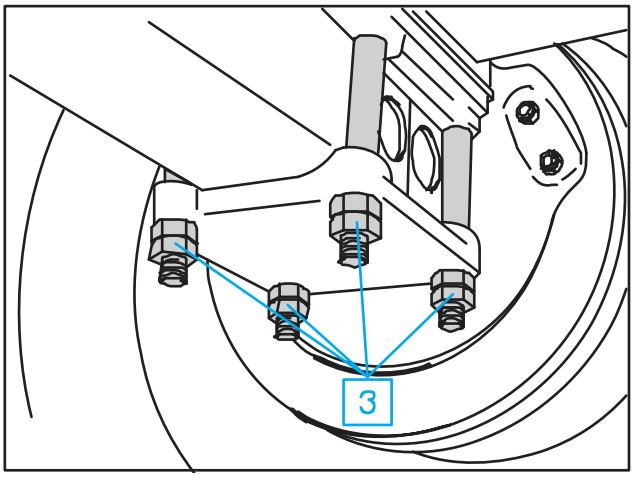



## 3 Spring U-bolts on the spring tension casings

– twice annually –

Check spring U-bolts on the spring tension casings for tightness.
If necessary loosen lock nuts, tighten nuts alternately to the prescribed torque, a bit at a time, 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 |



# Notice

BPW-W 3311901e

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