Workshop manual
BPW air suspensions, series ECO Air COMPACT

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Subject to change without notice.
Current versions and additional information can be found online at www.bpw.de.
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- Refer to appropriate workshop manuals for axle repairs
## 1 Product identification

### 1.1 Explanation of BPW axle type codes (extract)

Example:

<table>
<thead>
<tr>
<th>SH</th>
<th>B</th>
<th>F</th>
<th>ACAU</th>
<th>A</th>
<th>9010</th>
<th>VG</th>
<th>30 K</th>
<th>ECO Plus 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>SH</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Axle series</td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>SH..</td>
</tr>
<tr>
<td>SKH</td>
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<td>SKH..</td>
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<td>H</td>
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<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For single wheels, wheels with offset</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For single wheels, wheels without offset</td>
</tr>
<tr>
<td></td>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For twin wheels</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wheel studs M 22x1.5 without wheel nuts; order wheel nuts for stud or spigot alignment separately</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For spigot alignment / Alloy wheels</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For hanging brake cylinders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACAU</th>
<th>ACAM</th>
<th>ACAO</th>
<th>ACBU</th>
<th>ACBM</th>
<th>ACBO</th>
<th>AC..HD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACAU</td>
<td>ACAM</td>
<td>ACAO</td>
<td>ACBU</td>
<td>ACBM</td>
<td>ACBO</td>
<td>AC..HD</td>
</tr>
<tr>
<td>Cast link type A, air bag beam type U 205 - 350</td>
<td>Cast link type A, air bag beam type M 245 - 370</td>
<td>Cast link type A, air bag beam type O 335 - 385</td>
<td>Cast link type B, air bag beam type U 260 - 330</td>
<td>Cast link type B, air bag beam type M 300 - 425</td>
<td>Cast link type B, air bag beam type O 330 - 510</td>
<td>ECO Air COMPACT HD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>V</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9010</th>
<th>V</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle load (kg) + quantity of wheel studs per wheel</td>
<td>Adjustable hanger brackets</td>
<td>Air bags with split piston</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>30</th>
<th>30-1</th>
<th>30 K</th>
<th>36</th>
<th>36-1</th>
<th>36 K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air bag Ø 300 mm, for stroke 200 mm (standard)</td>
<td>Air bag Ø 300 mm, for stroke up to 340 mm</td>
<td>Air bag Ø 300 mm, for stroke 150 mm</td>
<td>Air bag Ø 360 mm, for stroke 200 mm (standard)</td>
<td>Air bag Ø 360 mm, for stroke up to 340 mm</td>
<td>Air bag Ø 360 mm, for stroke 180 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECO Plus 2</th>
<th>ECO Plus 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trailer axle with ECO Plus 2 Unit</td>
<td>Trailer axle with ECO Plus 3 Unit</td>
</tr>
</tbody>
</table>

- Single axle
- Tandem axle suspension
- Tri-axle suspension
1.2 Explanation of BPW axle code numbers (extract)

Example:

<table>
<thead>
<tr>
<th>No.</th>
<th>1 + 2 digit: Air suspension module</th>
</tr>
</thead>
<tbody>
<tr>
<td>73.</td>
<td>68. 01. 0004</td>
</tr>
<tr>
<td>71.</td>
<td>Air suspension module, without hanger bracket, without air bags</td>
</tr>
<tr>
<td>74.</td>
<td>Air suspension module, without hanger bracket, without air bags</td>
</tr>
<tr>
<td>72.</td>
<td>Air suspension module, with hanger bracket, without air bags</td>
</tr>
<tr>
<td>75.</td>
<td>Air suspension module, with hanger bracket, without air bags</td>
</tr>
<tr>
<td>73.</td>
<td>Air suspension module, with hanger bracket, with air bags</td>
</tr>
<tr>
<td>76.</td>
<td>Air suspension module, with hanger bracket, with air bags</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3 + 4 digit: Axle load and bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle load</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>58. 8000 - 9000 kg</td>
</tr>
<tr>
<td>68. 8000 - 9000 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5 + 6 digit: Designation of cast link and airbag beam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast link</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>01. ACAU</td>
</tr>
<tr>
<td>02. ACAM</td>
</tr>
<tr>
<td>03. ACBM</td>
</tr>
<tr>
<td>04. ACBO</td>
</tr>
<tr>
<td>05. ACBU</td>
</tr>
<tr>
<td>06. ACAO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7 to 10 digit: Consecutive number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consecutive number 0000 - 9999</td>
</tr>
</tbody>
</table>
2 Special tools

Installation / removal tool for rubber-steel bushes in cast links
Range of application: Pressing in rubber-steel bushes

BPW number: 99.00.000.9.69

General notes:

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

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

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

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

Side mounted axle lift

Airbags with central bolt connection

Two side axle lift

Spring bolts for bolted brace
## Name

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>Cast suspension arm</td>
</tr>
<tr>
<td>1005</td>
<td>Bush</td>
</tr>
<tr>
<td>1015</td>
<td>Plug</td>
</tr>
<tr>
<td>1030</td>
<td>Air bag beam</td>
</tr>
<tr>
<td>1050</td>
<td>Spring U-bolt</td>
</tr>
<tr>
<td>1055</td>
<td>Disc</td>
</tr>
<tr>
<td>1057</td>
<td>Lock nut</td>
</tr>
<tr>
<td>1154</td>
<td>Spring bolt</td>
</tr>
<tr>
<td>1161</td>
<td>Plate (adjusting plate)</td>
</tr>
<tr>
<td>1165</td>
<td>Disc</td>
</tr>
<tr>
<td>1168</td>
<td>Lock nut</td>
</tr>
<tr>
<td>1200</td>
<td>Air bag assembly</td>
</tr>
<tr>
<td>1205</td>
<td>Air bag</td>
</tr>
<tr>
<td>1210</td>
<td>Piston</td>
</tr>
<tr>
<td>1212</td>
<td>Hanger bracket</td>
</tr>
<tr>
<td>1213</td>
<td>Piston</td>
</tr>
<tr>
<td>1215</td>
<td>Threaded sleeve</td>
</tr>
<tr>
<td>1216</td>
<td>Bolt</td>
</tr>
<tr>
<td>1218</td>
<td>Nut</td>
</tr>
<tr>
<td>1220</td>
<td>Plate</td>
</tr>
<tr>
<td>1222</td>
<td>Locking screw</td>
</tr>
<tr>
<td>1224</td>
<td>Locking screw</td>
</tr>
<tr>
<td>1240</td>
<td>Lock nut</td>
</tr>
<tr>
<td>1300</td>
<td>Shock absorber</td>
</tr>
<tr>
<td>1303</td>
<td>Bush</td>
</tr>
<tr>
<td>1304</td>
<td>Rubber bump stop</td>
</tr>
<tr>
<td>1315</td>
<td>Hexagon screw</td>
</tr>
<tr>
<td>1324</td>
<td>Hexagon screw</td>
</tr>
<tr>
<td>1330</td>
<td>Lock nut</td>
</tr>
<tr>
<td>1511</td>
<td>Hanger bracket, adjustable</td>
</tr>
<tr>
<td>1525</td>
<td>Disc</td>
</tr>
</tbody>
</table>

### Two side axle lift

- 1510 Hanger bracket
- 1600 Support
- 1605 Tube
- 1610 Lever arm
- 1625 Support
- 1635 Bump stop

### Side mounted axle lift

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

### Central mounted axle lift

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

### Spring bolts for bolted brace

- 1155 Spring bolt
- 1570 Hexagon screw
- 1571 Hexagon nut
## Tightening torque

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

5.1 Safety regulations

- All work must be performed by trained mechanics at competent repair facilities or authorised specialist companies who have access to all relevant tools and have acquired the knowledge required for this work. Anyone who performs maintenance and repair work must be trained in automotive mechanics and already have experience in repairing trailers and semi-trailers. Anyone who performs brake work must be trained in brake systems.

- Comply with local safety regulations.

- The relevant operation and service regulations as well as safety regulations of the vehicle manufacturer and of the manufacturers of other vehicle parts must be adhered to.

- The vehicle must be prevented from moving during repair work. Please observe the relevant safety regulations for repair work on commercial vehicles, in particular the safety regulations for jacking up and securing the vehicle.

- The cast suspension arms, air bag beams, spring U-bolts, air bags and plastic hoses must be protected against sparks and weld splashes during all welding work.

- The earth terminal must under no circumstances be attached to the cast suspension arms, air bag beams, spring U-bolts or hubs.

- No welding at cast suspension arms or air bag beams!

- It is not permitted for the hanger brackets to be heated for straightening work!

- During repair work, make sure that the brake is not operated inadvertently. The brake must be released.

- Do not perform repair work unless wearing protective clothing (gloves, safety boots, safety goggles, etc.) and using the recommended tools.

- Only use recommended tools.

- A second mechanic must provide assistance when working with heavy components (cast links, airbag beam, brake discs, brake drums or brake removal/installation).

- All air lines and components must be depressurised before being removed.

- Following each repair, perform a function check or a test drive in order to make sure that the brakes and suspensions are functioning correctly. New brake linings only have maximum effect after a few braking actions. Avoid hard braking.

- All exchanged components must be reused or disposed in accordance with the applicable environmental regulations, laws and directives.

- The remaining thickness of the brake lining and the condition of the brake disc or brake drum must be visually inspected at regular intervals with respect to the way in which the vehicle is used (see BPW maintenance instructions).

- Tighten all fixings to the recommended tightening torque.
5.2 Safety information

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

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

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

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

Note! Application hints and especially useful information.

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

It is essential that all maintenance work is carried out in accordance with the prescribed intervals in order to maintain the safe operation and roadworthiness of the trailer. The relevant operation and service regulations of the vehicle manufacturer and of the manufacturers of other vehicle parts must also be adhered to. Rectification of any defects which are discovered or replacement of worn parts should be carried out by a BPW Service Centre or BPW Direct Service Partner unless the vehicle owner has the facilities, equipment and workshop manuals and possesses an official certificate to perform interim inspections or special brake inspections.

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

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

The warranty becomes null and void if spare parts other than original BPW parts are used.
6 Care and Maintenance
## Maintenance Work and Visual Inspection

### Overview

Visual checks during the warranty period for chassis fitted with ECO Plus air suspension after 12, 36, 60 and 72 months, thereafter annually.

- **Check air suspension levelling valves** for condition, seal-tightness and general tightness.  
  **Tightening torque with a torque wrench:**  
  M 24 (SW 36)  \( M = 420 \text{ Nm} \) (390 - 460 Nm)

- **Check condition of air bags.**

- **Visual inspection, check all component parts and welding seams for damage and wear.**

- **Check shock absorber fastening** for tightness.  
  **Tightening torque with a torque wrench:**  
  M 24 (SW 36)  \( M = 650 \text{ Nm} \) (605 - 715 Nm)

- **Check spring bolts** for tightness.  
  **Tightening torque with a torque wrench:**  
  M 20 (SW 30)  \( M = 420 \text{ Nm} \)

- **Check axle clamping** for tightness.  
  **Tightening torque with a torque wrench:**  
  M 18 x 1.5 (SW 27)  \( M = 420 \text{ Nm} \) (390 - 460 Nm)

- **Check the spring bolt to gusset plate connection** for tightness.  
  **Tightening torques with a torque wrench:**  
  M 12 (SW 17)  \( M = 66 \text{ Nm} \)  
  M 16 (SW 22)  \( M = 230 \text{ Nm} \) - 300 Nm  
  Centre screw  M 16 (SW 22)  \( M = 300 \text{ Nm} \)

- **Check air bag fastening** for tightness.  
  **Tightening torques with a torque wrench:**  
  M 12 (SW 17)  \( M = 66 \text{ Nm} \)  
  M 16 (SW 22)  \( M = 230 \text{ Nm} \) - 300 Nm  
  Centre screw  M 16 (SW 22)  \( M = 300 \text{ Nm} \)

- **Check axle lift** for tightness.  
  **Tightening torques with a torque wrench:**  
  Supporting arm  M 20 (SW 30)  \( M = 350 \text{ Nm} \) (325 - 385 Nm)  
  Diaphragm cylinder  M 16 (SW 24)  \( M = 190 \text{ Nm} \) (180 - 210 Nm)  
  Hexagon bolt  M 12 (SW 17)  \( M = 75 \text{ Nm} \)  
  Lock nut  M 10 (SW 16)  \( M = 38 \text{ Nm} \)  
  Cylinder cap screw  M 10 (SW 8)  \( M = 50 \text{ Nm} \)

### Note

Components that have damages due to improper mounting are to be exchanged after a review by a BPW Service Centre.
6  Care and Maintenance

1  Air installation circuit
   – Service intervals as shown on page 15 –

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

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

2  Air bags
   – Service intervals as shown on page 15 –

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

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

3  Visual inspection
   – Service intervals as shown on page 15 –

Check all component parts and welding seams for wear and damage.
3 Shock absorber fastening
– Service intervals as shown on page 15 –

Check lower and upper shock absorber fastening for tightness.

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

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

Tightening torques with a torque wrench:
M 24 (SW 36) \( M = 650 \text{ Nm} \) (605 - 715 Nm)

4 Spring bolts
– Service intervals as shown on page 15 –

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

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

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

Tightening torque with a torque wrench:
M 24 (SW 36) \( M = 650 \text{ Nm} \) (605 - 715 Nm)

The life expectancy of the bearing depends on the tightness of the spring bolt or the inner bush.
6 Care and Maintenance

5 Axle clamping
   – Service intervals as shown on page 15 –

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

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

When mounting new spring mounting kit components, tighten the M 20 locknuts to a torque of:
M = 420 Nm + 90° angle tightening.

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

6 Bolted connection, gusset plate spring bolts
   – Service intervals as shown on page 15 –

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

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

Installing or renewing the spring bolt:
1. Unscrew or install the spring bolt.
2. Loosely pre-mount the gusset plate with at least three M 16 bolts at the top on the cross-member and one M 18 bolt at the bottom on the spring bolt and tighten further until contact is made.
3. Set the track.
4. Tighten the spring bolt to the prescribed tightening torque.
5. Tighten the connecting bolt on the gusset plates spring bolt and then tighten the upper connecting bolt to the prescribed tightening torques.
**7 Air bag fastenings**
- Service intervals as shown on page 15 –

Check air bag fixing bolts or nuts for tightness.

Tightening torques with a torque wrench:
Upper attachment
M 12 (SW 17)  M = 66 Nm

Lower attachment - 2 screws:
M 16 (SW 22)  M = 230 - 300 Nm

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

**8 Axle lift**
- Service intervals as shown on page 15 –

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

Tightening torque:
M 20  M = 350 Nm (325 - 385 Nm)

**Two-sided lift:**

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

Tightening torque:
M 16 (SW 24)  M = 190 Nm (180 - 210 Nm)

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

Tightening torque:
M 10 (SW 8)  M = 50 Nm

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

Tightening torque:
M 12 (SW 17)  M = 75 Nm

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

For versions from 2016, check for tight seating of lock nut.
M 10 (SW 16)  M = 38 Nm
7 Replacing air bag mount

7.1 Removing air bag mount


[2] Raise vehicle, inflate air bags to maximum height by setting lever for rotary disc valve / change-over valve on air suspension to „Lift” and then to „Stop”.

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

![Picture 1]

![Picture 2]

![Picture 3]

If air suspension system is defective use forklift or winches.


[4] Release air from air bags by setting rotary disc valve / change-over valve on air suspension to „Lower”.

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

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

![Repair guide!]

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

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

[13] Pre-assemble top U-bolt (1050) on air bag mount (1030).

[14] Position new washers (1055) and install new lock nuts (1057) hand tight.

7 Replacing air bag mount

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

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

[17] Align trailing arms (1000) and air bag mount (1030) with spring centre markings (arrows).

[18] Lightly tighten lock nuts (1057, SW 30) - on each U-bolt - until all components make uniform contact.

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

Repair guide!
During assembly, pay attention to clearance between the U-bolts (1050) and cast parts (1000, 1030) and the 4 axle beam radii. Centre if required.
[19] Tighten lock nuts (1057, SW 30) to torque of 200 Nm diagonally in sequence 1, 2, 3, 4 using torque wrench.

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

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

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

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

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

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

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

\[
\begin{align*}
\text{M 16 (SW 22)} & \quad M = 230 - 300 \text{ Nm} \\
\text{Bottom mount with central bolt:} & \quad \text{M 16 (SW 22)} \\
& \quad M = 300 \text{ Nm}
\end{align*}
\]

⚠️ If the air bag has been removed completely, see Installing air bags, Chapter 11.2.
7 Replacing air bag mount

[25] Lower axle and remove vehicle jack.

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

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

[27] Remove vehicle supports.

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

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

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

[1] Remove air bag mount, see Chapter 7.1.

[2] Remove bolt (1324, SW 36) for bottom shock absorber mount on trailing arm (1000).

[3] Remove lock nut (1168, SW 36) from the spring bolt (1154).

[4] Remove washer (1165) and adjusting plate (1161).

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

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

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

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

8.2 Installing trailing arm

[7] Remove dirt from contact surfaces on axle beam, trailing arm and air bag mount.

[8] Position trailing arm (1000) on axle beam.

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

[10] Position adjusting plate (1161) in correct position on spring bolt (1154).

[11] Insert trailing arm (1000) with wear washers (1525) in to support. Lightly grease new spring bolts (1154) and install from outside to inside.

On version with bolted brace, install spring bolts (1155) from inside to outside.
[12] Position inner adjusting plates (1161) in correct position, install disc (1165) and assemble a new lock nut (1168, SW 36) loosely.

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

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

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

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

[14] On version with bolted brace, fasten gusset plate to top of cross-member with at least three M 16 bolts.

[15] Install bolt (1570, M 18 x 1.5) at bottom of spring bolt and assemble nut (1571, SW 27).

[16] Tighten bolt to specified torque of **420 Nm** (390 - 460 Nm).

[17] Install bellows mount, see Chapter 7.2.
9.1 Removing axle


[2] Measure and note distances (A) and (X) from top of axle beam and top of air bag mount to bottom of frame.

[3] Remove both air bag mounts, see Chapter 7.1.


[5] Disconnect all cable connections to axle (brake pad wear sensor, ABS, etc.).


9.2 Installing axle

Before installing the new axle, mark the spring centre position position of the airbag mount (1030) and trailing arm (1000) onto the axle beam with a coloured marker.

[7] Position axle on vehicle jack (low-lift platform truck) to prevent accidents, slide below frame and raise until top of axle beam reaches position (A) measured in work step [2] and is in contact with trailing arm on both sides.

[8] Pre-assemble top U-bolts (1050) on air bag mount (1030).

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

[9] Install new washers (1055) and assemble new lock nuts (1057) hand tight.

[10] Hook air bag mount with U-bolt mounted into bracket on trailing arm (1000).

9 Removing and installing axle

[12] Align trailing arms (1000) and air bag mount (1030) with spring centre markings (arrows).

[13] Lightly tighten lock nuts (1057, SW 30) - on each U-bolt - until all components make uniform contact.

[14] Check position of trailing arm (1000) and bellows mount (1030). Measure distance from centre of cast part (mould parting line) to brake drum / brake disc, equalise distances, if necessary. Permissible tolerance: ± 2 mm
[15] Tighten lock nuts (1057, SW 30) to torque of 200 Nm diagonally sequence 1, 2, 3, 4 using torque wrench.

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

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

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

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

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

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

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

Bottom mount with two bolts:
M 16 (SW 22)  M = 230 - 300 Nm

Bottom mount with central bolt:
M 16 (SW 22)  M = 300 Nm

If the air bag has been removed completely, see Installing air bags, Chapter 11.2.
9 Replacing axle

[21] Lower axle and remove vehicle jack.

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

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

[23] Remove vehicle supports.

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

[25] On air suspension systems without rotary disc valve / change-over valve, screw nut (2) for air suspension valve linkage (1) on to axle. The vehicle is automatically reset to the ride height.
**10.1 Removing rubber-steel bush**

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

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

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

***Repair guide!***

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

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

[9] Generously coat the tension rod (10) and nut (1, SW 36) with heavy-duty lubricating and mounting grease (e.g. STABURAGS NBU30 PTM).

[10] Insert the discs (9) and the cable mounts (8) onto the tension rod.

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

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

[12] Pull the rubber-steel bush (1005) over the tension rod (10) out of the trailing arm (1000).

[13] Unscrew the assembled tension rod (10), loosen threaded rods (6) and remove device with rubber-steel bush.

[14] Remove plugs (1015) from trailing arm (1000) with screwdriver, if necessary with aid of hammer.


10.2 Installing rubber-steel bush

[17] Position the mask (20) laterally on the trailing arm (1000). To do this, use the two short protruding pin ends in the two indentations in the face of the trailing arm.

[18] Using a suitable pin, attach the 'top' marking inside the fork of the mask (arrow) onto the trailing arm.

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

[19] The threaded rods (6) must be loosened far enough so that the assembly can be slipped over the head of the trailing arm (1000) from the front. Alignment funnel (5) sits snugly at the ring (7).

[20] Mount the installation device so that the centring of the puller plate (4) is positioned in the trailing arm eye.

[21] Tighten the threaded rods (6) slightly.

[22] Generously coat the tension rod (10) and nut (1, SW 36, see Fig. 5) with a heavy-duty lubricating and mounting grease (e.g. STABURAGS NBU30 PTM).

[23] Insert the discs (9) and the cable mounts (8) onto the tension rod.

[24] Insert the rubber-steel bush (1005) in the alignment funnel (5) with the arrow pointing up.

Repair guide!
If there are sprue nubs on the rubber-steel bush, they must be mounted so that they are pointing towards the alignment funnel.
10 Replacing rubber-steel bush in trailing arm

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

Alignment

Repair guide!
When aligning the bushing installer to the cast suspension arm, all the relevant parts markings must point upwards and be aligned.
- red groove of the puller plate (4)
- rod (6) over the manually applied marking on the cast suspension arm (see working step [18])
- marking rubber steel bush (1005) upwards (1005)
- red groove of the installation sleeve (8)

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

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

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

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

If the bush sits mis-aligned or off-centre in the eye of the cast suspension arm, it can be readjusted, using a long bar. To do this, insert the bar through the opening in the bush and lever the bush into the required position. The adjustment process must be finished within approx. 10 minutes to ensure the tyre fitting paste is not dried yet.
[29] Check the angular position of the rubber-steel bush (1005). To do this, place the mask (20) on the bushing countersink and position the two long protruding pin ends in the two indentations in the face of the trailing arm.

The position is correct if the marking of the bush ('up' arrow) can be seen within the notch (arrow) (permissible angular tolerance: ± 5.5°). Where appropriate, remove the bush and set tight again.

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

[31] Install trailing arm in support.

[32] Install spring bolt (1154, SW 36), see Chapter 8, work step 10 - 12.
11 Removing and installing air bags

11.1 Removing air bags

[1] Inflate air bags (1200) as far as possible with rotary disc valve / change-over valve.

[2] Support vehicle to prevent accidents, e.g. place suitable spacer between vehicle frame and trailing arm.


Air bags with central bolt connection


Continue with work step [5].

Air bags with universal plate

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

Remove locking screws (1224, SW 22).

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

Continue with work step [5].
**Air bags with split piston**

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

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

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

11 Removing and installing air bags

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

11.2 Installing air bags

[9] Slide pressure ring (3) over threads on fitting (1) with smooth surface forward then install new O-ring (4).

[10] Assemble fitting into air bags, do not tighten the lock nut (2) yet.


Air bags with central bolt connection

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

[13] Screw in M 16 locking bolt (1224, SW 22) and tighten to specified torque of M = 300 Nm.

Continue with work step [14].
**Air bag with universal plate**

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

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

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

Continue with work step [14].

---

**Air bag with split piston**

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

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

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

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

[16] Assemble union nut (2) for air hose (3) on to fitting (1), then tighten lock nut (4).

[17] Check compressed air system for leakage and functionality.
11.3 Dis-assembling and assembling air bags with central bolt connection

**Disassembly**

[1] Remove air bag, see Chapter 11.1.

[2] Feed compressed air in to the port for air connection until air bags (1205) are completely extended.


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

**Assembly**

[5] Tighten bolts (1215, SW 32) on air bag (1205) to torque of 130 Nm.

[6] Install plastic piston (1210) on bolt (1215).
11 Removing and installing air bags

11.4 Dis-assembling and assembling air bags with universal plate

Dis-assembly

[1] Remove air bag see Chapter 11.1.

[2] Feed compressed air in to the port for air connection until air bag (1205) is completely extended.

[3] Remove locking bolt (1222, SW 22) with impact wrench.

[4] Remove washer (1220) and plastic piston (1210).


Assembly

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

[7] Position plate (1220) in plastic piston (1210) and tighten locking bolt (1222, SW 22) on to threaded sleeve (1215) loosely.

[8] Align mounting points with one another so that air bag is not turned to wrong position after installation.

[9] Tighten locking bolt (1222, SW 22) to specified torque of 230 - 300 Nm.
11.5 Dis-assembling and assembling air bags with split piston

Dis-assembly

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

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

Assembly


[6] Coat threads (arrow) on air bag (1205) with thread-locking adhesive, e.g. Loctite.

[7] Assemble the pistons on to air bellows with nut (1218, SW 19).
   Tightening torque: $M = 130 \text{ Nm}$
12 Dismantling and assembly of shock absorber

Removal

[1] Support axle and vehicle to prevent accidents.

[2] Remove locking bolt (1324, SW 36) from bottom shock absorber mount on trailing arm (1000).

[3] Remove lock nut (1330, SW 36) from hex. head bolt (1315) on top shock absorber mount.

[4] Secure shock absorber (1300) from falling down and pull hex. head bolt (1315) out of support.

Installing

Repair guide!

- Always replace shock absorbers in pairs, i.e. all shock absorbers on one axle.
- Install shock absorbers with cover pointing upward.

[5] Coat hex. head bolt (1315) for shock absorber mount lightly with grease (thread and bearing points).


[8] Install shock absorber (1300) on trailing arm (1000) using hexagon bolt (1324, SW 36).

[9] Tighten hex. head bolt (1324) and lock nut (1330) to specified torque of 420 Nm (390 - 460 Nm).
12.1 Replacing bushes in shock absorber

Removal


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

Installation

[4] Coat rubber bush (1304) and steel bush (1303) with 50% soap solution.

Repair guide!
After replacing the rubber and steel bushes (1303, 1304) the protrusion on both sides of the shock absorber eye must be equal.
13 Dismantling and assembly of axle lift device

13.1 Two-side axle lift

Removal

[1] Support axle to prevent accidents and deflate air suspension.

[2] Remove the locking washer (1623; until end of 2015) or the lock nut M 10 (1623 / SW 16; from 2016) from the location pin (1621).

[3] Install bracket (1610) with shaped plate (1613) and secure lifting cylinder (1660) against falling down, remove positioning pin.

[4] Pull complete unit out of holder in air suspension hanger bracket and remove.

[5] If necessary remove lock nuts (1636, SW 17) from locking bolts (1635) and remove axle lift (1055). Note position of locking bolt.

[6] If necessary, remove lift cylinder (1660), by removing the two lock nuts (1663, SW 24) from the stud bolts for the lift cylinder.
If necessary, remove cylinder cap screw (1644, SW 8) with washer (1643) out of shaped part (1640) or trailing arm (1000).

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

Tap or drill out upper anchor bolt flange (1642) and drive anchor bolt out through shaped part and trailing arm with drift punch.

Pull shaped part off trailing arm seat and remove.

Installation

Clean all parts, check for wear and damage, replace, if necessary.

If removed, position shaped part (1640) on mount on trailing arm (arrow).

Install cylinder cap screw (1644, SW 8) with washer (1643) in to new anchor bolt (1642).

Drive fitting in to holes in shaped part (1640) and trailing arm (1000) with hammer.

Tighten cylinder cap screw to specified torque of 50 Nm.

If removed, position shaped plate (1613) in adapters on two-side axle lift bracket (1610, arrow).

Bolt bracket and shaped plate to position noted in work step [5] using locking bolts (1635) and lock nuts (1636, SW 17).

Tightening torque: 75 Nm
13 Dismantling and assembly of axle lift device

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

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

[18] Raise axle lift. Fasten rear part of axle lift to air suspension hanger bracket with positioning pin (1621).

[19] Attach the locking washer (1623; until end of 2015) or screw on the lock nut (1623 / SW 16; from 2016) and tighten to a torque of 38 Nm.

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

13.2 Sidemounted axle lift

Removal

[1] Support axle to prevent accidents and deflate air suspension.

[2] Unscrew bottom locking screws or central bolt (1224, SW 22) for lift bags (1200).


[5] Secure lift arm (1630) against falling down and drive out spring bolt.

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

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

[7] Remove lock nut (1640, SW 30) from hex. head bolt (1637). Note position of bolt.

[8] Take out hex. head bolt and remove bush (1635) with tube (1638).
13 Dismantling and assembly of axle lift device

Installation

Clean all parts, check for wear and damage, replace, if necessary.

[9] Position bush (1635) on tube (1638).

[10] Use tube to install bush in lift arm (1630) (position noted in work step [7]).


[12] Install locking screw (1640, SW 30) and tighten to specified torque of \( M = 350 \text{ Nm} \) (325 - 385 Nm).


[14] Insert pre-assembled bushes in to lift arm (1630) from inside to outside.

[15] Attach adjusting plate with anti-rotation lock (1560), position washer (1165) and insert new, lightly greased spring bolt (1156).
[16] Raise pre-assembled axle lift device until bushes and holes for spring bolts (1156) are aligned.

[17] Drive spring bolts in to end of air suspension hanger bracket. Ensure that wear washers (1525) are installed on bush (1005) in trailing arm (1000) (see picture 12, Page 36).

[18] Install adjusting plate (1161) in correct position between air suspension hanger bracket (1511) and stepped bush (1175).


[21] Insert spring bolt to stop.

[22] Ensure that adjusting plate is correctly seated on anti-rotation lock (arrow) on air suspension hanger bracket.

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

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

<table>
<thead>
<tr>
<th>Locking screws</th>
<th>230 - 300 Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central bolt</td>
<td>300 Nm</td>
</tr>
</tbody>
</table>
13 Dismantling and assembly of axle lift device

13.3 Central axle lift device

Removal


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


[5] Secure lift arm (1605) and tube (1605) against falling down and drive out hex. head bolt.

**Caution! RISK OF INJURY**

Use hoist or have second person help remove lift arm.

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

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

Clean all parts, check for wear and damage, replace, if necessary.

[8] Install lift arm (1610) and bracket (1615) using two hex. head bolts (1225, SW 24) and tighten to specified torque of 230 Nm.

[9] Position bush (1180) on stepped bush (1175).

[10] Insert pre-assembled bushes into bracket (1615) from inside to outside.


[12] Place washer (1165) on spring bolt.

[13] Raise preassembled axle lift device until bushes and holes in support (1510) are aligned.

[14] Insert spring bolt in to bush in support, position tube (1605) and press spring bolt all the way in.
13  Dismantling and assembly of axle lift device


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

[17] Fasten axle lift to lift bag (1200) with locking bolts (1224, SW 22).
  Tightening torque: 230 - 300 Nm
  Top mounting nuts (1240, SW 17):
  Tightening torque: 66 Nm
14.1 General

The air suspension valve controls the air bag pressure as a function of vehicle load and keeps the ground clearance at the same level no matter the load condition. It is attached to the chassis frame by bolts and connected to the axle by a pivot linkage arrangement. The pivot link is located in the middle of the axle, on three-axle units at the centre axle, on two-axle units on the rear axle. In special cases (e.g. axle lift device, large vehicle slope) the air suspension valve may also be connected to the front or rear axle. In exceptional cases two air suspension valves may be fitted.

14.2 Replacing

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

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

[5] The valve is refitted on in the reverse order. Following this, check compressed air system for leaks.

14.3 Setting

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

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

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

![Repair guide!](image)

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

[4] Press valve lever down and hold in this position until the vehicle has fully lowered.

[5] Slowly push valve lever up and hold until a single-axle vehicle has been raised by at least 60 mm, two- and three-axle vehicles by at least 70 mm and vehicles with axle lift device by at least 100 mm.

[6] After these setting heights have been reached, the air suspension valve lever must be moved into the horizontal position (picture 1).

This adjustment achieves the minimum ride height.

[7] Insert guide linkage (5) into the fastening lug on the axle beam. Screw on nut (2) with spring washer (3).

[8] Connect valve lever and guide linkage with one another via the guide rod (6). After fitting the valve, lever must be located in the horizontal position. If necessary, re-adjust the double nut (1) correspondingly and tighten the nut (3). Fasten the guide rod by tightening the screws on the band clamps.

**Spring deflection**

<table>
<thead>
<tr>
<th>Type</th>
<th>Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single axles:</td>
<td>60 mm</td>
</tr>
<tr>
<td>Tandem / Triaxle:</td>
<td>70 mm</td>
</tr>
<tr>
<td>with axle lift</td>
<td>100 mm</td>
</tr>
</tbody>
</table>
15.1 Conventional axle alignment check on the vehicle

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

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

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

Note: The triangle in the BPW logo is concentric with the axle.
15 Axle alignment check

[3] Lift vehicle frame to normal height and support.


[5] Loosen lock nut (1168, SW 36) on spring bolt (1154) slightly.

[6] Move adjusting plates (1161) on both sides up or down, depending on required adjustment direction, by tapping lightly with hammer.

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

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

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

The square on the spring bolt head (anti-rotation lock) must sit in the slot of the adjusting plate.
15.2 Axle alignment check with laser measurement devices

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

Calculating the toe values:

\[
\text{Toe} = \frac{A_1 - B_1 \text{ (mm)}}{A \text{ (m)}} \quad \text{Positive value = Toe-in} \\
\text{A (m)} \quad \text{Negative value = Toe-out}
\]

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

Permitted toe tolerance range per axle:
- for rigid axles: -1 to +5 mm/m
- for LL axles
  - unladen: -2 to +2 mm/m
  - laden: 0 to +6 mm/m

[3] Correct track if out of tolerance (see chapter 15.1).
16 Notice
BPW is a globally leading manufacturer of intelligent running gear systems for trailers and semi-trailers. As an international mobility and system partner, we offer a wide range of solutions for the transport industry from a single source, from axle to suspension and brake to user-friendly telematics applications. We thereby ensure outstanding transparency in loading and transport processes and facilitate efficient fleet management. Today, the well-established brand represents an international corporation with a wide product and service portfolio for the commercial vehicle industry. Offering running gear systems, telematics, lighting systems, composite solutions and trailer superstructures, BPW is the right system partner for automotive manufacturers.

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