Axle types SK RS/RZ 9042
SK RS/RZ 11242
SK RS/RZ 9037
SK RS/RZ 11037
Manufacturer...................................................................................................................................
Address.............................................................................................................................................
Body type..........................................................................................................................................
Chassis no..........................................................................................................................................
Year of manufacture ......................................................................................................................
Registration, date-in-service...........................................................................................................

Spare parts service for SAF axles and suspension systems

When ordering spare parts, quote correct axle identification serial no., refer to the axle type plate.

Please enter the vehicle identification figures in the type plates shown below so that correct specifications are available when required.

Type plate for axle identification

Identification of axles without type plate
Production No. of axle on right of axle tube as seen in direction of forward travel
This manual is intended for the technical workshop personnel responsible for maintenance and repair.

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The item numbers indicated are given only for identification and to distinguish between different versions. Use the part numbers from the valid spare parts documents for identification of spare parts.

SAF axles and suspension units are subject to continuous further development; the data and drawings contained in the manual may therefore differ from the details given in the operating permit.

The contents of the manual does not constitute the basis for a legal claim.

Reprinting, reproduction or translation in whole or in part is not permitted.

The issue of this publication invalidates all earlier maintenance and repair manuals.
A) Component Description

The components of the SAF axle Types SK RS / RZ 9042 / 11242 and SK RS / RZ 9037 / 11037 have important technical details which distinguish them from other axle types:

- Great ease of installation
  (e.g. only 1/4 of the working time is now required for brake repairs)
- Long wheel bearing grease change intervals of 500,000 km
- Favourable lubrication intervals for the camshaft bearing at each brake lining change, but not later than every 12 or 24 months (up to axle No. 233.95)
- Approx. 40 % less individual components in the brakes
- No adjustment of the wheel bearing clearance necessary

Overview of the Components

- **Hub cap** with snap fit: Removal and fitting is quick and easy; simply lever off and push on.

- **Wheel hub**: A compact unit of hub with two equal-sized wheel bearings and seal rings. The wheel bearings are filled with a longlife grease and sealed.

- **Wheel bearing**: Thanks to the protected installation of generously dimensioned wheel bearings, service lives of 500,000 km and more can be achieved. Grease changing at brake repairs is no longer necessary.

After 500,000 km or after 50 months' operation, the following 3 procedures are possible:

1) Inspection of the wheel bearing for further serviceability with grease change and replacement of the seal rings.
2) Replacement of the complete wheel bearing assembly with seals and long-life grease. The wheel hub can continue to be used.
3) Installation of a complete original compact wheel hub.
A) Component Description

Wheel bearing clearance
Thanks to the precision manufacturing of the components, no adjustment of wheel bearing clearance is necessary. The correct position of the wheel bearing is achieved simply by tightening the axle nut.

Axle nuts
Right-hand side – right-hand thread
Left-hand side – left-hand thread
Additional locking of the axle nuts is therefore not necessary.

Brake shoes
The brake shoes are each supported spherically on a ball and are held by a spring clamp. Only one return spring is required for the return of the brake shoes. The brake shoe cam rollers are guided exactly in the specially machined S-cam profile.

Brake linings
Two different asymmetrically formed lining segments are riveted onto the brake shoes. The thicker end of the lining is installed on the S-cam side (cam roller).
As a result of this scythe-shaped brake lining contour, uniform maximum wear of the brake lining over the whole surface is achieved during normal operation.
The brake linings have an embossed groove on the end surfaces which indicates the maximum permissible lining wear.

Camshaft
For axle types SK RS/RZ 9042/11242 up to 02/98 and axle types SK RS/RZ 9037/11037 up to 08/99 the following applies:
The camshaft bearings are brass bushes situated in the brake calliper. The bearing bush in the rod guide is made from PVC.
For axle types SK RS/RZ 9042/11242 up to 03/98 and axle types SK RS/RZ 9037/11037 up to 09/99 the following applies:
The camshaft bearings in the brake calliper as well as the rod guide are in the form of a screwed compact bearing, that guarantees a quick replacement. Both bearing are provided with grease nipples and must be greased every 12 months.
For both variations the following applies:
Both bearings have a long-life lubrication and are protected by seal rings and rubber sleeves against the ingress of dirt and splash water.
On the slack adjuster end the camshaft has a milled groove and a slip-on indicator for visual checking of the brake lining wear.
When the wear indicators have reached a horizontal position, an inspection of the brake lining thickness must be carried out.

Inspection of the brake lining thickness
During maintenance work, the thickness of the brake linings can be inspected at two sight holes in the rear cover plate.
B) General safety instructions

Please observe the following safety instructions in order to maintain the operational and road safety of your SAF axles and suspension systems:

1. The wheel contact surfaces between the wheel disc and wheel hub and the wheel nut contact surface at the wheel disc must not be additionally painted. The contact surfaces must be clean, smooth and free from grease. Failure to observe this may result in the wheel coming loose. Any additional instructions of the wheel manufacturer must also be observed.

2. Only the wheel and tyre sizes approved by the trailer builder may be used. The tyres must always have the specified inflation pressure.

3. The brake systems of the tractor and the trailer/semi-trailer must be synchronised by means of a tractor/trailer brake synchronisation not later than 5,000 km after the initial start of operation of the trailer/semi-trailer in order to ensure a safe and uniform braking behaviour and uniform brake pad wear. Tractor/trailer brake synchronisations should be carried out by appropriately qualified and equipped brake workshops.

   The use of an additional braking system, such as a trailer anti-jackknife brake is forbidden by law on vehicles with type approval after January 1999.

4. Before starting a journey, ensure that the maximum permissible axle load is not exceeded and that the load is distributed equally and uniformly.

5. On trailers with air suspension, ensure that the air bags are completely filled with air before starting the journey. Incompletely filled air bags may result in damage to axles, suspension, frame and superstructure and impair road safety.

6. Ensure that the brakes are not overheated by continuous operation.

   With drum brakes, overheating can result in a hazardous deterioration in the braking efficiency.

   With disc brakes, overheating can result in damage to surrounding components – in particular the wheel bearings. This can result in a significant deterioration in road safety, e.g. failure of wheel bearings.

7. The parking brake must not be immediately applied when the brakes are hot, as the brake discs and brake drums may be damaged by different stress fields during cooling.

8. Use the supports provided when loading and unloading in order to avoid damage to the axle.

9. Observe the operating recommendation of the trailer builder for off-road operation of the installed axles and suspension systems.

   The SAF definition of OFF-ROAD means driving on non-asphalted / non-concreted routes, such as e.g. gravel roads, agricultural and forestry tracks, on construction sites and in gravel pits.

   Off-road operation of SAF axles and suspension systems not designed for the purpose may result in damage and hence to an impairment of road safety.

10. SAF axles and suspension systems require continuous care, service and maintenance in order to maintain operational and road safety and to be able to recognise natural wear and defects in good time.

    The daily inspection of the trailer for road safety before starting the journey is one of the driver’s obligations.

    SAF recommends that at least the inspections and maintenance operations described on page 6 should be carried out.

We recommend the use of original SAF spare parts.
A close-knit service network of SAF partner companies is available for the technical support of the SAF axle and suspension systems and for the supply of original SAF spare parts (see rear cover or on the Internet under www.saf-axles.com).
Updates will be published as necessary on the Internet under www.saf-axles.com.
C) Maintenance instructions

for SK RS/RZ 9042/11242/9037/11037 axles

<table>
<thead>
<tr>
<th>Service schedule</th>
<th>Mileage intervals</th>
<th>Time intervals</th>
<th>After first 5,000 km or</th>
<th>Periodic checks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>&gt;</td>
<td>&gt;</td>
<td>after first month</td>
<td>every 30,000 km</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;</td>
<td></td>
<td>every 150,000 km</td>
</tr>
</tbody>
</table>

**Mechanical check**

**Attention:**
Torque check wheel nuts after the first 50 km and 150 km (and after every wheel removal).

Torque check all nuts and bolts to recommended setting.

Hub end-float adjustment not required.
Pack wheel bearings with fresh grease after 500,000 km or 50 month, whichever comes first.
Check condition of taper roller bearings and replace, if necessary.
Lubricate camshaft bearings after every brake lining replacement, however, at least every 12 months.

**Visual inspection for wear/damage**

Check suspension components for wear, fluid leakage and damage
Check brake linings for wear
**Check camshafts for free movement**
Check slack adjusters for correct function
Check braking system for leaks (brake applied)
Check air suspension for air leaks
Check air suspension bellows for damage
Check piston surface for contamination and clean, if necessary
Check parabolic springs for damage, scoring and corrosion
Check self steering axle for correct function
Check tyre wear and tracking (if required)

**Safety inspection**

Check wheel brake for correct adjustment
Check service brake and hand brake efficiency

Check truck-trailer combination for brake compatibility
Check service brake pressure to manufacturer's recommendation

Check air suspension for correct ride height.
With 2 levelling valves, the max. permissible bellows pressure difference (LH to RH vehicle side) is 0.2 bar.

**Special service conditions**

Vehicles with long standing periods: service at specified time intervals
Vehicles used under extreme conditions: service at suitably reduced intervals

Warranty claims will only be accepted as long as the operating and maintenance instructions have been complied with and if SAF approved spare parts have been fitted.
C) Maintenance instructions

Axle types SK RS / RZ 9042 / 11242

Hub end-float setting. Lubricant.
Hub end-float adjustment is not required.
Pack wheel bearings with fresh grease after 500,000 km or 50 months, whichever comes first.
Check condition of taper roller bearings and replace, if necessary.
Replace O-ring (39) and fit the wheel cap.
After brake relining, lubricate camshaft bearings whilst rotating the camshaft through 360° several times.
Do not disassemble the wheel bearing assembly.
Use a vacuum cleaner to remove brake dust.
Never use pressurised cleaning devices or cleaning fluids on the brake drum and hub.
Clean stub axle of any old grease and apply fresh SAF fitting paste.

Lubricant specification:
Wheel bearings:
SAF Part No. 4 387 0011 05
Camshaft:
SAF Part No. 4 387 0011 05
Stub axle:
SAF Part No. 4 387 0015 06
SAF fitting paste
Brake anchor bracket ball:
SAF Part No. 4 387 0007 00
Copper paste

Hub nut tightening

LH direction of travel - LH thread.
RH direction of travel - RH thread.
Tightening torque 900 Nm. Each hub unit must be rotated smoothly at least twice while tightening the bolts.
Hub nuts with LH threads are marked with a groove milled into the hex outside.

BRAKE type SNK 420
Max. permissible turned brake drum bore: 424.0 mm
Brake drum bore with max. permissible wear: 425.0 mm
SAF approved brake linings:
BERAL 1541, BREMSKERL 6386
Turn new brake linings to brake drum bore dimension + 0.3 mm.
When renewing rivets, observe the manufacturer’s instructions regarding the brake lining form (see leaflet enclosed in pack); rivet on the brake linings with the thicker lining on the cam roller side.

<table>
<thead>
<tr>
<th>Brake size</th>
<th>SAF parts no. brake lining</th>
<th>Brake drum / brake lining refacing stages in mm</th>
<th>Brake linings</th>
<th>Rivets</th>
<th>DIN 7338 rivet</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNK 420</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>nominal size</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nominal size</td>
<td>1st oversize</td>
<td>2nd oversize</td>
<td>number per axle</td>
</tr>
<tr>
<td>x 180</td>
<td>1 057 0060 00</td>
<td>20.6</td>
<td>21.6</td>
<td>22.6</td>
<td>4</td>
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<td>x 200</td>
<td>1 057 0066 00</td>
<td>20.6</td>
<td>21.6</td>
<td>22.6</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1 057 0067 00</td>
<td>20.0</td>
<td>20.0</td>
<td>21.0</td>
<td>4</td>
</tr>
</tbody>
</table>

Assembly tools

Hub nut spanner
1 012 0024 00
Puller for wheel hub
4 434 3822 00
Brake shoe clamping device
3 349 1001 00
Brake drum fixing flanges
3 434 1040 01
Wheel bearing installation drift
3 434 1043 00
Puller for MS bushing diameter 46 mm
1 434 1056 00
Installation drift diameter 50/46 and diameter 42/38 mm 1 434 1055 00
SK RS / RZ 9037 / 11037 axles

Hub end-float setting. Lubricant.
Hub end-float adjustment is not required.
Pack wheel bearings with fresh grease after 500,000 km or 50 months, whichever comes first.
Check condition of taper roller bearings and replace, if necessary.
Replace O-ring (39) and fit the wheel cap.
After brake relining, lubricate camshaft bearings whilst rotating the camshaft through 360° several times.
Do not disassemble the wheel bearing assembly.
Use a vacuum cleaner to remove brake dust.
Never use pressurised cleaning devices or cleaning fluids on the brake drum and hub.
Clean stub axle of any old grease and apply fresh SAF fitting paste.

Lubricant specification:

Wheel bearings:
SAF Part No. 4 387 0011 05
Camshaft:
SAF Part No. 4 387 0011 05
Stub axle:
SAF Part No. 4 387 0015 06
SAF fitting paste
Brake anchor bracket ball:
SAF Part No. 4 387 0007 00
Copper paste

Hub nut tightening

LH direction of travel - LH thread.
RH direction of travel - RH thread.
Tightening torque 900 Nm. Each hub unit must be rotated smoothly at least twice while tightening the bolts.
Hub nuts with LH threads are marked with a groove milled into the hex outside.

BRAKE type SNK 367
Max. permissible turned brake drum bore: 371.0 mm
Brake drum bore with max. permissible wear: 372.0 mm
SAF approved brake linings:
BERAL 1561, BREMSKERL 6386

Turn new brake linings to brake drum bore dimension + 0.3 mm.
When renewing rivets, observe the manufacturer's instructions regarding the brake lining form (see leaflet enclosed in pack); rivet on the brake linings with the thicker lining on the cam roller side.

<table>
<thead>
<tr>
<th>Brake size</th>
<th>SAF parts no. brake lining</th>
<th>Brake drum / brake lining refacing stages in mm</th>
<th>Brake linings</th>
<th>Rivets</th>
<th>DIN 7338 rivet</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNK 367</td>
<td>1 057 0068 00</td>
<td>d₀-367.0</td>
<td>d₁-367.0</td>
<td>d₂-369.0</td>
<td>number per axle</td>
</tr>
<tr>
<td></td>
<td>1 057 0069 00</td>
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<td>22.1</td>
<td>23.1</td>
<td>4</td>
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<tr>
<td></td>
<td></td>
<td>20.5</td>
<td>21.5</td>
<td>22.5</td>
<td>64</td>
</tr>
<tr>
<td>x 180</td>
<td>1 057 0070 00</td>
<td>21.1</td>
<td>22.1</td>
<td>23.1</td>
<td>4</td>
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<tr>
<td></td>
<td>1 057 0071 00</td>
<td>20.5</td>
<td>21.5</td>
<td>22.5</td>
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<td>x 200</td>
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<td>22.1</td>
<td>23.1</td>
<td>4</td>
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<td></td>
<td></td>
<td>20.5</td>
<td>21.5</td>
<td>22.5</td>
<td>64</td>
</tr>
</tbody>
</table>

Assembly tools

Hub nut spanner
SAF parts no. 1 012 0024 00
Puller for wheel hub
SAF parts no. 4 434 3822 00
Brake shoe clamping device
SAF parts no. 3 349 1001 00
Brake drum fixing flanges
SAF parts no. 3 434 1040 01
Wheel bearing installation drift
SAF parts no. 3 434 1043 00
Puller for MS bushing
SAF parts no. 1 434 1056 00
Bushing tool for MS bushing
SAF parts no. 1 434 1055 00
Axle types SK RS / RZ 9042 / 11242 / 9037 / 11037
Lubrication of camshaft bearing in brake carrier
up to Axle No. 233·95---

Maintenance instructions

Park the vehicle on level, solid ground and chock the wheels to prevent the vehicle from rolling away.

Lift the axle using a jack. Completely release the wheel brake by turning the adjusting screw on the slack adjuster until cam and brake shoes are in the end position.

Lever the hub cap off the wheel hub using one of the recesses around the circumference of the hub cap.

Press the ABS sensor completely out of the sensor mounting block and place inside the axle tube.

The sensor holder can remain on the axle nut.

Loosen the axle nut and unscrew from the stub axle.
Axle nut wrench: SAF Part No. 1 012 0024 00
Note: Axle nut: W.A.F. 140
On left-hand side of vehicle (as seen in direction of forward travel) – left-hand thread.
Identification of axle nut with left-hand thread: Milled groove on outside of hexagonal head.
Position the wheel mounting carriage and pull the complete wheel hub unit off the stub axle.

Relubrication of camshaft bearing in brake carrier
Grease the camshaft bearing in the brake carrier via the grease nipple on the face of the S-cam using a grease gun until grease emerges at the end of the bearing. Turn the camshaft through 360° several times and check that the bearing is completely lubricated and that the camshaft turns easily.

This lubrication procedure must be carried out every time the brakes are repaired, but at least every 24 months.
Use lithium complex grease of consistency class 2 with EP additives, "SAF Part No. 4 387 0011 05".
Axle types SK RS / RZ 9042 / 11242 / 9037 / 11037
up to Axle No. 233-95--- with camshaft diameter Ø 55 and Ø 56 mm

Torque wrench settings

Use a torque wrench.
The use of impact wrenches is not accepted.

**Wheel nuts:**
- Spigot-hub-centred fixing:
  - M 22 x 1.5 / 600 Nm
- Bolt-centred fixing:
  - M 22 x 1.5 / 430 Nm

**U-bolts:**
- (diagonally in three stages)
  - M 24 / 700 Nm
  - M 22 / 650 Nm
  - M 20 / 500 Nm

**Shock absorber:**
- M 24 / 400 Nm
## D) Spare part designation

Axle types SK RS / RZ 9042 / 11242 / 9037 / 11037
up to Axle No. 233·95--- with camshaft diameter Ø 55 and Ø 56 mm

<table>
<thead>
<tr>
<th>Item</th>
<th>Parts designation</th>
<th>Item</th>
<th>Parts designation</th>
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<td>Wheel cap assembly including items 39, 41</td>
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<td>3</td>
<td>Spherical mounting plate</td>
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<tr>
<td>4</td>
<td>Protection plug</td>
<td>059</td>
<td>Brake assembly including items 64, 74, 75</td>
</tr>
<tr>
<td>4.1</td>
<td>Protection plug</td>
<td>64</td>
<td>Brake shoe assembly without brake linings</td>
</tr>
<tr>
<td>5</td>
<td>Ball 40 mm Bearing bush 55/60 x 40 up to Axle No. 335·92---</td>
<td>65</td>
<td>Brake shoe assembly</td>
</tr>
<tr>
<td>6</td>
<td>Bearing bush 56/60 x 33</td>
<td>66</td>
<td>Cam roller</td>
</tr>
<tr>
<td>010</td>
<td>Camshaft bearing assembly including items 11 - 18</td>
<td>71</td>
<td>Brake lining</td>
</tr>
<tr>
<td>11</td>
<td>Spherical bush housing</td>
<td>72</td>
<td>Brake lining</td>
</tr>
<tr>
<td>12</td>
<td>Bearing bush</td>
<td>73</td>
<td>Rivet</td>
</tr>
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<td>12.1</td>
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<td>74</td>
<td>Clamp</td>
</tr>
<tr>
<td>13</td>
<td>O-ring</td>
<td>75</td>
<td>Return spring</td>
</tr>
<tr>
<td>14</td>
<td>Hex bolt assembly including items 15 - 17</td>
<td>181/082</td>
<td>Camshaft assembly left/right</td>
</tr>
<tr>
<td>15</td>
<td>Hex bolt</td>
<td>Camshaft diameter 55 mm up to Axle No. 335·92--- no longer available. Replacement: Camshaft diameter 56 mm and bearing bush 56/60 x 33 with items 84 - 88.2, 18.3</td>
<td></td>
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<td>16</td>
<td>Spring washer</td>
<td>O-ring</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Hex nut</td>
<td>84</td>
<td>Seal ring</td>
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<td>18</td>
<td>Bellows</td>
<td>85</td>
<td>Disc spring</td>
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<td>18.3</td>
<td>Brake lining wear gauge</td>
<td>86</td>
<td>Clamp</td>
</tr>
<tr>
<td>19</td>
<td>O-ring - Stub axle</td>
<td>87</td>
<td>Washer</td>
</tr>
<tr>
<td>20</td>
<td>O-ring - Hub nut</td>
<td>88</td>
<td>Washer</td>
</tr>
<tr>
<td>22</td>
<td>Axle nut right</td>
<td>88.1</td>
<td>Clamp</td>
</tr>
<tr>
<td>22.1</td>
<td>Axle nut left</td>
<td>88.2</td>
<td>Conical grease nipple</td>
</tr>
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<td>Baseplate</td>
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<td>Slack adjuster</td>
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<tr>
<td>27</td>
<td>Wheel hub assembly including items 27 - 41</td>
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<td>Return spring</td>
</tr>
<tr>
<td>27.2</td>
<td>Wheel hub unit, complete with item 27.2</td>
<td>91</td>
<td>Dust cover assembly including items 92 - 99</td>
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<td>92</td>
<td>Dust cover, RH</td>
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<td>29</td>
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<td>Dust cover, LH</td>
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<td>30</td>
<td>Wheel bolt assembly including items 31 - 34 Bush 1 095 1040 00 not included</td>
<td>94</td>
<td>Plug</td>
</tr>
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<td>31</td>
<td>Wheel bolt</td>
<td>95</td>
<td>Rubber seal</td>
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<td>34</td>
<td>Wheel nut</td>
<td>96</td>
<td>Hex bolt</td>
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<td>38</td>
<td>Seal ring</td>
<td>97</td>
<td>Clamp</td>
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<tr>
<td>38.1</td>
<td>Split seal ring</td>
<td>98</td>
<td>Plug</td>
</tr>
<tr>
<td>39</td>
<td>O-ring</td>
<td>99</td>
<td>Rubber grommet</td>
</tr>
</tbody>
</table>
Axle types SK RS / RZ 9042 / 11242 / 9037 / 11037
from Axle No. 234·95---

Torque wrench settings

Use a torque wrench.
The use of impact wrenches is not accepted.

Wheel nuts:
- Spigot-hub-centred fixing: M 22 x 1.5 / 600 Nm
- Bolt-centred fixing: M 22 x 1.5 / 430 Nm

U-bolts:
- (diagonally in three stages)
  - M 24 / 700 Nm
  - M 22 / 650 Nm
  - M 20 / 500 Nm

U-bolts:
- (diagonally in three stages)
  - M 24 / 700 Nm
  - M 22 / 650 Nm
  - M 20 / 500 Nm

Shock absorber:
- M 24 / 400 Nm
<table>
<thead>
<tr>
<th>Item</th>
<th>Parts designation</th>
<th>Item</th>
<th>Parts designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Axle beam assembly including items 3 - 8, 010, 19, 22 - 22.1, 25</td>
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<td>Plug</td>
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<tr>
<td>010</td>
<td>Camshaft bearing assembly including items 11 - 13, 14, 18</td>
<td>059</td>
<td>Brake assembly including items 64, 74 - 75</td>
</tr>
<tr>
<td>081/082</td>
<td>Camshaft assembly left/right including items 18.3, 84 - 88.1</td>
<td>071</td>
<td>Brake lining, cam roller side</td>
</tr>
<tr>
<td>072</td>
<td>Brake lining, ball side</td>
<td>073</td>
<td>Rivet</td>
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<tr>
<td>074</td>
<td>Clamp</td>
<td>075</td>
<td>Return spring</td>
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<td>076</td>
<td>O-ring</td>
<td>077</td>
<td>Distance ring</td>
</tr>
<tr>
<td>078</td>
<td>Seal ring</td>
<td>079</td>
<td>Washer</td>
</tr>
<tr>
<td>080</td>
<td>Washer</td>
<td>081</td>
<td>Clamp</td>
</tr>
<tr>
<td>082</td>
<td>Washer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>083</td>
<td>Slack adjuster with automatic adjustment</td>
<td>084</td>
<td>Automatic slack adjuster</td>
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<tr>
<td>085</td>
<td>Anchor plate, LH</td>
<td>086</td>
<td>Anchor plate, RH</td>
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<tr>
<td>087</td>
<td>Return spring</td>
<td>088</td>
<td>Dust cover assembly including items 92 - 94, 96 - 99</td>
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<td>089</td>
<td>Dust cover, LH</td>
<td>090</td>
<td>Dust cover, RH</td>
</tr>
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<td>090</td>
<td>Plug</td>
<td></td>
<td></td>
</tr>
<tr>
<td>091</td>
<td>Plug</td>
<td></td>
<td></td>
</tr>
<tr>
<td>092</td>
<td>Hex bolt</td>
<td>093</td>
<td>Clamp</td>
</tr>
<tr>
<td>094</td>
<td>Plug</td>
<td></td>
<td></td>
</tr>
<tr>
<td>095</td>
<td>Rubber grommet, ABS</td>
<td>096</td>
<td>O-ring</td>
</tr>
</tbody>
</table>
Repairing the brakes

Removing and installing the wheel hub
Park the vehicle on level, solid ground and chock the wheels to prevent the vehicle from rolling away.
Lift the axle using a jack.
Completely release the wheel brake by turning the adjusting screw on the slack adjuster until cam and brake shoes are in the end position.
Lever the hub cap off the wheel hub using one of the recesses around the circumference of the hub cap.

Press the ABS sensor completely out of the sensor mounting block and place inside the axle tube.
The sensor holder can remain on the axle nut.

Loosen the axle nut and unscrew from the stub axle.
Axle nut wrench: SAF Part No. 1 012 0024 00.

Note:
Axle nut: W.A.F. 140
On left-hand side of vehicle (as seen in direction of forward travel) – left-hand thread
Identification of axle nut with left-hand thread:
Milled groove on outside of hexagonal head.

Position the wheel mounting carriage and pull the complete wheel hub unit off the stub axle.
The complete wheel hub unit can be easily pulled off the stub axle. If the bearing inner races tilt on the stub shaft, the hub unit can be pulled off using a normal workshop puller or SAF Part No. 4 434 3822 00.

Note:
Do not disassemble the compact wheel bearing unit!
The wheel bearings have a long-life grease packing. Grease change intervals, see chapter "Maintenance instructions".

Brake drum cleaning:
The brake drum may only be cleaned using a dry cleaning material. Liquid cleansers, high-pressure cleaners or machine cleaning are not permitted. With this type of cleaning there is a danger of cleansing fluid entering the wheel bearing with a consequent failure of the wheel bearing lubrication.

Disassembling the brakes
Lever the spring clip out of the retainer in the brake shoe using a screwdriver.
Remove the spring clip.

Pull the upper brake shoe sideways over the cam and ball pivot point and then remove both brake shoes from the brake carrier.

Inspecting the camshaft
Push the camshaft firmly from side to side in the bearing of the brass bush and measure the radial clearance.
Max. permissible radial clearance: 2.0 mm
If the max. permissible radial clearance is exceeded, the camshaft must be removed and the brass bush in the brake carrier replaced.
E) Installation instructions

Removing and installing the camshaft

Removing the slack adjuster.

Remove the circlip from the groove in the camshaft and pull the camshaft completely out of the bearing.

55 mm diameter camshafts up to axle Production No. 335·92--- are secured with a circlip.

56 mm diameter and 46 mm diameter camshafts from axle Production No. 336·92--- are secured with a spring clip.

Inspect both camshaft bearing points and the camshaft for wear; replace the camshaft, if necessary.

46 mm diameter camshaft bearings from axle Production No. 234·95---.

The arrangement of the camshaft bearings for all SK Series has been standardised to a standard bearing diameter of 46 mm.

The camshaft bearing on all axles is now lubricated via the grease nipple on the outside of the cover plate.

56 mm diameter camshaft bearings now available only for replacement up to axle Production No. 233·95---.

Note:
Camshafts with 55 mm diameter are no longer available.

Replacement from axle Production No. 336·92--- camshaft and 56 mm diameter brass bush.

Arrangement and installation position of the camshaft bearings, see drawing.

Install and remove the brass bush in the brake carrier using a drift.

Note:
Support the brake carrier during removal and installation of the brass bush.

Removal drift for brass bush SAF Part No. 1 434 1056 00
Installation drift for brass bush SAF Part No. 1 434 1055 00

After installation of the brass bush, the camshaft must turn easily. If necessary, ream the diameter of the brass bush using an adjustable reamer until the camshaft turns freely.
E) Installation instructions

Ensure that the seal ring is installed correctly; the sealing lip must face outwards.

Replace the complete plastic bearing bush of the camshaft on the slack adjuster end. Coat the inner surfaces of the plastic and brass bush all round with lubricating grease. Suitable greases, see chapter “Maintenance instructions”.

Replace the O-rings on the camshaft. Coat both bearing points on the camshaft with lubricating grease. Push washer and new sealing sleeve onto the camshaft. Insert the camshaft into the bearings and secure in position with the circlip.

Align the plastic bearing bush in the ball mounting plate with the camshaft, tighten the retaining screws and check that the camshaft turns freely. If necessary, correct the alignment of the plastic bearing bush with the camshaft. Push both sealing sleeves onto the camshaft until they contact the plastic bearing bush. Coat the splines of the slack adjuster and of the camshaft with lubricating grease.
Install the slack adjusters and wear indicators, place both cover plates into the sealing sleeve of the camshaft and secure on the axle tube with clamps.

Grease the camshaft bearing in the brake carrier and in the plastic bearing bush using a grease gun until grease emerges at the end of the bearing.

Turn the camshaft through 360º several times.

Check that the bearing is completely lubricated and that the camshaft turns easily.

Lubrication intervals for the camshaft bearing, see chapter “Maintenance instructions”.

Brake linings

Original dimensions and wear limits, see table in chapter “Maintenance instructions”.

Two different brake linings are riveted onto each brake shoe. The lining contour tapers towards the ball side.

**The thicker end of the brake lining is riveted on the roller side (S-cam).**

Corrosion-proofed steel rivets are used for securing the linings. The brake linings have a monitoring shoulder on the face end indicating the brake lining type approved by SAF and the wear limit for the minimum brake lining thickness.

Only brake linings of the same quality may be installed on the same axle.

Observe the approved rivet quality.

Replacement of the brake lining

Clean all parts and inspect for wear. Inspect the brake drum for wear and turn down to the next repair stage, if necessary (see table in chapter “Maintenance instructions”).

Remove the brake lining from the brake shoe.

Thoroughly clean the mounting surface for the brake lining on the brake shoe; grind slightly, if necessary.

Carefully remove any corrosion from the lining plate. Protect the contact surface against corrosion with a thin coating of zinc dust primer.

Replace the brake linings according to the repair stage of the brake drum (see table in chapter “Maintenance instructions”).

Observe the position of the different brake lining segments.

**The thicker end of the brake lining is riveted on the roller side (S-cam).**
**E) Installation instructions**

The brake lining must contact the brake drum over its full surface. The corners of the brake lining must not be broken and the lining must not be cracked at the rivets.

Required riveting force: 25,000 N

Read off the required working pressure on the setting plate of the rivetter and set the pressure at the pressure gauge.

Observe the rivetting sequence 1 - 8 for each brake lining half.

**Brake drum**

Brake drum diameter
Permissible wear limits, see table in chapter “Maintenance instructions”.

**Brake drum cleaning:**
The brake drum may only be cleaned using a dry cleaning material. Liquid cleansers, high-pressure cleaners or machine cleaning are not permitted. With this type of cleaning there is a danger of cleansing fluid entering the wheel bearing with a consequent failure of the wheel bearing lubrication.

**Inspecting the brake drum**

**Removing and installing the brake drum**

Inspect the brake surface of the brake drum closely for further serviceability.

Brake drums with fine hairline cracks in the contact surface can continue to be used. If the contact surfaces of the brake drums exhibit deep scoring, the drums must be turned down. If cracks are still visible after turning down, replace the brake drums.

Measure the brake drum diameter and turn down to the next repair stage, if necessary. When the maximum permissible brake drum inside diameter is reached, the brake drums must be replaced.

Permissible wear limits, see table in chapter “Maintenance instructions”.
Note:
The compact wheel bearing units are not removed when turning down the brake drum.
Centre wheel hub on the brake drum lathe using clamping device, SAF Part No. 3 343 1040 01.
Further machining of the brake drum can then be carried out as normal in the workshop.

Replacing the brake drum
In order to remove the brake drum from the wheel hub, drive all the wheel studs out of the wheel hub using a plastic hammer. Removal of the circlips (33) is not necessary. Before assembling the wheel hub and brake drum, remove any corrosion from the contact surfaces.

Drive the wheel studs into the brake drum flange until they are flush with the inner surface using a normal workshop drift. Ensure that the twist lock engages correctly. The circlips (33) are no longer required. If necessary, the wheel studs can also be correctly positioned by pulling in using a wheel nut.

Installing the brake shoes
Check the proper mounting seat of the two balls in the brake carrier. The balls can still be moved easily by hand in their mountings. If a ball has come loose in its mounting, a secure fit can be achieved again by tapping the sides of the mounting lightly with a hammer.
Check the proper mounting of the cam roller on the brake shoes. 
The cam roller must not jam in the mounting. It must turn easily, but 
without radial clearance. 
Replace the cam roller if the journal is severely worn. 
When installing new cam rollers, a secure mounting in the brake 
shoe can be achieved by pressing in the two side faces in a vice. 
Apply copper paste to the brake shoes, to the ball surface and to 
the two journals of the cam roller. 
See chapter “Maintenance instructions” for recommended media.

Apply copper paste to the 
two balls in the brake carrier. 
See chapter 
“Maintenance instructions” 
for recommended media.

Hook a new return spring into the tabs of the brake shoes. 
Position the upper brake shoe on the ball pivot point and the cam 
roller surface. 
Tilt the lower brake shoe towards the cover plate until the correct 
seating on the cam and on the ball pivot point is achieved; if 
necessary, turn the camshaft into the required position. Insert 
the spring clip into the groove on the lower brake shoe and hook 
into the retainer on the upper brake shoe using a screwdriver.

Ensure that the spring clip is fitted securely. 
Check the assembly and the proper operational condition of the 
installed brakes. 
Turn the camshaft by actuating the slack adjuster by hand and 
check the correct positioning and smooth return of the brake shoes; 
readjust the camshaft bearing, if necessary.
** Turning down the brake linings **

Even after a brake lining replacement with new brake linings, the brake lining must be in full contact with the braking surface of the brake drum over its whole surface in order to achieve an optimum braking effect.

For a uniform contact pattern, the brake lining must therefore be turned down centrally to the stub shaft on a normal workshop brake lining lathe.

Set the lathe tool to the diameter of the brake drum + 0.3 mm.

Use the clamping device for the brake shoes, SAF Part No. 3 349 1001 00.

** Leave the clamping device loose at this stage – do not clamp! **

Turn the camshaft by actuating the slack adjuster until the brake shoes are spread sufficiently that the lathe tool can take off material over the whole circumference of the brake linings.

Now tighten the clamping device.

** Turn down the brake linings. **

Inspect the brake lining surface all over for complete machining. If necessary, loosen the clamping device and spread the brake shoes slightly further and repeat the machining process.

Remove all chips of the brake lining from the brake shoes and stub axle.

** Brake lining lathe **

- 120 mm diameter supporting tube for axle type SK 9042/11242
- 100 mm diameter supporting tube for axle type SK 9037/11037

Order adapter sleeves from the lathe manufacturer.

** Installing the wheel hub with brake drum **

Completely coat the wheel bearing seats on the stub shaft and in the wheel hub with SAF fitting paste (SAF Part No. 4 387 0015 06)

See chapter “Maintenance instructions” for recommended media.

Replace O-ring - stub axle (19).
E) Installation instructions

Completely release the wheel brake by turning the adjusting screw on the slack adjuster until the cam rollers of the brake shoes are in the end position.

Position a wheel mounting carriage and push the complete wheel hub unit with brake drum onto the stub axle.

Inspect the O-rings (19) on the axle nut and replace, if necessary. Screw on the axle nut.

Axle nut: W.A.F. 140

On left-hand side of vehicle (as seen in direction of forward travel) – left-hand thread

Identification of axle nut with left-hand thread: Milled groove on outside of hexagonal head.

Tighten the axle nut.

Axle nut wrench: SAF Part No. 1 012 0024 00

Tightening torque 900 Nm. Each hub unit must be rotated smoothly at least twice while tightening the bolts.

Special locking of the axle nut is not necessary.

Completely coat the ABS sensor with copper paste and install in the sensor holder.

Inspect the O-ring (39) on the wheel hub for the snap fastening of the hub cap; replace, if necessary. Push on the hub cap and check that it is securely seated.

Remove the plug from the hub cap and adjust the ABS sensor until it is just contacting the exciter ring.

Insert the plug into the hub cap again.

Measure the voltage output on the ABS sensor cable using a voltmeter (approx. 100 mV) whilst turning the brake drum.

Check the sensor, if necessary.

Check that the cover plate of the brake shoes is correctly installed and correct the positioning, if necessary, using a clamp.
Checking the brake lining thickness

The brake lining thickness can be checked at the two sight holes in the rear cover plate.

Carry out the adjustment of the wheel brakes as normal at the slack adjuster.

See chapter “Slack adjuster”.

Carry out a normal test run and check the function and adjustment of the wheel brakes.

Check the freewheeling of the brake drum and check the clearance; repeat the adjustment at the slack adjuster, if necessary.

Brake lining wear indicator

On the slack adjuster the camshaft has a milled groove and a slip-on indicator for visual checking of the brake lining wear.

Wear indicator in vertical position = Brake linings as good as new

When the wear indicators have reached a horizontal position, an inspection of the brake lining thickness must be carried out.
E) Installation instructions

Repairing the wheel bearings

Changing the wheel bearing grease
As the operations are identical for both procedures, the descriptions are contained in the same chapter.

After 500,000 km or after 50 months’ operation, the following 3 procedures are possible:
1) Inspection of the wheel bearing for further serviceability with grease change and replacement of the seal rings.
2) Replacement of the complete wheel bearing assembly with seals and long-life grease. The wheel hub can continue to be used.
3) Installation of a complete original compact wheel hub.

The wheel bearing has to be disassembled for the inspections; replace any parts which are worn or damaged.
The wheel bearings must be in a good and serviceable condition.
The outer races must still have a correct, secure seating in the wheel hub.
The wheel bearing must turn freely without noises.
During assembly of the wheel bearing set, ensure absolute cleanliness of all the parts as even the slightest dirt can significantly reduce the service life of the wheel bearings.

Note:
Replacement of only one bearing is not permitted.

Always change the wheel bearings in pairs with the complete seal set and the prescribed grease packing.
The wheel bearing axial clearance must not exceed 0.5 mm.
Check the axial clearance without brake drum.
If the permissible limit for the wheel bearing clearance of 0.5 mm is exceeded, the wheel bearing set or, optionally, the bearing hub must be replaced.
Checking of the axial clearance should be expediently carried out when changing the brake drum.
E) Installation instructions

Removing the wheel bearing assembly
Lever out the retaining ring using a screwdriver.

Place a drift against the joint of the two wheel bearings and drive the bearing inner races out of the wheel hub together with the seal rings.
Drive the bearing outer races out of the hub housing using a normal workshop drift.
Thoroughly clean the hub housing.

Installing the wheel bearing assembly
Drive both bearing outer races into the hub housing until they bottom.
Use installation tool, SAF Part No. 3 434 1043 00.
Pack the space between the bearing outer race and shoulder with long-life grease.
Coat the taper roller bearing with the remaining grease.
Distribute the grease supplied in the repair kit uniformly over both bearings and use up completely.
Place the bearing inner races into the hub. Secure both bearing inner races with the retaining ring. Pack the ring gap on the face side of the bearing with long-life grease.

Fit the seal rings.

Press the seal rings into the hub on both sides using the installation tool, SAF Part No. 3 434 1043 00, until they are flush with the edge of the hub.

If the hubs are subsequently painted, ensure that the contact surface for the wheel and brake drum are not painted.
Braking system – checking and adjustment

S-cam brakes with manual slack adjusters

Due to normal brake drum and brake lining wear, the wheel brakes must be regularly adjusted in order to maintain the full brake cylinder stroke. To ensure maximum brake efficiency, the clearance between brake lining and drum must be kept to an absolute minimum. To determine this clearance, check the brake cylinder stroke while full pressure is applied to the service brake. If the path at the yoke end measures more than 2/3 of the maximum cylinder stroke then the brake must be adjusted without delay. With a correctly adjusted brake, it should be impossible to move the piston rod by hand more than 15 mm.

1. Turn adjusting screw to the right until...
2. ... the brake shoes fit closely to the brake drum.
3. Turn adjusting screw to the left, until...
4. ... the no-load stroke at the slack adjuster (at 127 mm) is approx. 10 - 15 mm long.
5. The wheel must rotate freely with no grating noise.

No-load - absolutely no play is permissible between the piston and membrane.

Adjusting screw (width across flats 19 mm)

Special instructions for automatic slack adjusters are given on the following pages.

A = At 1/2 stroke, the angle must not exceed 90°.
B = On full brake application, the slack adjuster and axle beam must not come in contact with each other.
L = Inspect piston rod according to technical specification.
F) Slack adjuster

Automatic slack adjuster – adjustment Type HALDEX

- Set cams and brake shoes to released position.
- Observe the correct push rod length “L” as indicated in the SAF specifications.

**Membrane brake cylinder**
Before installing the automatic slack adjuster, ensure that the brake chamber push rod is in released position.

- By contrast, **spring brake chambers** must be under full operating pressure (min. 6 bar).

**IMPORTANT:** If this is not maintained properly, the basic setting will be wrong, with critical effect of overheating the brakes.

- Grease the camshaft.
- Install anchor bracket (3), being sure to use two fixing bolts (4), do not yet tighten the bolts.
- Install the slack adjuster on the camshaft.
- The arrow (7) points in the braking direction.

- Turn adjusting screw (1) until the bore in the slack adjuster (8.1) coincides with the bore in the clevis end (9) (see drawing).
- Grease split pin (8) and secure.
- Install return spring (10).
- Move the control arm (2) in the direction of the arrow (operating direction of slack adjuster) up to its end position “A” **without** applying excessive force.
- When control arm (2) is in its end position “A”, tighten the fixing bolts (4).
- For the anchor bracket mounting (11), ensure that the 2 U-profiles engage firmly together.
- Fit slack adjuster retaining clip on camshaft.
- Axial clearance: Adjust 0.5 - 2 mm using shims.
- Adjust running clearance between brake lining and drum by turning adjusting screw (1) in clockwise direction until the lining fits smoothly against the drum. Then back off adjusting screw (1) by 3/4 turn. Do **not use impact wrenches**!

**FUNCTION CHECK**

- If the self adjuster is functioning correctly, then a minimum torque of 18 Nm must be felt and a grating noise must be heard when adjusting screw (1) is backed off.
- Operate the footbrake several times. Check whether the brake drum rotates freely, check the lining clearance and repeat adjustment procedure if necessary.
Automatic slack adjuster - adjustment Type S-ABA

- Set cams and brake shoes to released position.
- Observe the correct push rod length “L” as indicated in the SAF specifications.

Membrane brake cylinder
Before installing the automatic slack adjuster, ensure that the brake chamber push rod is in released position.

By contrast, spring brake chambers must be under full operating pressure (min. 6 bar).

IMPORTANT: If this is not maintained properly, the basic setting will be wrong, with critical effect of overheating the brakes.

- Grease the camshaft.
- Install anchor bracket (3), being sure to use two fixing bolts (4), do not yet tighten the bolts.
- Install the slack adjuster on the camshaft.
- The arrow (7) points in the braking direction.
- Turn adjusting screw (1) until the bore in the slack adjuster (8.1) coincides with the bore in the clevis end (9) (see drawing).
- For the fixed point mounting, ensure that the 2 U-profiles engage firmly inside one another.
- Grease split pin (8) and secure.
- Install return spring (10).
- Mount slack adjuster on camshaft.
- Axial clearance: Adjust 0.5 - 2 mm using shims.
- Adjust control arm.

- Possible adjustment range for control lever position (slack adjuster) up to its end position without applying excessive force.

- Adjust running clearance between brake lining and drum by turning adjusting screw (1) in clockwise direction until the lining fits smoothly against the drum. Then back off adjusting screw (1) by 3/4 turn. Do not use impact wrenches!

FUNCTION CHECK
- If the self adjuster is functioning correctly, then a minimum torque of 18 Nm must be felt and a grating noise must be heard when adjusting screw (1) is backed off.
- Operate the footbrake several times. Check whether the brake drum rotates freely, check the lining clearance and repeat adjustment procedure if necessary.
Commercially available optical measuring instruments must be used for performance of the track control on SAF SK Series axles.

1) For the original installation in the vehicle manufacturer’s works using universal centering on the wheel studs.

2) For the service inspection using universal rim centering.
For track control, the air suspension ride height must be adjusted to the values specified by SAF.

Semi-trailers with trailing steering axle
Distance A, B, C, max. permissible deviation 1.0 mm. Axle alignment responsibility of vehicle manufacturer.
Axle toe in/out $\pm 12' = \pm 3.0 \text{ mm/m}$, Axle camber $\pm 12'$ (SAF manufacturing tolerance)
(values apply to unloaded vehicle)

The max. permissible deviations for axle alignment are following to the tyre manufacturer’s specifications.
To avoid excessive tyre wear we recommend having the alignment checked at regular intervals.
The relevant reference point for alignment check is the hub cap centre or stub axle centre.
Alignment deviations may be caused by:
- loose U-bolts
- spring seat wear
- deformation of axle assembly components due to excessive vehicle operation.
1. **Lever for hub cap**  
SAF Part No. 1 434 1041 00

2. **Axle nut wrench W.A.F. 140**  
SAF Part No. 1 012 0024 00

3. **Clamping device for brake shoes**  
SAF Part No. 3 349 1001 00

4. **Clamping rings for brake drum lathe**  
SAF Part No. 3 343 1040 01
5. Wheel hub puller
SAF Part No. 4 434 3822 00

6. Removal drift for camshaft brass bush
SAF Part No. 1 434 1056 00

7. Installation drift for camshaft brass bush
SAF Part No. 1 434 1055 00

8. Wheel bearing installation drift
SAF Part No. 3 434 1043 00
### I) Tightening torque in Nm

The following tightening torques are only valid if no other values are given in the axle maintenance chart.

Torque wrenches settings, impact wrench not permissible.

<table>
<thead>
<tr>
<th>Thread</th>
<th>W.A.F.</th>
<th>Material 8,8</th>
<th>Material 10,9</th>
<th>Material 12,9</th>
</tr>
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<td>M 8</td>
<td>W.A.F. 13</td>
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<td>M 10</td>
<td>W.A.F. 17 / 16</td>
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<td>W.A.F. 19 / 18</td>
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<td>W.A.F. 22 / 21</td>
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<td>W.A.F. 24</td>
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<td>W.A.F. 30</td>
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<td>580</td>
<td>690</td>
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**Wheel fixing:**
Wheels see appropriate axle maintenance chart.

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<td>270 - 300 Nm</td>
<td>320 - 350 Nm</td>
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Soforthilfe im Pannenfall
NonStopService 24
Support in the case of service

- Im Servicefall wählen Sie bitte immer die Rufnummer Ihres Heimatlandes.
- In the case of service please always dial the number of your own country.

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<th>Inland home country</th>
<th>Vom Ausland from abroad</th>
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www.saf-axles.com

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