

Maintenance and Repair Manual

for SAF axle types SK RS/RZ 9030
SK RS/RZ 11030
SK RZ 12030



Edition 11/2001



Manufacturer.....

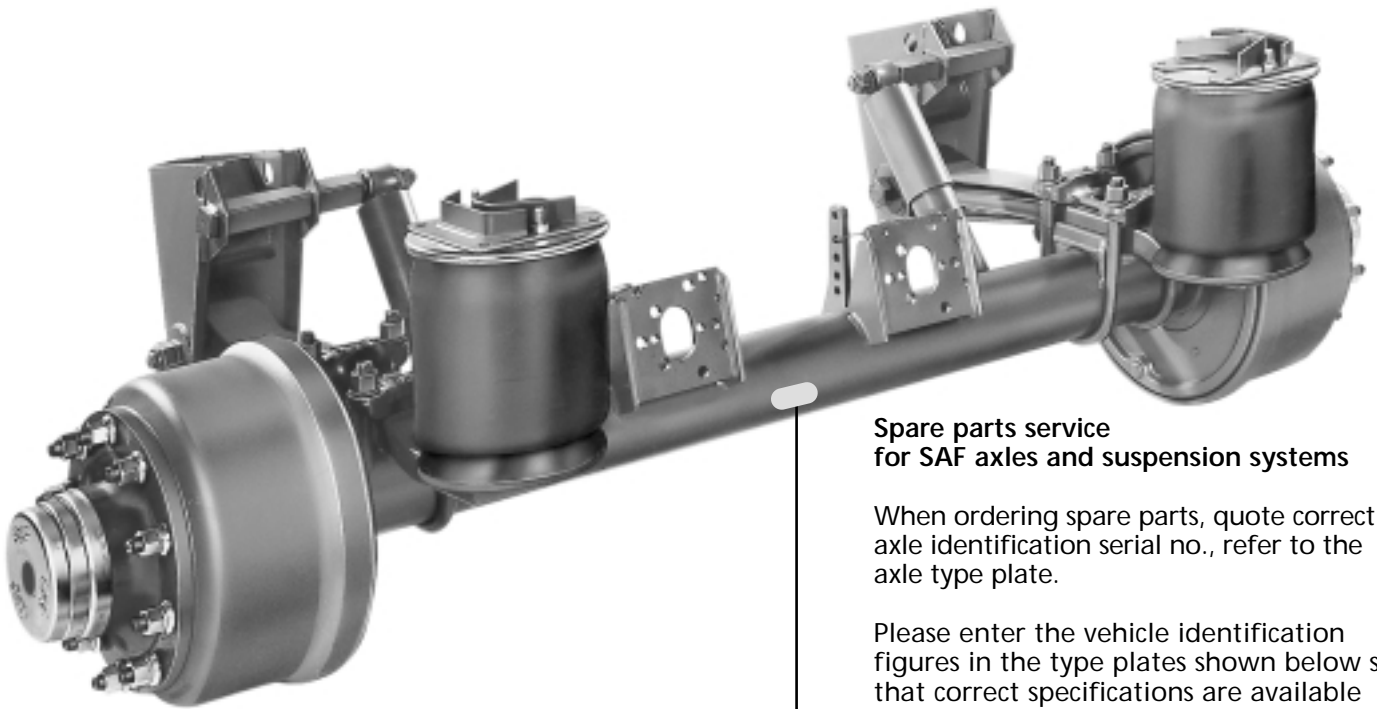
Address.....

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

SAF		OTTO SAUER ACHSENFABRIK KEILBERG	
D-63854 BESSENBACH / G E R M A N Y			
TYP			
Ident.-No. /Prod.-No.			
zul. Last kg perm. cap. charge adm.	STAT.	TECH.	v max. km/h max. speed vitesse maxi.
TDB-No.	Grundtyp		

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.

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The components of the SAF axle Types **SK RS/RZ 9030/11030** and **RZ 12030** 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 300,000 km or 36 months' operation
- Favourable lubrication intervals for the camshaft bearing at each brake lining change, but not later than every 12 months
- Approx. 40 % less individual components in the brakes
- Wheel bearing clearance adjustment is required as in the past

Overview of the Components



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



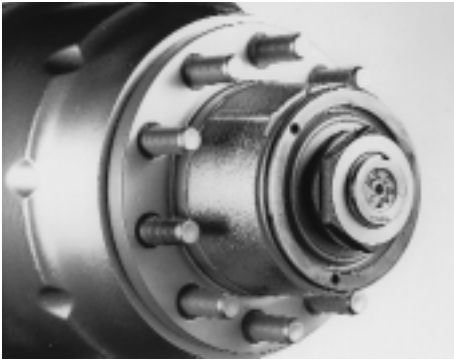
- **Wheel hub:** A compact unit of hub with two different sized wheel bearings and seal rings. The wheel bearings are filled with a longlife grease and sealed.



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

After 300,000 km or after 36 months' operation, the following 2 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-term grease packing. The wheel hub can continue to be used.



Wheel bearing clearance

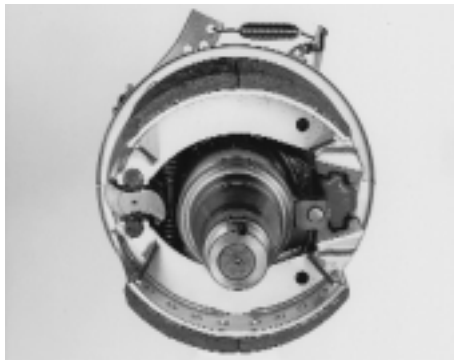
The wheel bearing clearance has to be adjusted as in the past.

Axle nuts

The axle nuts have a right-hand thread on both sides. The wheel hub is secured with a lock nut.

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.

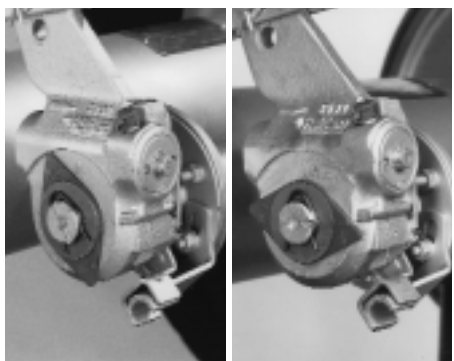


Brake linings

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.



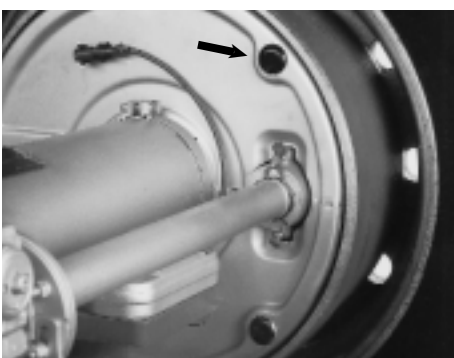
Camshaft

The camshafts are supported in the brake carrier in a brass bush. The bearing bush at the slack adjuster end is made of PVC.

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.

for SAF axles and suspension units

1. Instructions and tips for vehicle operation

In order to maintain the operation and road safety of the vehicle, the maintenance operations prescribed by SAF must be carried out regularly at the specified intervals (see "Maintenance instructions").

Furthermore, ensure that

- 1.1 the disc brake is not overheated due to continuous operation as otherwise irreparable damage to the surrounding components – in particular the wheel bearings – cannot be ruled out. This can impair the operational and road safety of the vehicle and represent a serious hazard for man and machine.
- 1.2 the compatibility of the brakes on the truck-trailer combination is checked. For reliable braking and uniform brake lining wear, the brake systems of the two vehicles must be matched to one another before starting operation.
- 1.3 the parking brake is not applied immediately when the brakes are hot as the resulting different stress fields can damage the brake discs
- 1.4 the drum brakes are not overheated as this will result in a dangerous reduction in braking efficiency
- 1.5 the maximum permissible axle loads and speeds are not exceeded
- 1.6 the cargo is evenly distributed over the loading area and safely secured
- 1.7 on vehicles with air suspension, the air bags are always fully pressurised before starting a journey
- 1.8 the prescribed wheel rims and tyre sizes are employed
- 1.9 the tyres have the prescribed inflation pressure
- 1.10 your driving style is matched to the road conditions
- 1.11 axle supports are used when loading/unloading construction machinery
- 1.12 the use of auxiliary trailer braking facilities (trailer underrun brake) is not permitted.

2. Vehicle safety

- 2.1 The daily check of the vehicle for road safety before starting a journey is the responsibility of the driver.
- 2.2 Modifications to the suspension and braking system are strictly forbidden.
- 2.3 Compliance with the specified permissible axle loads, specifications in the vehicle operating permit, vehicle inspection intervals and the regular maintenance intervals is the responsibility of the vehicle owner.
- 2.4 We strongly recommend fitting only SAF approved replacement parts and spare parts which are covered by SAF product liability. These products have been thoroughly tested by SAF for safety, functionality and suitability. Fitting of these parts guarantees not only safety on the roads but satisfies the legal operational requirements. SAF is not in a position to judge whether those products from other companies represent a safety risk for SAF axles and systems.

3. Warranty

- 3.1 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.
- 3.2 Warranty claims must be reported to SAF before starting the work.
- 3.3 The warranty period is 12 months after the vehicle registration date or after the start of operation of the vehicle.

4. Service and spare parts

A close-knit service network of SAF partner companies is at your disposal for technical advice on SAF axles and suspension systems as well as for supplying approved SAF spare parts (see back cover or brochure "SAF service stations").

In case of repair we strongly recommend fitting only SAF original parts for those reasons mentioned in point 2.4.

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for SK RS/RZ 9030 / 11030/RZ 12030 axles

Service schedule	Mileage intervals >	After first 5 000 km or	Periodic checks		
			every 30 000 km	every 90 000 km	every 150 000 km
whichever comes first	Time intervals >	after first month	every 3 months	every 6 months	every 12 months

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.	●			●
Check and adjust hub end-float (if required). Pack wheel bearings with fresh grease after 300,000 km or 36 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 function of trailing steering axle Check tyre wear and tracking (if required)	●	●		
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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

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Axle types SK RS/RZ 9030/11030/RZ 12030

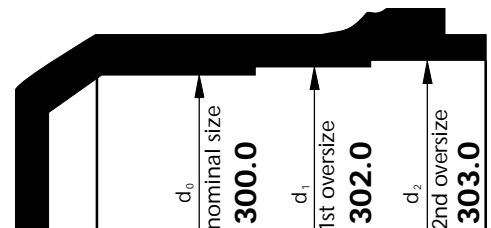
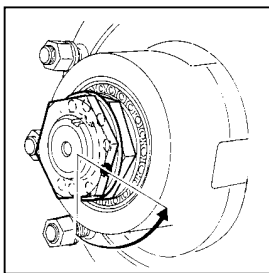
Adjusting the wheel bearing clearance:

Tighten axle nut WAF 85 (22) to a torque of 150 Nm, turning the wheel hub at the same time.
 Back off the axle nut by 2 1/2 holes of the locking collar (23).
 Push on the locking collar and secure the hub nut with dowel.
 Tighten the lock nut (24) to a torque of 400 Nm.
 Check that the wheel bearing rotates freely and without excessive end float. The wheel must rotate freely and without resistance and no end float should be felt at the wheel rim. Repeat the adjustment, if necessary.
 Replace O-ring (39) and fit the wheel cap.

Lubricant specification:

Wheel bearings:
 SAF parts no. 4 387 0011 05
 Camshaft:
 SAF parts no. 4 387 0011 05
 Stub axle:
 SAF parts no. 4 387 0015 06
 SAF fitting paste
 Brake anchor bracket ball:
 SAF parts no. 4 387 0007 00
 Copper paste
 Grease packing volume:
 Inner bearing 150 g
 Outer bearing 90 g

Hub nut tightening



BRAKE type SNK 300

Max. permissible turned brake drum bore:
 Brake drum bore with max. permissible wear:
 SAF approved brake linings:

303.0 mm
 304.0 mm
 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.

Brake size	SAF parts no. brake lining	Brake drum / brake lining refacing stages in mm			Brake linings	Rivets	DIN 7338 rivet
		Nominal size	1st oversize	2nd oversize			
		d ₀ -300.0	d ₁ -302.0	d ₂ -303.0			
x 150	1 057 0034 00	15.5	16.7	17.1	4	64	B 8 x 15
	1 057 0033 00	16.5	17.7	18.1	4		
x 200	1 057 0025 00	15.5	16.7	17.1	4		
	1 057 0024 00	16.5	17.7	18.1	4		

Assembly tools

Hub nut spanner
 Puller for wheel hub
 Brake shoe clamping device
 Brake drum fixing flanges
 Wheel bearing installation drift
 Puller for MS bushing diameter 46 mm
 Installation drift diameter 50/46 and diameter 42/38 mm

SAF parts no.

2 012 0023 00
 4 434 3822 00 or 3 301 0010 00
 3 349 1003 00
 3 434 1060 00
 3 434 3308 00
 1 434 1056 00
 1 434 1055 00

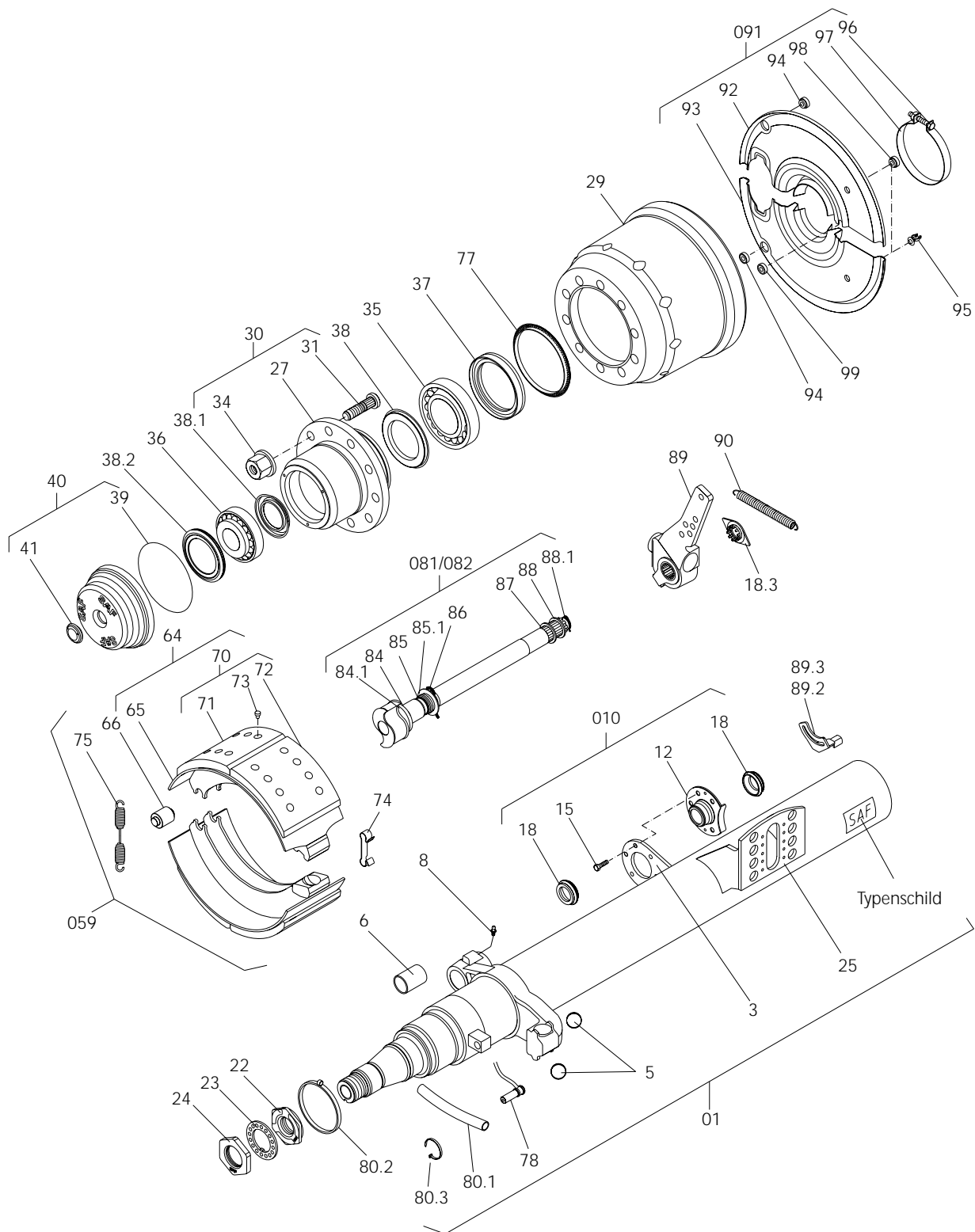
Axle types SK RS/RZ 9030/11030/RZ 12030 Torque wrench settings

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

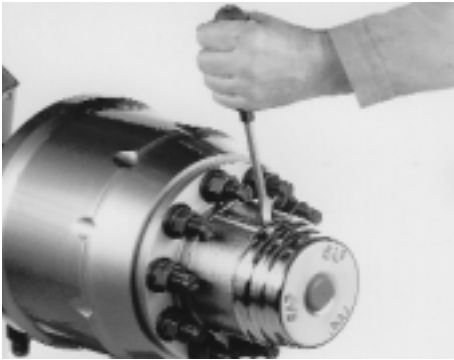
Shock absorber:
M 24/400 Nm



SK RS/RZ 9030/11030/RZ 12030

Item	Parts designation	Item	Parts designation
01	Axle beam assembly including items 3 - 8, 010, 22	64	Brake shoe assembly including items 65, 71 - 73
3	Spherical mounting plate		
5	Ball	65	Brake shoe with item 66
6	Bearing bush	66	Cam roller
8	Grease nipple	71	Brake lining, cam roller side
		72	Brake lining, ball side
010	Camshaft bearing assembly linkage adjustment side including items 12, 15, 18	73	Rivet
12	Compact bearing linkage adjuster side	74	Clamp
15	Pinch bolt	75	Return spring
18	Bellows	77	Outer seal ring
		78	ABS sensor
18.3	Brake lining wear gauge	081	Camshaft assembly (RH) including items 18.3, 84 - 88.1
22	Hub nut with dowel	082	Camshaft assembly (LH) including items 18.3, 84 - 88.1
23	Locking washer	84	O-ring
24	Lock nut	84.1	Distance ring
25	Mounting plate	85	Seal ring
27	Hub unit	85.1	Disc spring
29	Brake drum	86	Clamp
		87	Washer
30	Wheel bolt assembly including items 31 - 34	88	Washer
31	Riffle bolt	88.1	Clamp
34	Wheel nut with pressure plate	89	Mechanical slack adjuster
		90	Return spring
35	Taper roller bearing		
36	Taper roller bearing	091	Dust cover assembly including items 92 - 99
37	Grease seal		
38	Inner seal ring	92	Dust cover, RH
38.1	Protection ring	93	Dust cover, LH
38.2	Outer seal ring	94	Plug
39	O-ring	96	Hex bolt
40	Hub cap, complete with items 39, 41	97	Clamp
41	Plug	98	Plug
		99	Rubber grommet, ABS
059	Brake assembly including items 64, 74 - 75		

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



Repairing the brakes

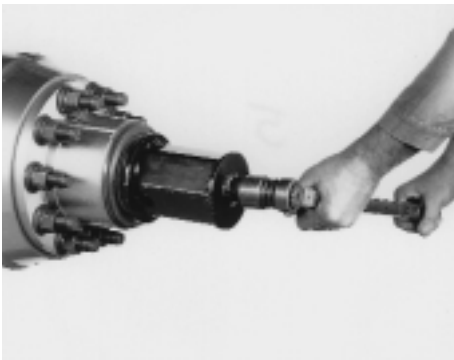
Removing and installing the wheel hub

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

Lift the axle using a jack. Do not position the jack in the middle of the axle.

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

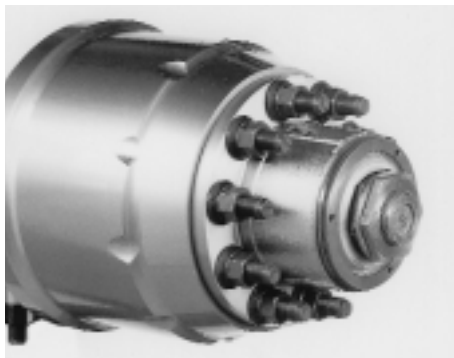
Lever the hub cap off the wheel hub using one of the recesses around the circumference of the hub cap.



Loosen the lock nut and unscrew from the stub axle.

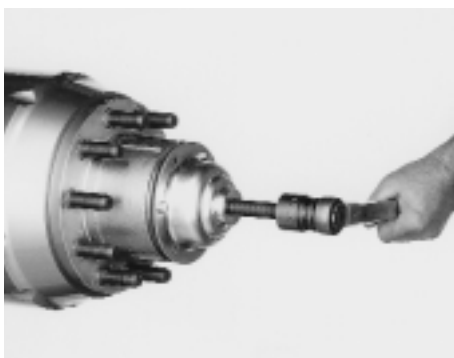
Axle nut wrench: SAF Part No. 2 012 0023 00.

Remove the locking collar.



Unscrew the axle nut.

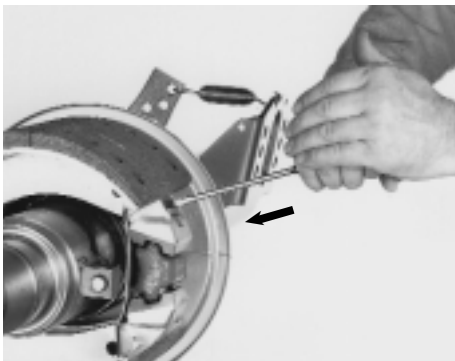
Pull off the wheel hub.



Alternatively, position a wheel mounting carriage and pull the complete wheel and wheel hub unit off the stub axle.

SAF recommends the use of the unit puller, SAF Part No. 4 434 3822 00.

With this axle it is also possible to use the puller, SAF Part No. 3 301 0010 00, used up to now.



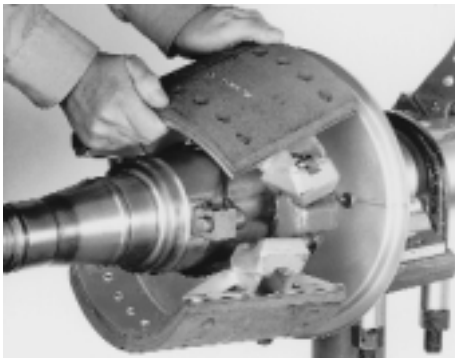
Brake drum cleaning:

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.

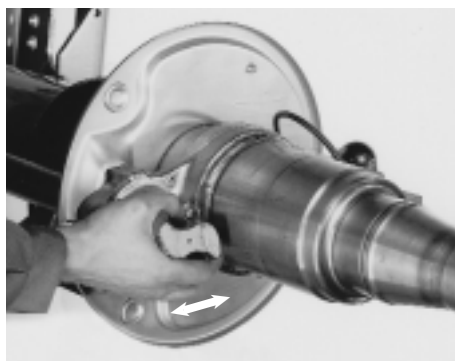
Disassembling the brakes

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.

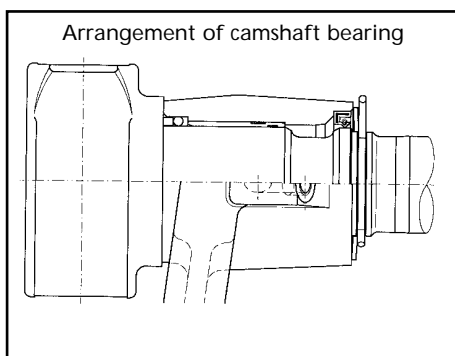


Inspecting the camshaft

Push the camshaft firmly from side to side in the bearing of the brass bush and measure the radial clearance.

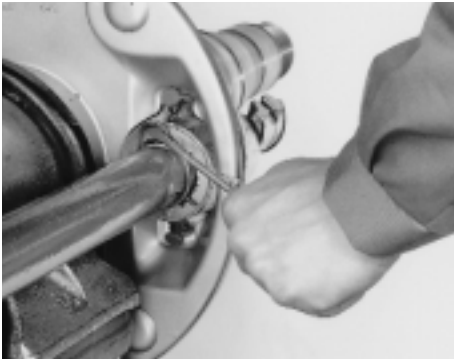
Max. permissible radial clearance: 2.0 mm

If the max. permissible radial clearance is exceeded, the camshaft must be removed and the brass bush in the brake carrier replaced.



Removing and installing the camshaft

Remove the slack adjuster.



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

Arrangement and installation position of the camshaft bearings, see drawing on page 13.

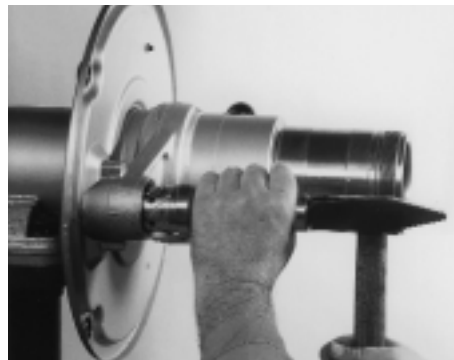
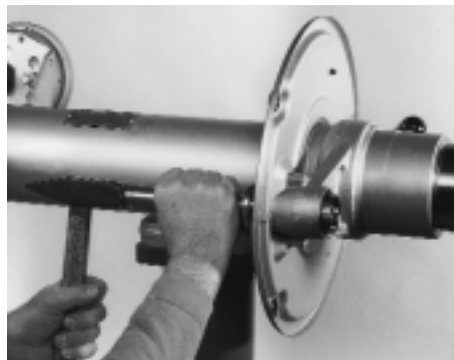


Install and remove the brass bush in the brake carrier using a drift.

Note:

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

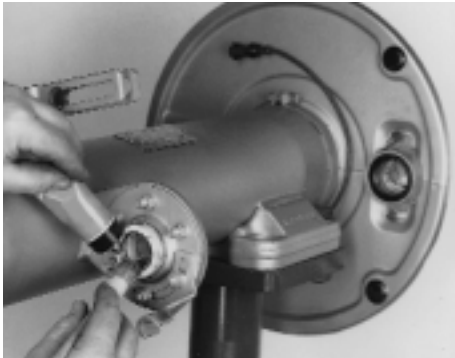
Removal drift for brass bush SAF Part No. 1 434 1056 00
Installation drift for brass bush SAF Part No. 1 434 1055 00



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.



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 360° 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.

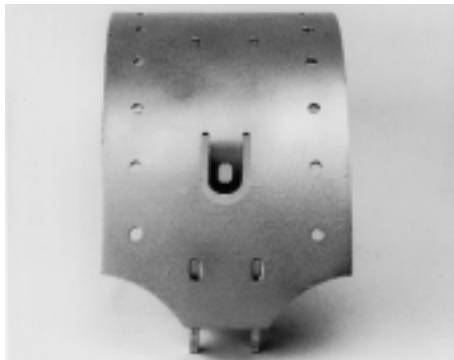
The thicker end of the brake lining is riveted on the roller side (S-cam).

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 (see table in chapter "Maintenance").



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.

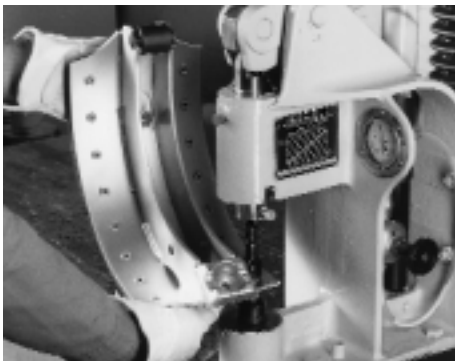
Thoroughly clean the mounting surface for the brake lining on the brake shoe; grind slightly, if necessary.

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.

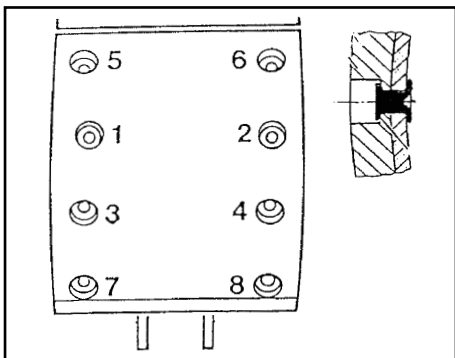
The thicker end of the brake lining is riveted on the roller side (S-cam).



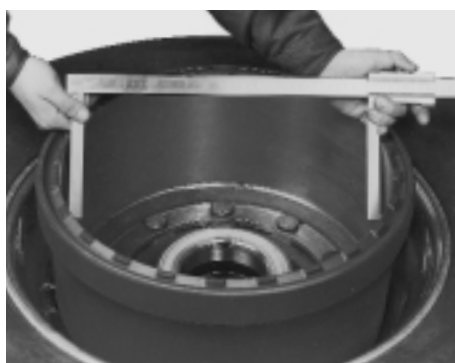
The brake lining must contact the brake drum over its full surface. The corners of the brake lining must not be broken and the lining must not be cracked at the rivets.

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. 3 434 1060 00

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. 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.

Ensure that the ABS exciter ring is in the correct operating position.



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.



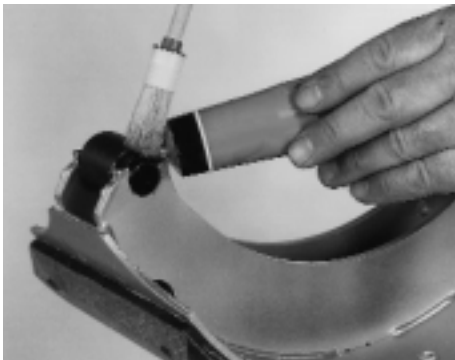
Check the proper mounting of the cam roller on the brake shoes. The cam roller must not jam in the mounting. It must turn easily, but without radial clearance.

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.

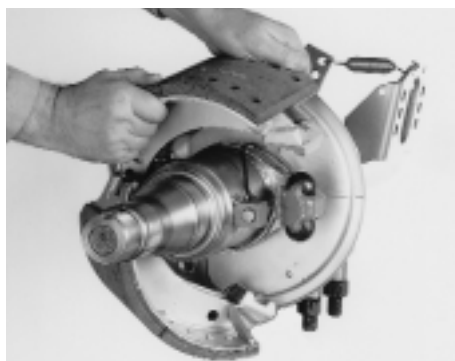
Apply copper paste to the brake shoes, to the ball surface and to the two journals of the cam roller.

See chapter "Maintenance instructions" for recommended media.



Apply copper paste (SAF Part No. 4 387 0007 00) to the two balls in the brake carrier.

See chapter "Maintenance instructions" for recommended media.

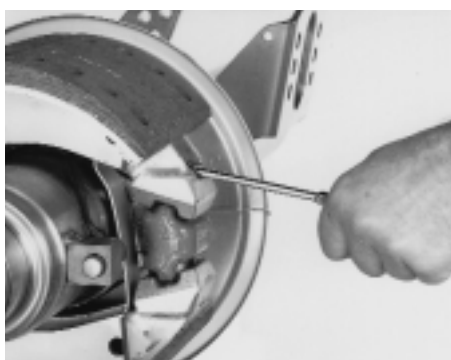


Hook a new return spring into the tabs of the brake shoes.

Position the upper brake shoe on the ball pivot point and the cam roller surface.

Suspend the spring clip on the upper brake shoe.

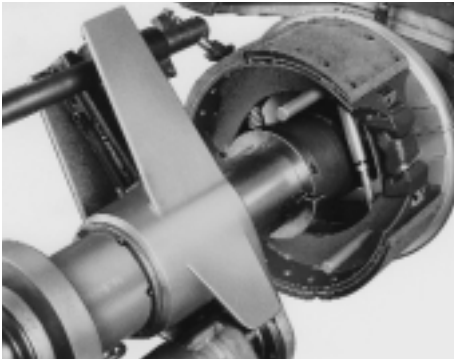
Tilt the lower brake shoe towards the cover plate until the correct seating on the cam and on the ball pivot point is achieved; if necessary, turn the camshaft into the required position. Insert the spring clip into the groove on the lower brake shoe and hook into the retainer on the upper brake shoe 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

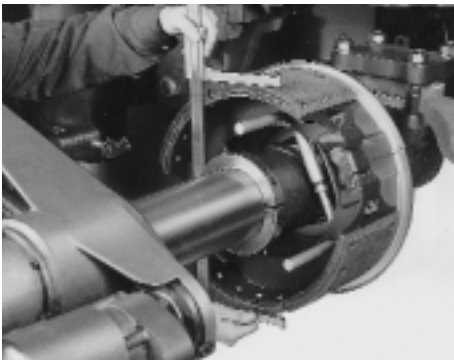
Even after a brake lining replacement with new brake linings, the brake lining must be in full contact with the braking surface of the brake drum over its whole surface in order to achieve an optimum braking effect.

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 1003 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 the clamping device.

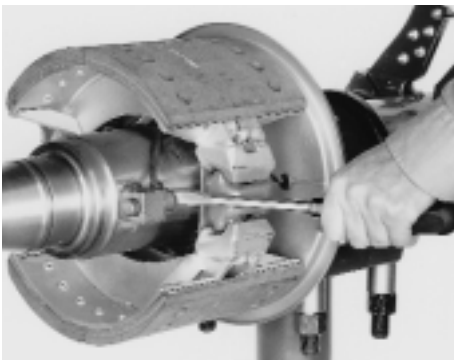
Remove all chips of the brake lining from the brake shoes and stub axle.

Brake lining lathe

90 mm diameter supporting tube inner wheel bearing

65 mm diameter supporting tube outer wheel bearing

Order adapter sleeves from the lathe manufacturer.



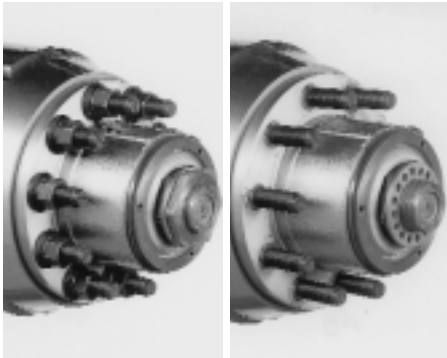
Installing the wheel hub with brake drum

Completely coat the ABS sensor with copper paste and press into the sensor holder up to the collar.



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).

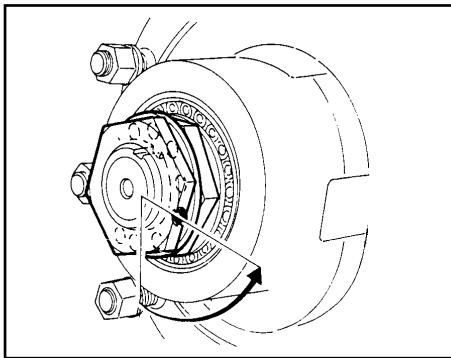
See chapter "Maintenance instructions" for recommended media.



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.

Push the complete wheel hub unit with brake drum onto the stub shaft.

Screw on the axle nut.



Hub end-float setting

Tighten hub nut (22) to a torque of 150 Nm at the same time rotating the hub and drum.

Locate the locking collar (23) onto the dowel on the hub nut noting the position of the dowel in relation to the collar. Remove the collar and turn the hub nut 2 1/2 holes anti-clockwise.

Reverse the collar and re-locate it onto the repositioned hub nut dowel.



Fit the lock nut (24) and tighten using a torque of 400 Nm.

Axle nut wrench: SAF Part No. 2 012 0023 00

Check whether the hub rotates freely and without excessive end-float (adjust if necessary).



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.

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.

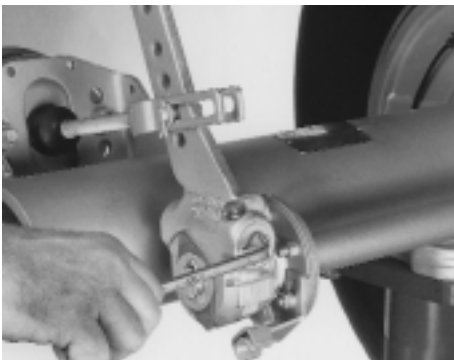


Checking the brake lining thickness

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

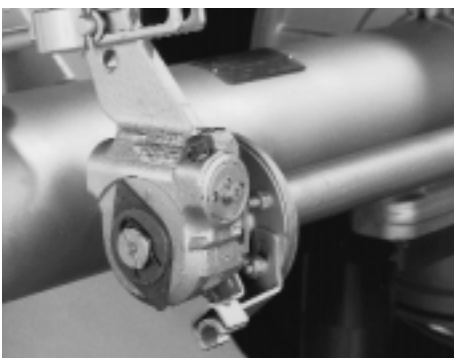
Carry out the adjustment of the wheel brakes as normal at the slack adjuster.

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.

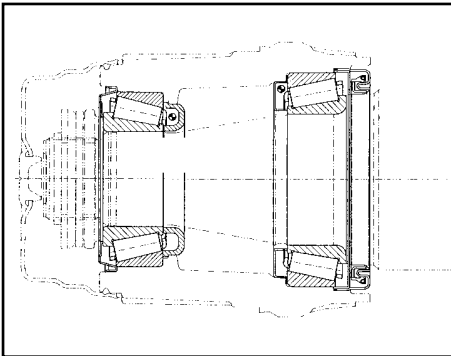


Brake lining wear indicator

On the slack adjuster end 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.



Arrangement of wheel bearing assembly with seals

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.



Wheel bearing kit
SAF Part No. 3 434 3016 00

After 300,000 km or after 36 months' operation, the following 2 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.

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:

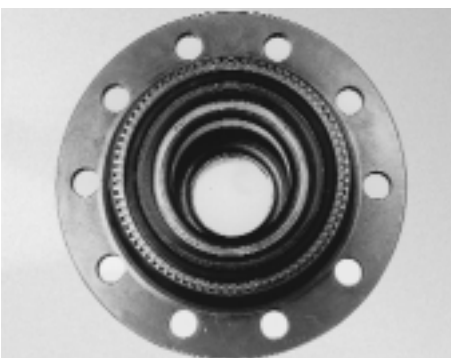
Replacement of only one bearing is not permitted.

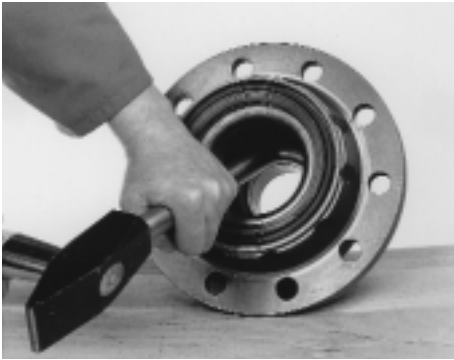
Always change the wheel bearings in pairs with the complete seal set and the prescribed grease packing.

Adjust the wheel bearing clearance – see chapter "Maintenance".



Original compact hub
SAF Part No. 3 307 2056 00





Removing the wheel bearing assembly

Place a normal workshop drift against 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

Install seal ring (38) and protective ring (38.1) in the hub housing.



Press both bearing outer races into the hub housing until they bottom using installation drift, SAF Part No. 3 434 3308 00.



Pack both taper roller bearings with long-life grease.

Grease packing volume: **Inner bearing 150 g**
 Outer bearing 90 g



Pack the ring gap on the face side of the bearing with long-life grease.

Press in unitised seal (37) and outer sealing washer (38.2) using installation drift, SAF Part No. 3 434 3308 00.



Install the exciter ring.



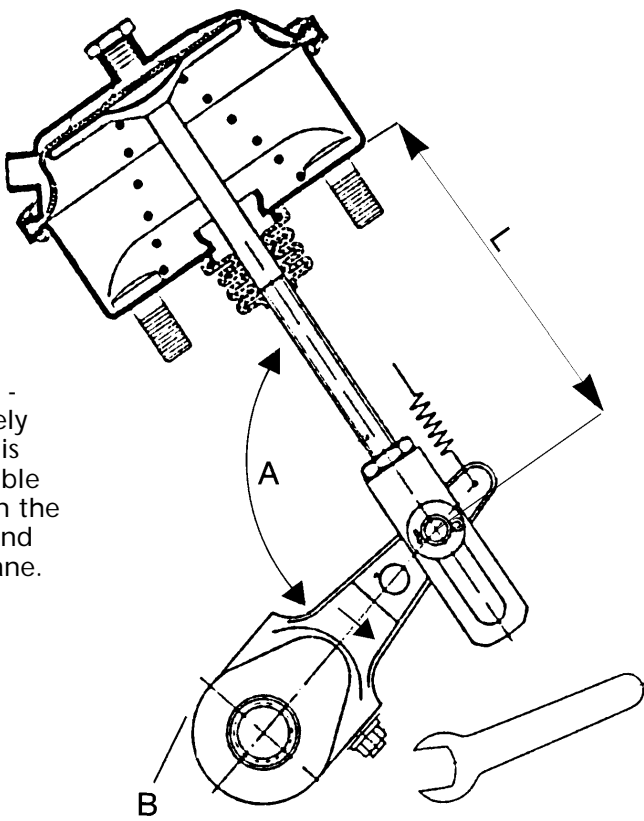
Installation drift, SAF Part No. 3 434 3308 00

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

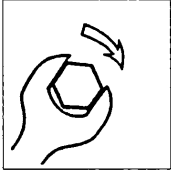
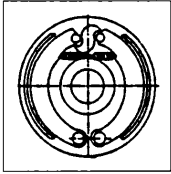
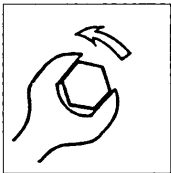
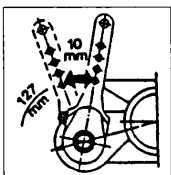
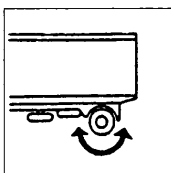
S-cam brakes with manual slack adjusters

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.



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

Adjusting screw (width across flats 19 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.

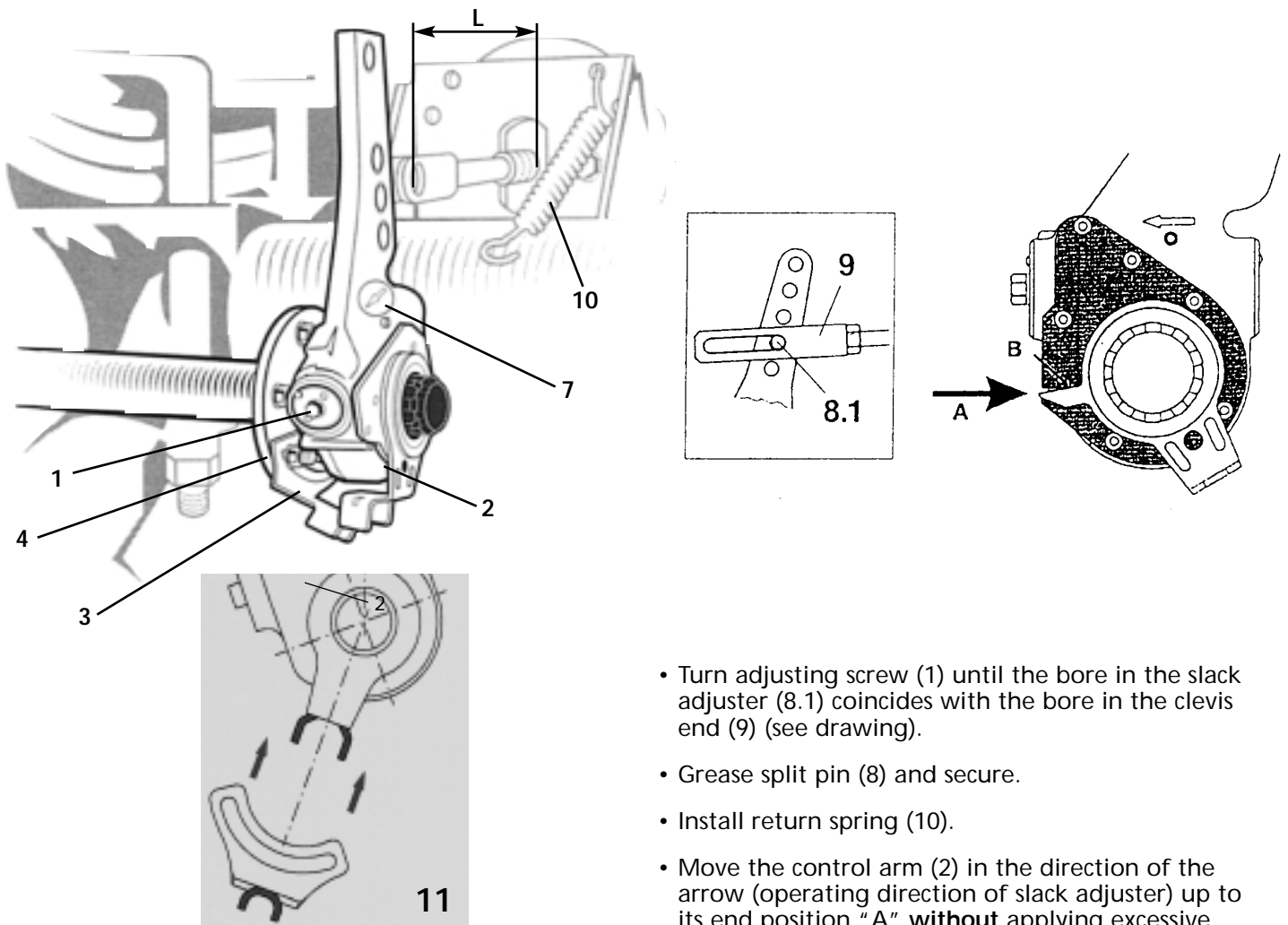
Special instructions for automatic slack adjusters are given on the following pages.

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.

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!**

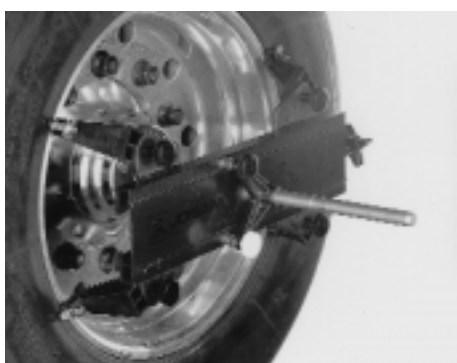
FUNCTION CHECK

- 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.



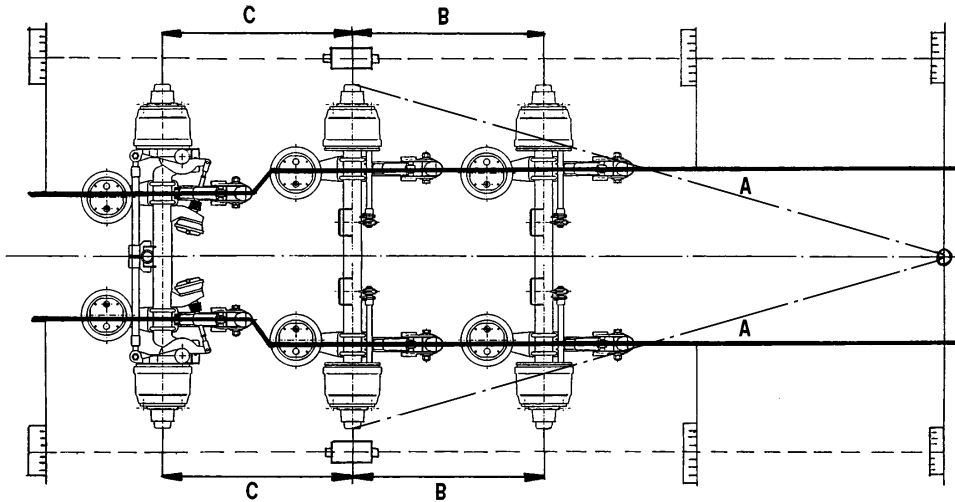
Commercially available optical measuring instruments must be used for performance of the track control on SAF SK Series axles.

- 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

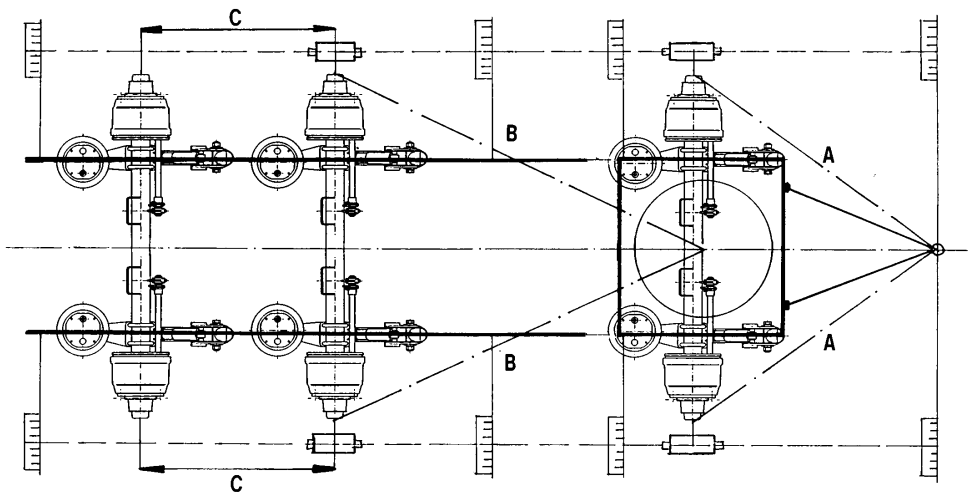
Distance A, B, C, max. permissible deviation 1.0 mm

Toe setting ± 3.0 mm/m

Camber ± 3.0 mm/m

In the case of trailing steering axles the membrane cylinder must be pressurised to 2.0 bar.

Total toe 4.0 mm/m i.e. 2.0 mm/m per wheel side (values apply to unloaded vehicle)



Trailer

Distance A, B, C, max. permissible deviation 1.0 mm

Toe setting ± 3.0 mm/m

Camber ± 3.0 mm/m

(values apply to unloaded vehicle).

The max. permissible deviations for track values are identical with the manufacturer's specifications.

To avoid excessive tyre wear we recommend having the track checked at regular intervals.

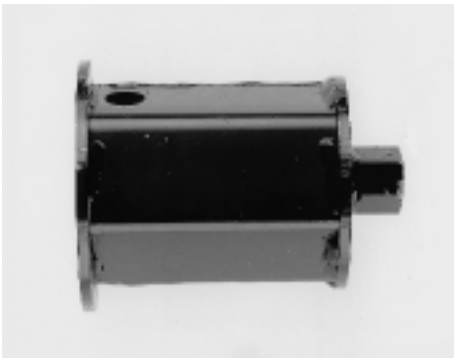
Track deviations may be caused by:

- loose U-bolts
- spring guide bearing wear
- deformation of axle assembly components due to improper use

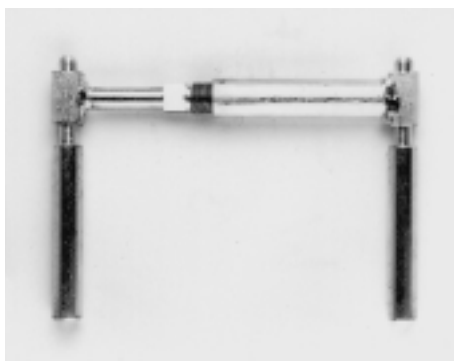
The relevant reference point for alignment is the hub cap centre or stub axle centre.



1. Lever for hub cap
SAF Part No. 1 434 1041 00



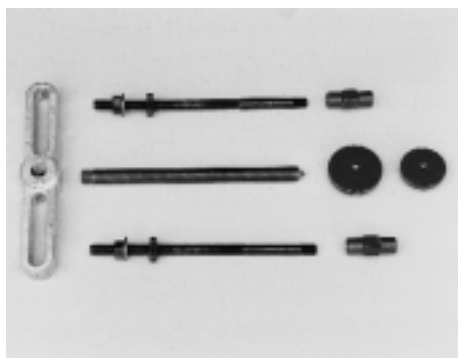
2. Axle nut wrench WAF 85
SAF Part No. 2 012 0023 00



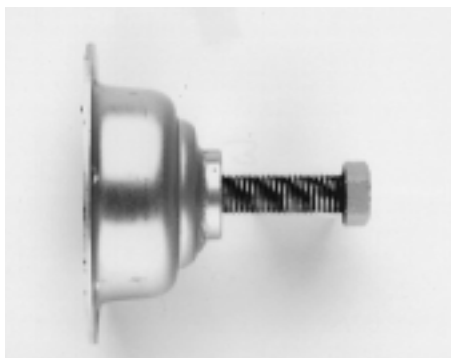
3. Clamping device for brake shoes
SAF Part No. 3 349 1003 00



4. Clamping rings for brake drum lathe
SAF Part No. 3 434 1060 00

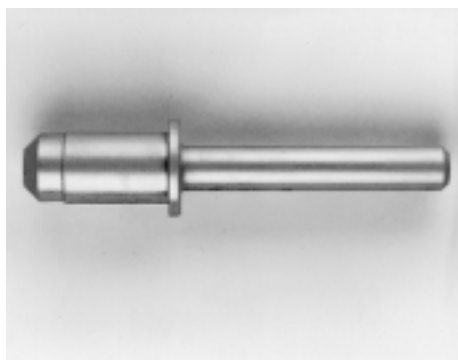


SAF Part No. 4 434 3822 00 by choice



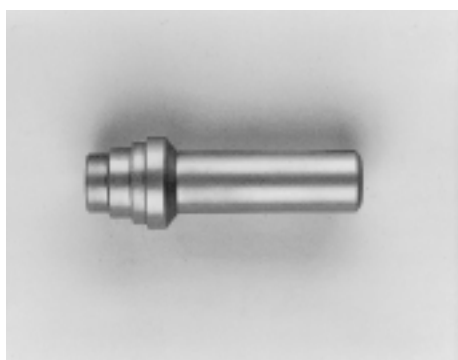
SAF Part No. 3 301 0010 00

5. Wheel hub puller



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 3308 00

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.

Thread	 W.A.F.	Material		
		8,8	10,9	12,9
M 8	W.A.F. 13	25	35	41
M 8 x 1		27	38	45
M 10	W.A.F. 17 / 16	49	69	83
M 10 x 1		52	73	88
M 12	W.A.F. 19 / 18	86	120	145
M 12 x 15		90	125	150
M 14	W.A.F. 22 / 21	135	190	230
M 14 x 1.5		150	210	250
M 16	W.A.F. 24	210	300	355
M 16 x 1.5		225	315	380
M 18	W.A.F. 27	300	405	485
M 18 x 1.5		325	460	550
M 20	W.A.F. 30	410	580	690
M 20 x 1.5		460	640	770
M 22	W.A.F. 32	550	780	930
M 22 x 1.5		610	860	1050
M 24	W.A.F. 36	710	1000	1200
M 24 x 2		780	1100	1300
M 27	W.A.F. 41	1050	1500	1800
M 27 x 2		1150	1600	1950
M 30	W.A.F. 46	1450	2000	2400
M 30 x 2		1600	2250	2700
M 36 x 2	W.A.F. 55	2450	3450	4150

Wheel fixing:

Wheels see appropriate axle maintenance chart.

TRILEX wheels	M 18	270 - 300 Nm
	M 20	320 - 350 Nm

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Service-Stationen / Service Stations / Points Service

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Bulgaria	SAF Trade Bulgarien OOD	(00 359) 58 - 2 24 91
Chile	Union Tecnica Automotriz S.A.C.	(00 56) 2 - 6 23 48 51
Czech Republic	SAF Trade, spol. s.r.o.	(00 4 20) 6 32 - 55 71 88
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Germany	Otto Sauer Achsenfabrik Keilberg KG	(00 49) 0 60 95 - 3 01 - 0
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Italy	SAF Italia s.r.l.	(00 39) 0 45 - 8 78 14 35
Malaysia	Quality Trailer Components	(00 60) 3 - 61 85 82 92
Netherlands	SAF Benelux B.V.	(00 31) (0) 3 42 - 49 78 89
New Zealand	Transpecs Ltd.	(00 64) 9 - 9 80 73 00
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Peoples Republic of China	Jinan SAF Axle Co. Ltd.	(00 86) 5 31 - 8 87 33 61-889
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Portugal	Suspartes Lda.	(00 3 51) 21 - 2 13 47 10
Romania	S.C. SAF TRADE RO S.R.L.	(00 40) 68 - 25 88 30
Russia	SAF-INTCOM	(00 7) 0 95 - 5 79 94 00
Republic of Slovakia	SAF Trade spol s.r.o.	(00 4 21) 38 - 7 60 18 34
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