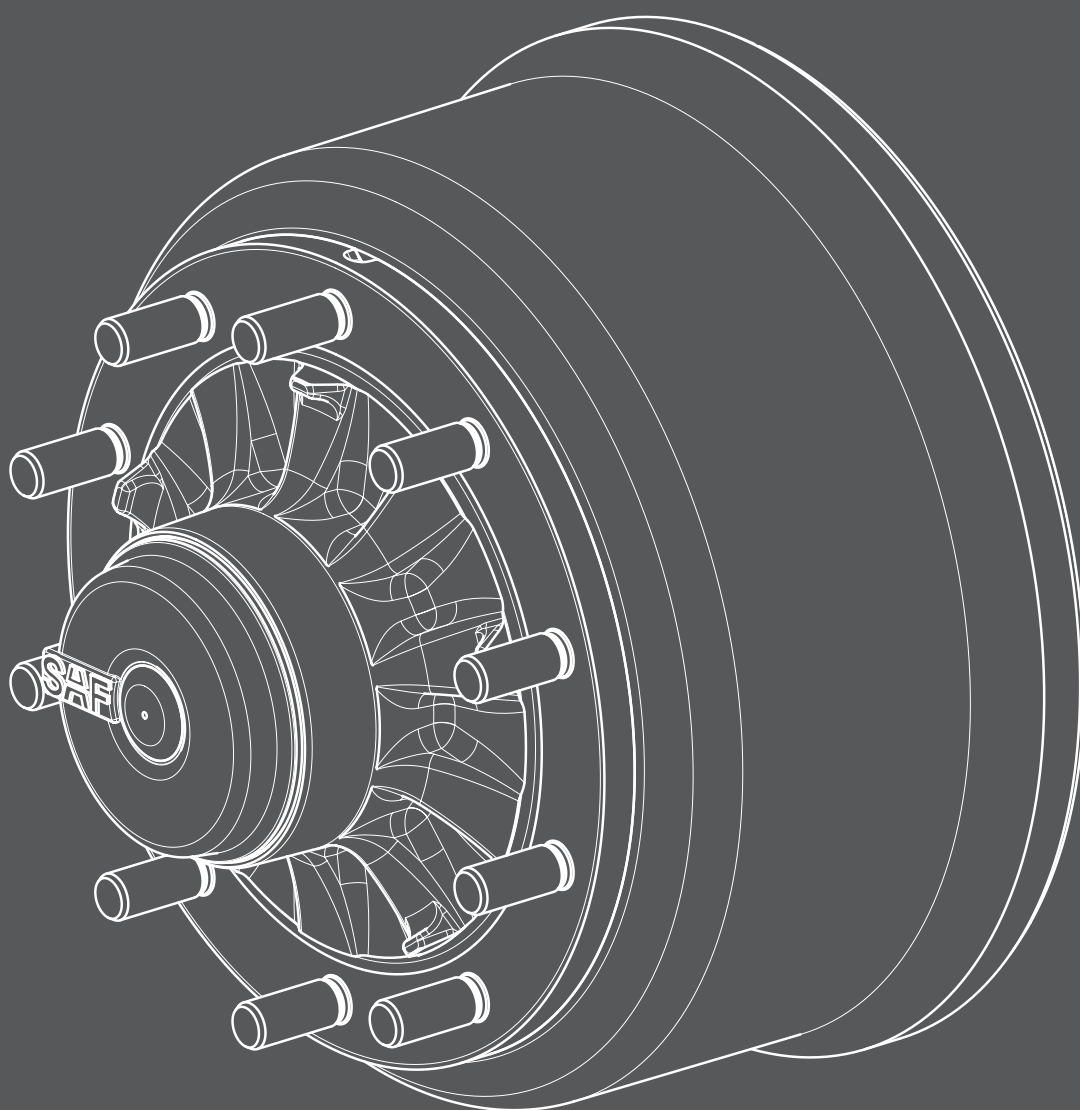


## General Operating and Service Manual

Air suspension systems and axles with drum brakes





## Identification and maintenance instructions

Axle / Suspension identification .....	2-3
General safety instructions .....	4
Intradrum maintenance instructions .....	5
Modul maintenance instructions .....	6

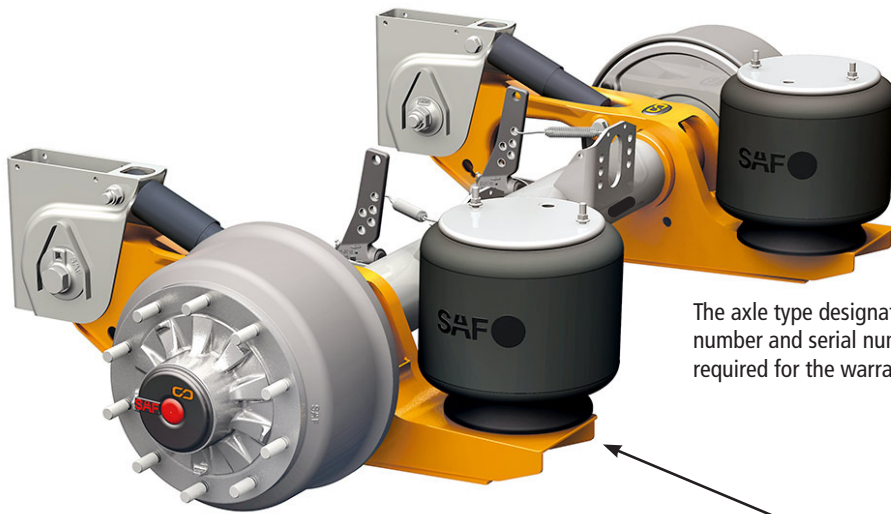
## Tightening torques and adjustment instructions

Torque settings and procedures .....	7
Tightening torques for Modul suspension assemblies .....	8
Tightening instructions for adjustable pivot bolt .....	9
Axle torque and test specifications .....	10
Tightening torques for self-steering axles .....	11

## General Information

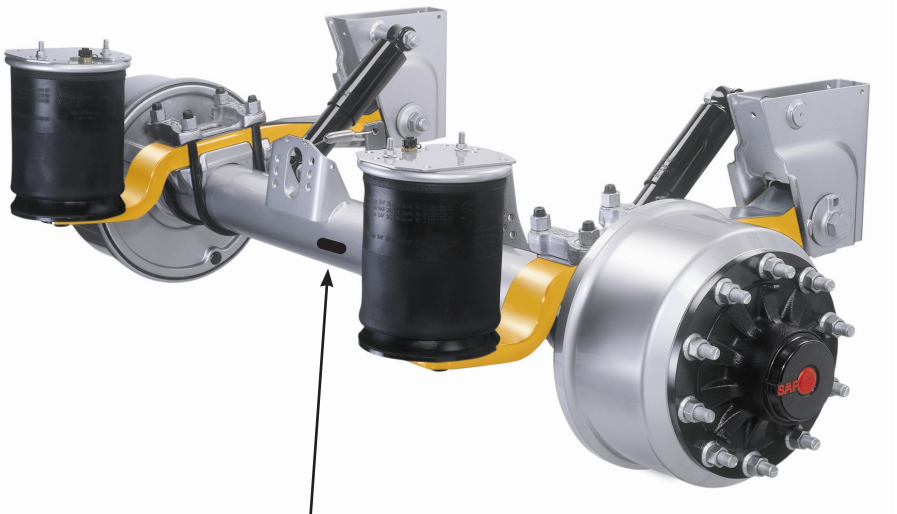
Installation Instructions .....	12-18
S-cam brakes with manual slack adjusters .....	19
Adjustment of HALDEX automatic slack adjusters .....	20
Adjustment of S-ABA automatic slack adjusters .....	21
Semi-trailer tilt angle .....	22
Tyre changing on fully loaded trailer with INTRA axle .....	23
Adjustment of the air suspension system ride height .....	24
Axle Track Control .....	25

## Air suspension system Type INTRA

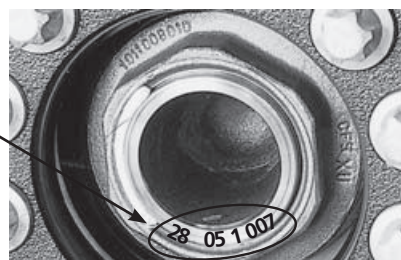


The axle type designation (version), identification number and serial number (see type plate) are required for the warranty procedure.

## Air suspension system Type Modul



SAF-HOLLAND GMBH D-63856 BESSENBACH · GERMANY		<b>SAF Holland</b>	
Version	BI9-22K01	ID1 - SBK2243 - 11S	
Serial No.	11 12 117 0009	ID2 - SBK2243 - 11S 01	
Ident No.	147 96 62 7 48 20	ID3 - 10791	
Stat. 9000 kg Vmax. 105 km/h		ID4 - 36110303	
Made in Germany	E	 SN 11121170009	



Identification if the type plate is missing:  
The Serial No. of the axle is embossed in the axle end on the right-hand side (as seen in the direction of travel).

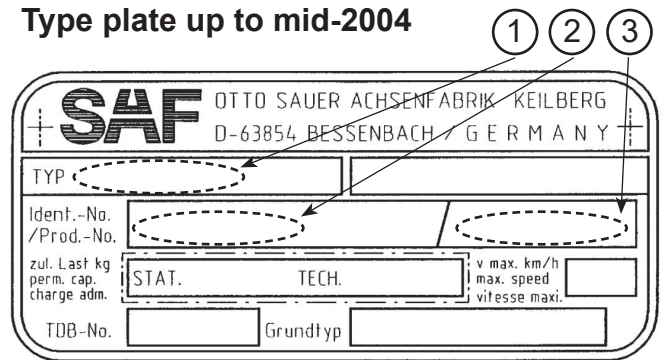
When ordering spare parts quote correct axle identification & serial no., refer to the axle type plate.  
Please provide the following information from the type plate (as below) to ensure correct parts are ordered.

- ① Axle type (example: "SKRZ 9019W", "SKRLB 9022KI" or "Z9-4218" etc.)
- ② Ident No. (example: "147 83 25 7 6 69 0" or "171 91 50 7 49 1" etc.)
- ③ Serial No. (example: "167 06 3 648" etc.)

**Type plate from mid-2004**



**Type plate up to mid-2004**



**Axle serial number code** (up to July 2009)

The serial number looks like this:

DDDYXNNN

DDD = Production day

YY = Production year

X = Site

NNN = Running number per day, year and site

**Axle serial number code** (from July 2009)

The serial number looks like this:

XX YY DDD NNNN

XX = Site

YY = Production year

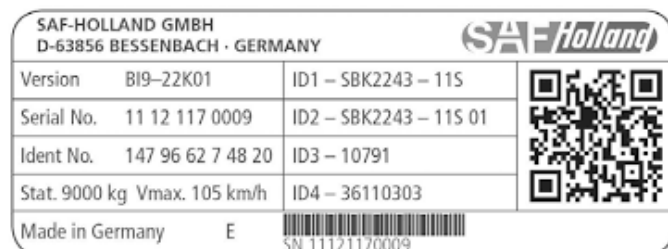
DDD = Production day

NNN = Running number per day, year and site



**QR codes**

QR codes on type plates lead directly to a list that only displays spare parts that are relevant for the scanned product.



**Please observe the following safety instructions in order to maintain the operational and road safety of your SAF-HOLLAND 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.
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 filled with air before starting the journey. Flat 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. Observe the operating recommendations for off-road operation of the installed axles and suspension systems. The SAF-HOLLAND definition of OFF-ROAD means driving on non-paved roads, such as e.g. gravel roads, agricultural and forestry tracks, on construction sites and in gravel pits.
9. SAF-HOLLAND 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-HOLLAND recommends that at least the inspections and maintenance operations described on pages 6 & 7 should be carried out.
10. Caution: After every wheel change, always retighten the wheel nuts to the prescribed torque after 50 km and again after 150 km.
11. Check the brake lining thickness at regular intervals.
12. Carry out general visual inspections of the brakes, tyres and all suspension components at regular intervals and check for proper attachment, wear, leaks, corrosion and damage.
13. Carry out regular visual inspections of the wheel bearing unit for grease leaks and axial clearance. For wheel bearing grease change information, see pages 12 - 17.
14. Regularly check the camshaft for smooth return and the slack adjuster for proper function.
15. Lubricate the camshaft at regular intervals.
16. Inspect the brake drum for wear and cracking at every brake lining change. For wear limits see pages 12 to 17.
17. Replace the brake shoe return springs at every brake lining change.
18. Check the air suspension ride height at regular intervals in accordance with the trailer builder's specifications and adjust as described on page 32.
19. With aluminium and steel hanger brackets, check that the bolts of the spring brackets and shock absorbers are tightened to the prescribed torques as described on page 8-9.
20. Modul suspension u-bolts are tightened to the prescribed torques as described on page 10.
21. For steering axles, observe also the points on pages 18 and 19.
22. Carry out a general safety check in accordance with the statutory provisions.
23. We recommend the use of original SAF-HOLLAND spare parts.

\* We recommend the use of original SAF-HOLLAND spare parts. A service network of SAF-HOLLAND partners companies is available for the technical support of the SAF-HOLLAND axles and suspension systems and for the supply of original SAF-HOLLAND spare parts. Updates will be published as necessary on the internet under [www.safholland.com.au](http://www.safholland.com.au)  
We recommend that a full general safety check is carried out when the minimum wear limit is reached.

## Intra Disc/Drum Suspension

Service schedule	Periodic checks				
	Distance intervals >	After first 5000 km or	Every 30000 km	Every 90000 km	Every 150000 km
<i>whichever comes first</i>	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.	•			•
Hub unit maintenance-free. Visual inspection for grease leakage, bearing noise and end play check.	•	•		
Inspect hub nuts and make sure they are not loose. If loose, retighten as per prescribed procedure.	•		•	
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 trailing arms 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-HOLLAND approved spare parts have been fitted.				
First service free if completed according to SAF-HOLLAND first service requirements and appropriate documentation is submitted to SAF-HOLLAND before 5000 km or one month from in service date.				

## Modul Suspension

Service schedule	Periodic checks				
	Distance intervals >	After first 5000 km or	Every 30000 km	Every 90000 km	Every 150000 km
<i>whichever comes first</i>	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.				•

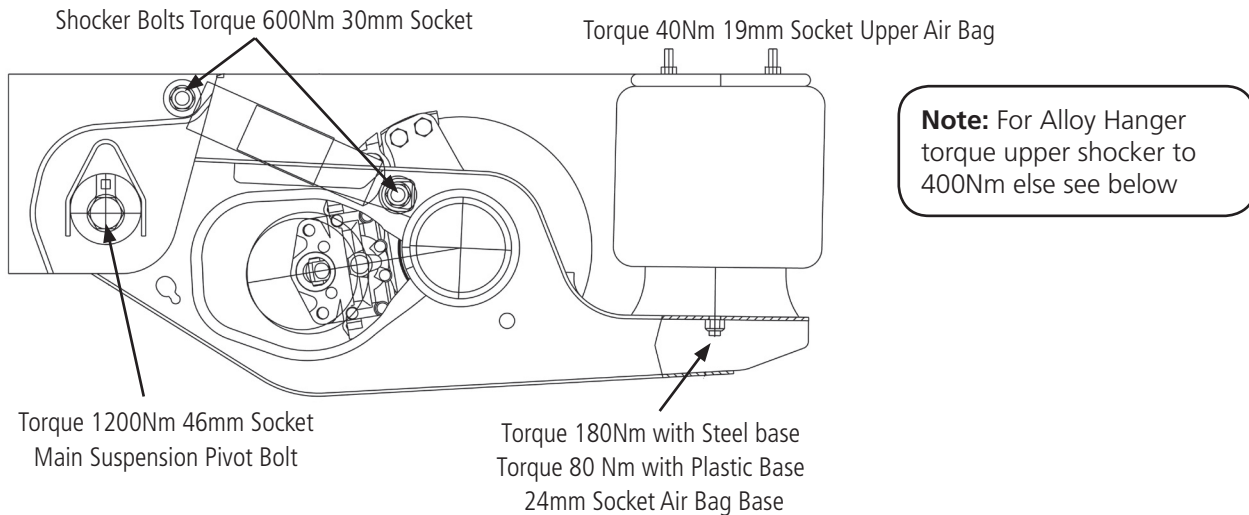
Visual inspection for wear/damage				
Check suspension components for wear, fluid leakage and damage Check brake linings for wear Check camshafts for free movement Check slack adjusters for correct function Check braking system for leaks (brake applied) Check air suspension for air leaks Check air suspension bellows for damage Check air bag piston surface for contamination and clean, if necessary Check parabolic springs for damage, scoring and corrosion Check function of steering axle 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-HOLLAND approved spare parts have been fitted.				



## Intra Disc/Drum Suspension Maintenance Torque settings and procedures



**The First Service Provider** is responsible for re-torqueing and marking the suspension pivot, shocker bolts and axle spindle nuts to facilitate the regular visual inspection as required in the "Repair and Maintenance Manual".



When torqueing pivot bolt ensure bolt head cannot turn by use of a suitable spanner or socket and bar "the torque application should be on the nut, not the bolt head".



Clearly mark with counterpunch and or line marker the relative position of the bolt, nut and hanger after the final tightening for the future visual inspections (to be easily visible).

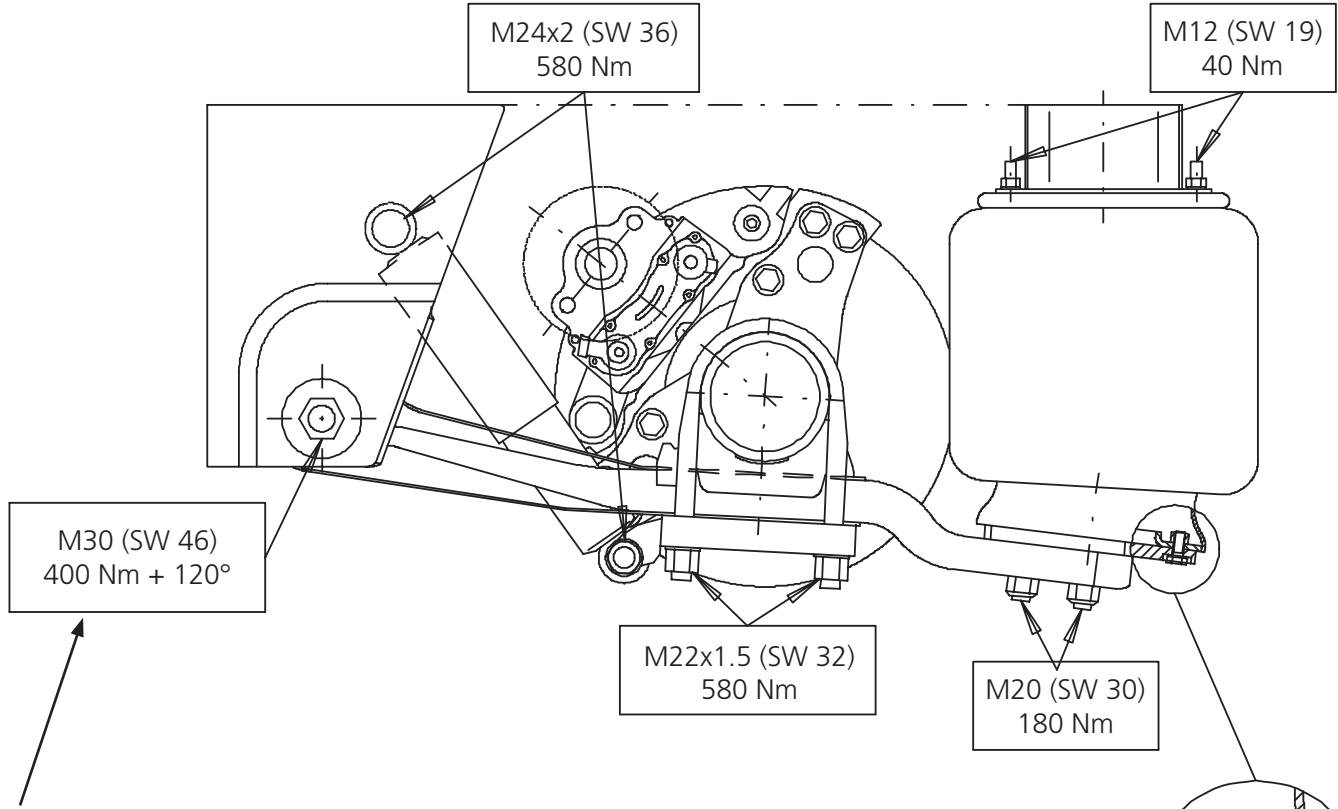
**Note:** As an alternative only if the appropriate torque wrench is not available to achieve 1200Nm the pivot bolt can be tensioned by first loosening and re-torqueing to 400Nm and then turning a further 120 deg... 2 flats of the nut.

Warranty on SAF Intradisc/Intradrum suspension would be void if the prescribed maintenance procedures are not performed as per the "Repair and Maintenance Manual".

If the manual has not been delivered with the trailer, please call **SAF-HOLLAND Customer Service on 03 9971 7900**.

## Modul Disc/Drum Suspension Maintenance

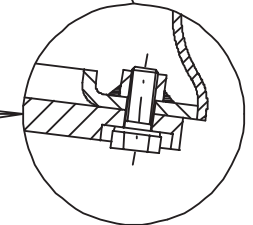
The max. coat thickness of any primer or paint must not exceed 45 µm on any contact surfaces of the suspension arm and shock absorber fixation!



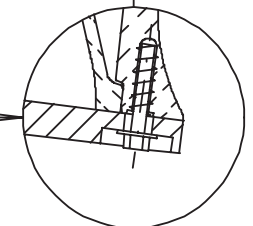
### Torque - Tightening procedure

1. Faces of the HD bearing bush and hanger must be free from paint, oil and grease.
2. Install the functional suspension arm parts as shown in the spare parts drawing.
3. Adjust the vehicle to ride height.
4. Tension the bolt to 1200 Nm or alternatively follow the procedure below if a large tension wrench is not available.
  - Pre-tighten the nuts M30/WAF46 to 400 Nm using a torque wrench.
  - Align the marks on the welded hub, hexagon head bolt and nut over one corner of the nut.
  - Tighten the nut a further 120° (2 nut corners), holding the bolt head to prevent the bolt from turning with the nut.
  - Perform a visual check. Correct the turn angle, if necessary.
5. Make marks with a counter punch on the welded hub, hexagon head bolt and nut in a line after completing the tightening procedure.

M12 (SW 19) 80 Nm  
for steel plunger piston



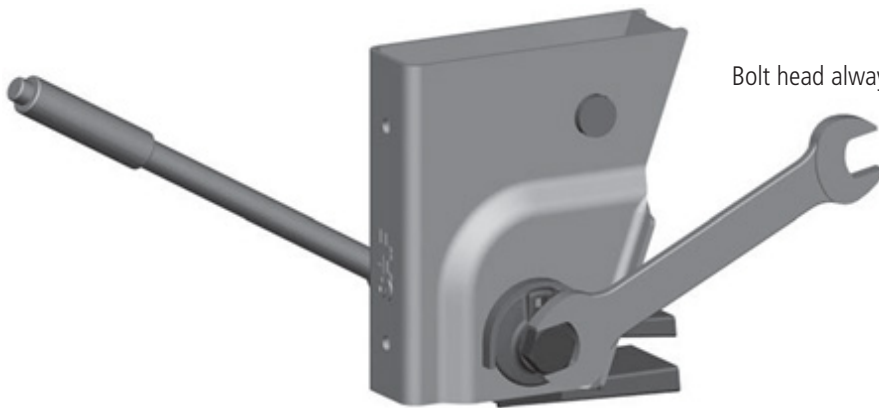
K100x40 (SW10) 20 Nm  
for plastic plunger piston



### Attention!

- Threads are not to be oiled or greased!
- Pivot bolt mounting for hanger bracket, steel maintenance free.
- Pivot bolt mounting for hanger bracket aluminium to be checked after 500 km, further checks every 6000 km. Inspection torque 1200 Nm.

## Initial Tightening instructions for adjustable pivot bolt



### Attention!

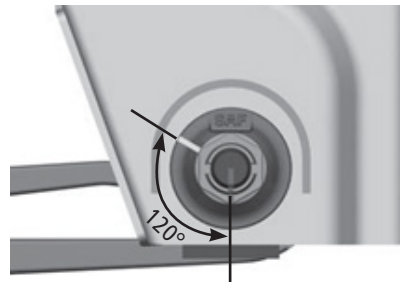
- Pivot bolt tightening must always be performed at the specified ride height
- No paint residues on mounting surfaces of pivot or shocker bolts e.g. between eccentric/thrust washer and hanger to bush faces.

The Pivot Bolt can be directly tightened to 1200Nm with the appropriate Tension wrench. Alternatively the following lower tension value and angle turn tightening method can be used. Please note to always tension the nut and hold the bolt head which should be on the eccentric washer.

### Pre-tightening: 400 Nm Use torque wrench



### Marking for angle tightening



### Angle tightening: 120° Use impact wrench or extended lever to 2.5 m



### Visual inspection



### Attention!

- Pivot bolt tightening must always be performed at the specified ride height
- No paint residues between eccentric/thrust washer and hanger!

## Axle Torque Chart

Tensioning Chart				
Axle types	Axle spindle tension	Alternate tension method	Max hub bearing backlash	Hub nut size
Z9-4218 Z9-3720 ZL9-3720 Z11-3020 ZL11-3020	900Nm whilst turning hub at least twice	Pre tension to 150Nm turn hub by min 5 revolutions, then add additional 30 deg turn to nut "1 increment"	0.25mm	85mm
SK RZ 9037	900Nm whilst turning hub at least twice	N/A	0.20mm	140mm
SK RZ 9042	900Nm whilst turning hub at least twice	Pre tension to 200Nm whilst rotating wheel hub, then turn an additional 1 - 1.5 graduations of nut (10-15deg)	0.20mm	140mm
SK RZ 9030 SK RZ 12242 SK RZ 12342	Tighten hub nut to 150Nm whilst rotating hub, turnback nut by 2.5 holes of the lock washer, fit lock washer and lock nut then tension lock nut to 400nm	N/A	0.20mm	85mm

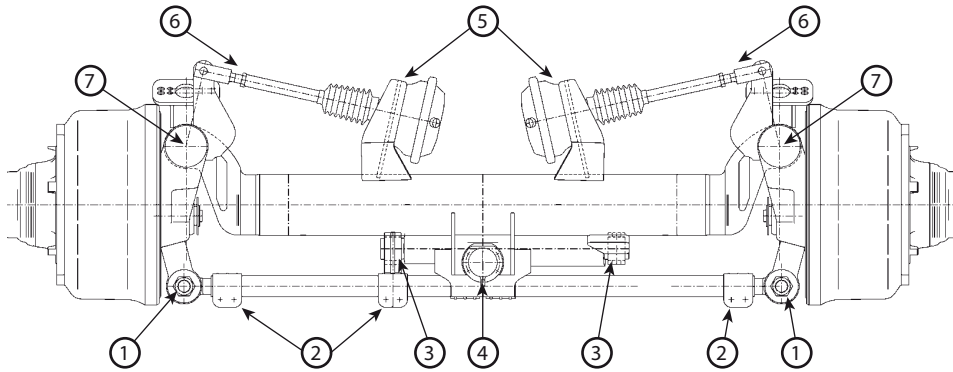
## Lubrication Chart

Lube part numbers - All Axles			
Axle Stub end	Camshaft	Wheel bearing if applicable	Brake carrier ball
5387004203 x 5gm 5387004201 x 1kg	5387001105	5387001105	Proprietary Copper Lube type anti seize

## Brake Drum Dimensions and Hub/Brake Tooling

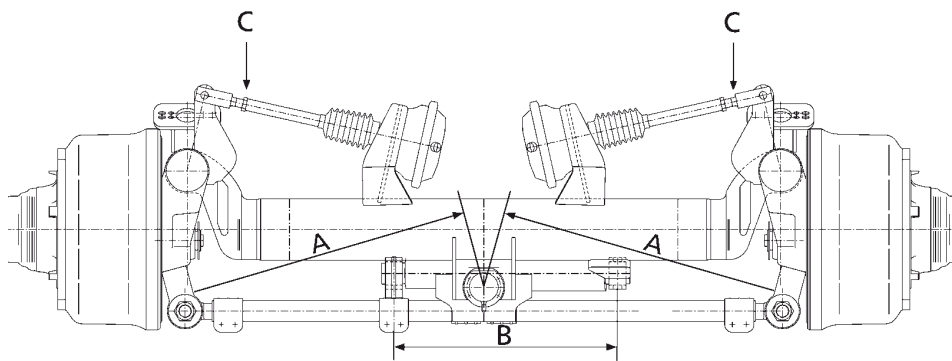
Axle type	Brake designation	Brake shoe width	Brake drum min dia	Max machining max dis	Brake drum max dia	Axle nut tool	Brake shoe tensioner tool	Wheel hub puller	Wheel bearing mandrel
Z9-4218	SNK 420	180	420 mm	424 mm	425 mm	4434382800L	3349100100	2501871	NA
Z9-3720 Z9-3720	SNK 367	200	367 mm	371 mm	372 mm	4434382800L	3349100100	2501871	NA
SKRZ-9030	SNK 300	200	300 mm	303 mm	304 mm	1012002400	3349100100	2501871	3434101400, 3434330800
SKRZ-9037	SNK 367	200	367 mm	371 mm	372 mm	1012002400	3349100100	2501871	3434105800
SKRZ-9042	SNK 420	180	420 mm	424 mm	425 mm	1012002400	3349100100	2501871	3434104300
Z11-3020 ZL11-3020	SNK 300	200	300 mm	303 mm	304 mm	4434382800L	3349100100	2501871	NA
SKRZ12242 J-SAF	SNK 420	180	420 mm	424 mm	425 mm	4434382800L	3349100100	2501871	3434332000, 3434103600
SKRZ12342	SNK 420	180	420 mm	424 mm	425 mm				

## Tightening Torques



No.	Designation	Number per axle	Tightening torque
1	Ball joint screw	2	M30 (340 Nm)
2	Retaining clamp screw	10	M12 (80 - 90 Nm)
3	Steering damper screw	2	M24 (600 - 660 Nm)
4	Lock cylinder screw	4	M6 (8 - 10 Nm)
5	Stabilising cylinder screw	4	M16 (180 ± 30 Nm)
6	Lock nut	2	M20 (is locked against the thrust rod)
7	Cover plate screw	6	M8 (25 - 30 Nm)

## Adjustment instructions for self steering axles



- Dimension "A" must be the same; observe the toe-in (approx.4.0 mm/m).
- Dimension "B" is 537 mm; engage the reversing lock.
- On versions with pneumatic stabilisation, a steering damper is not necessary. Additional pneumatic kit is required.
- On versions without pneumatic stabilisation, a steering damper must be used.
- Check: Backlash-free seating of the piston rods of the stabilising cylinders.

Apply stabilising pressure (2 bar min) to the cylinders. Piston and pressure rods must then be backlash-free (under slight pressure); otherwise adjust at "C".

- When setting the track width on the trailer, the cylinders must be under stabilising pressure and the correct ride height of the air suspension system must have been set.
- Tighten all bolts to the prescribed torque and lock the nuts or insert the cotter pin.

**Note:** During lubrication work on the steering pin bearing, the axle must be relieved (raised).

Lubrication at the bearing points of the king pin bolt for the first time after 1 month, then every 6 months.

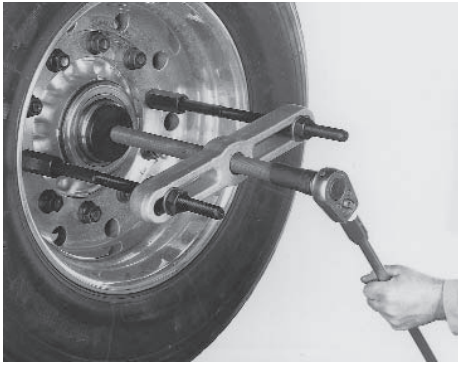


Fig. 1

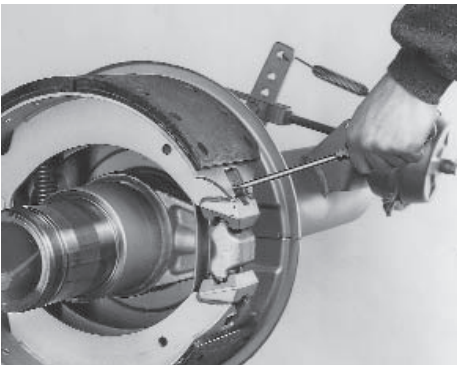


Fig. 2

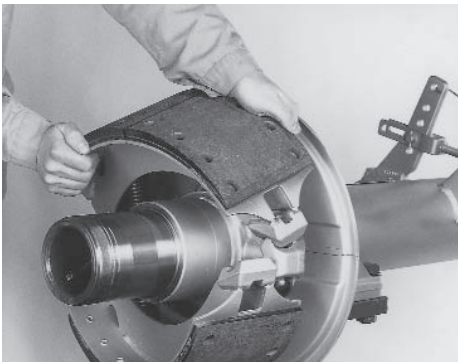


Fig. 2.1



Fig. 3

## 1. Disassembly instructions

- 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 using 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.

## 2. Disassembling the brakes

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

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

## 3. 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.



Fig. 1

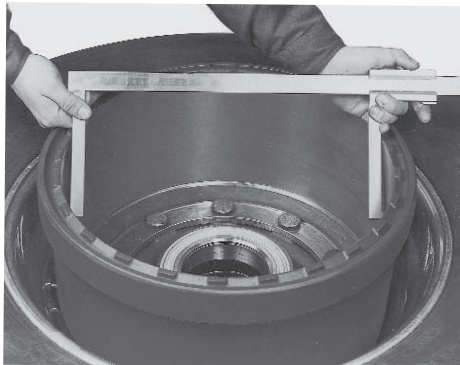


Fig. 2



Fig. 3

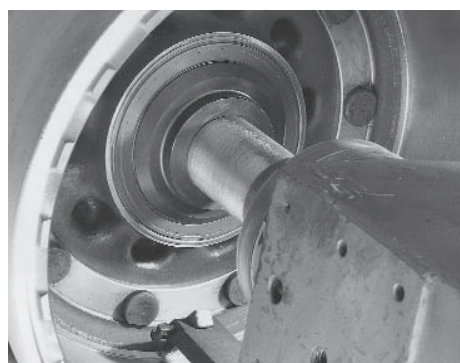


Fig. 3.1

## 1. Brake lining

- For original dimensions and wear limits, see table on page 10.
- Intradrum brake has two different brake linings 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-protected 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.
- 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.

## 2. Brake drum

- For brake drum diameter permissible wear limits, see table on page 10.

### 2.1 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.

## 3. 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.
- For permissible wear limits, see table in chapter "Maintenance instructions".

### 3.1 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.

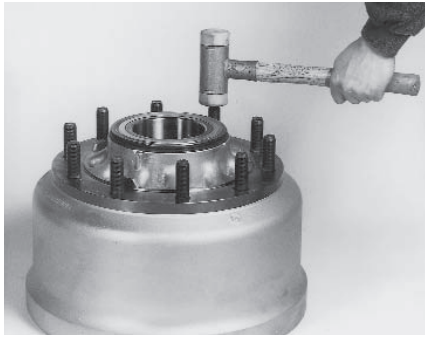


Fig. 1



Fig. 1.1

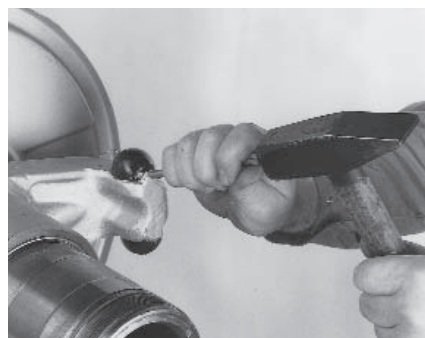


Fig. 2

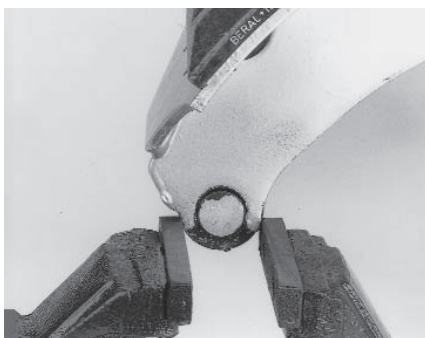


Fig. 2.1

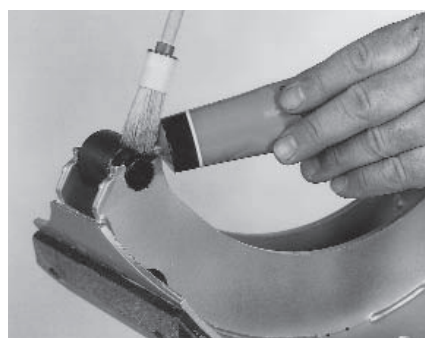
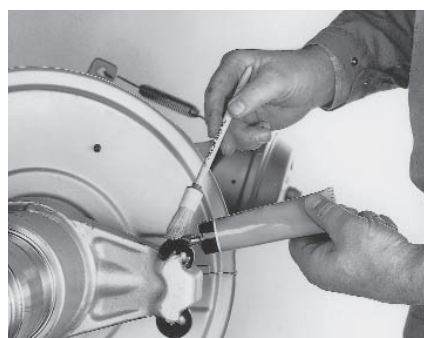


Fig. 2.2



## 1. 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.

### 1.1 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 studs are secured in the position.
- If necessary, the wheel studs can also be correctly positioned by pulling in using a wheel nut.

## 2. 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.

### 2.1 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.

### 2.2 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.



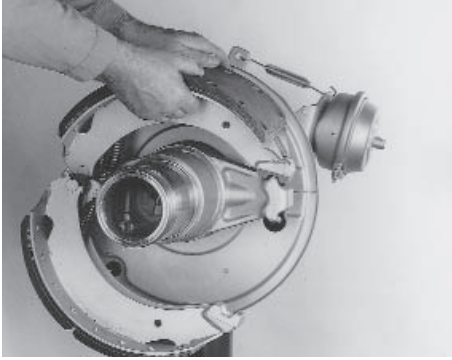


Fig. 2.3

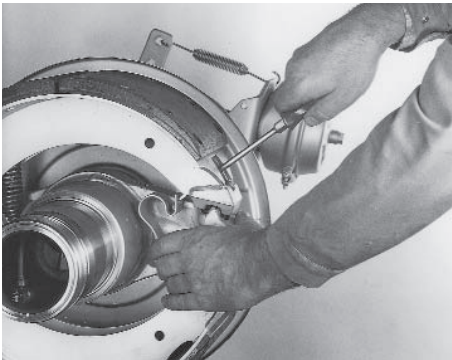


Fig. 2.4

**2.4** 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.

**2.5** 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.

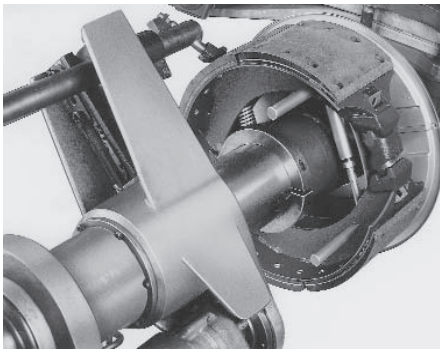


Fig. 1

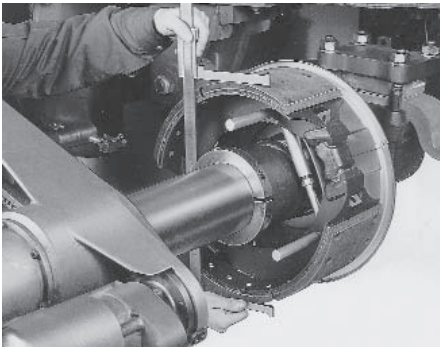


Fig. 1.1

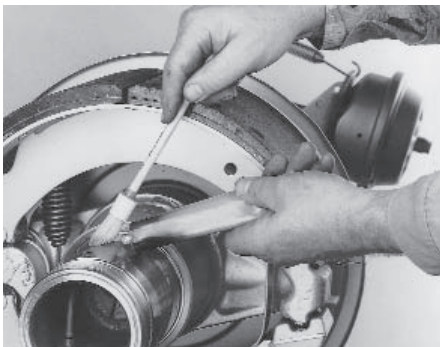


Fig. 2

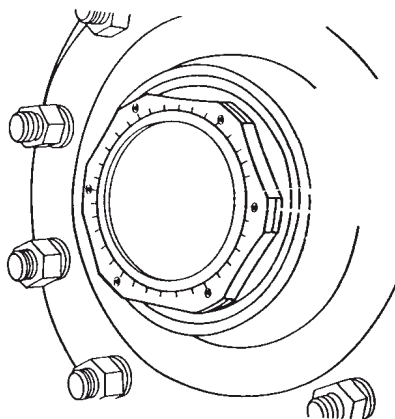


Fig. 2.1

## 1. 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!**

**1.1** 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.

### 1.2 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.

## 2. 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. 5387004203)
- See chapter “Maintenance instructions” for recommended media.
- Replace O-ring - stub axle (19).

**2.1** 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 on the axle nut and replace, if necessary.
- Screw on the axle nut.



Fig. 1



Fig. 1.1

### 1. Axle nut:

- On right-hand side of vehicle (as seen in direction of forward travel) right hand thread.
- 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 the outside surface.
- Tighten the axle nut.
- Axle nut socket: SAF Part No. 4434382800L
- 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.

#### 1.1 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.



Fig. 1

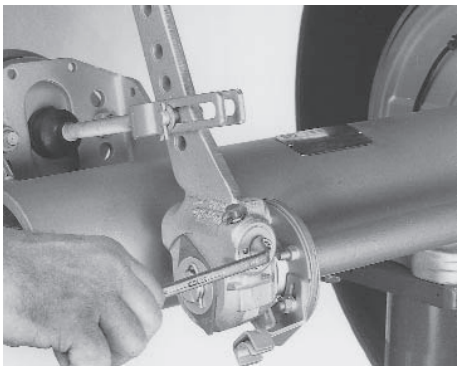


Fig. 1.1

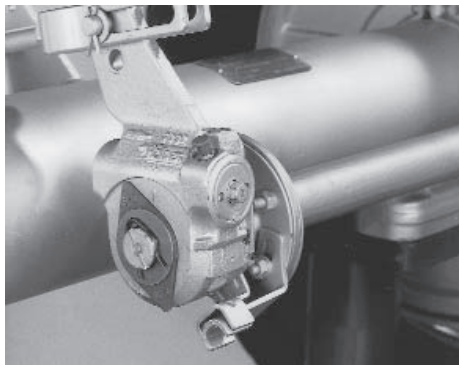


Fig. 2

## 1. 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".

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

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

## 2. Brake lining wear indicator

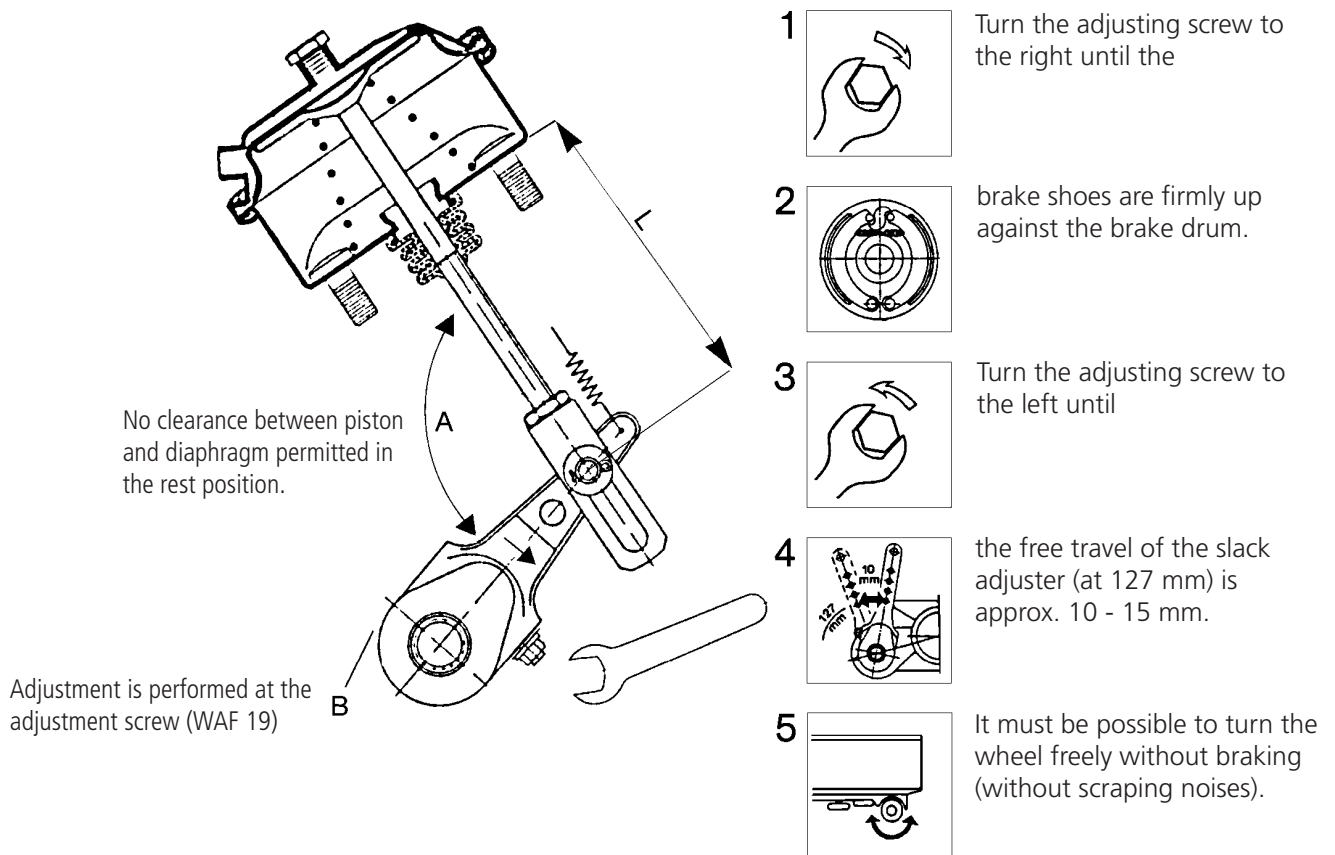
- On the slack adjuster the camshaft has a milled groove and a slip-on indicator for visual checking of the brake lining wear.
- Wear indicator in vertical position = Brake linings as good as new.
- When the wear indicators have reached a horizontal position, an inspection of the brake lining thickness must be carried out.

### S-cam brakes with manual slack adjusters.

The natural wear of the brake drum and brake lining necessitate frequent adjustment of the wheel brakes in order to maintain the maximum stroke of the brake cylinders.

In order to achieve good braking, it is essential to minimise the clearance between the brake drum and brake lining. In order to check the clearance, the service brake is applied with full pressure and the stroke of the brake cylinder checked.

If the stroke at the yoke end is more than 2/3 of the maximum cylinder stroke, the brake must be urgently adjusted. If the brakes are correctly adjusted, it should not be possible to move the piston rod more than 15 mm by hand.



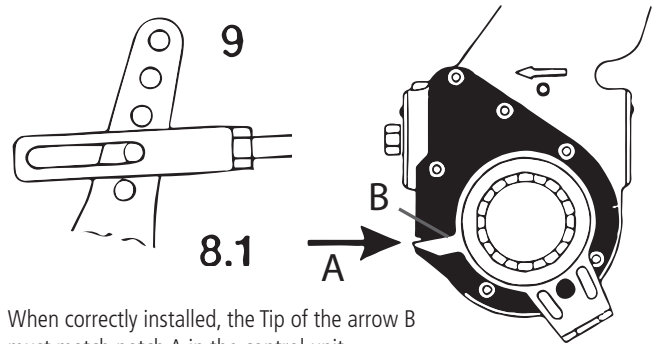
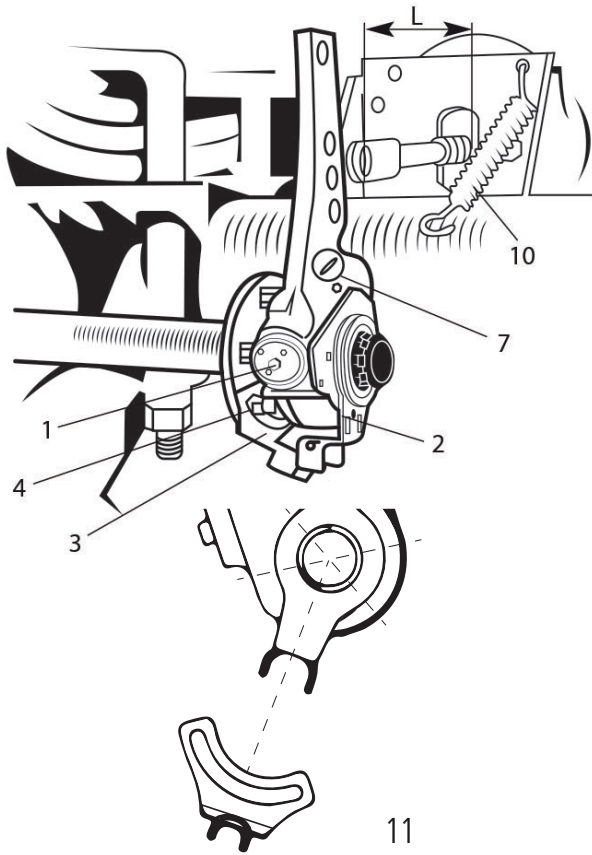
### Special instructions apply for automatic slack adjusters (see adjustment procedure on the following pages).

A = Angle must not exceed 90° at 1/2 stroke.

B = No contact permissible between slack adjuster and axle beam during emergency braking.

L = Observe piston rod length as per the SAF-HOLLAND specifications.

### Installation & adjustment of HALDEX automatic slack adjusters



When correctly installed, the Tip of the arrow B must match notch A in the control unit.

**Cams and brake shoes are in the zero position.**

**Observe the correct piston rod length "L" as given in the SAF-HOLLAND specifications.**

#### Brake chambers

1. Before installation, ensure that the brakes are fully released.
2. Spring brake chambers, on the other hand, must be under full working pressure (6 bar min).

**IMPORTANT:** If this is not observed, the basic setting will be wrong!

3. Grease the camshaft.
4. Install mounting point strap (3); be sure to use two mounting bolts (4).
5. Install the slack adjuster on the camshaft.
6. The arrow mark (7) points in the braking direction.
7. Turn adjusting screw (1) until the bore in the slack adjuster (8.1) is aligned with the bore in the yoke end (9) (see figure).
8. Grease cotter pin and secure.

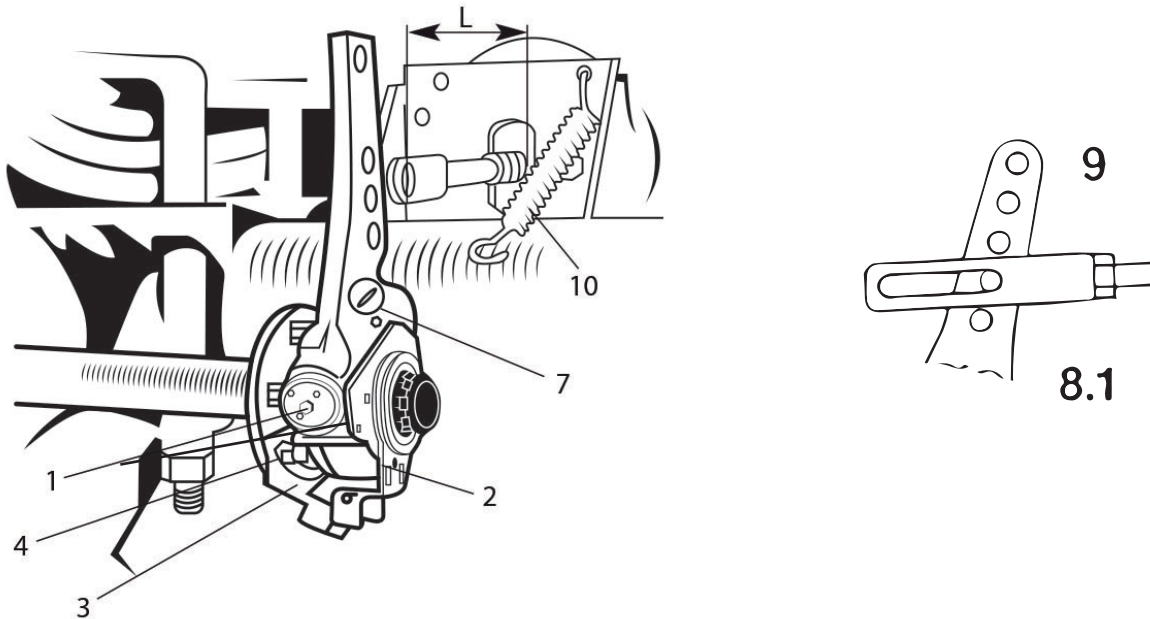
9. Hook in return spring (10).
  10. Turn the control arm in the direction of the arrow (working direction of the slack adjuster) into its end position without using force.
  11. In this end position of control arm (2), tighten mounting bolts (4).
  12. With the fixed mounting point (11), ensure that the 2 U-profiles engage correctly in one another.
- NOTE FOR SELF-STEERING AXLES:** Weld on mounting point strap (3) in this position.
13. Fix the slack adjuster on the camshaft.
  14. Axial clearance: Adjust the nominal value of 0.5 - 2 mm using shims.
  15. Adjust the clearance of the brake lining by turning adjusting screw (1) in clock-wise direction until the brake lining is in contact with the brake drum. Then back off adjusting screw (1) by 3/4 turn.

**Do not use an impact wrench!**

#### FUNCTION CHECK

- If the adjustment coupling is functioning correctly, a torque of at least 18 Nm must be felt when backing off adjusting screw (1); a ratchet noise should also be clearly audible.
- Actuate the service brake several times, check the free running of the brake drum, check the clearance. If necessary, repeat the adjustment of the slack adjuster.

## Installation & adjustment of S-ABA automatic slack adjusters



**Cams and brake shoes are in the zero position.**

**Observe the correct piston rod length "L" as given in the SAF-HOLLAND specifications.**

### Brake chambers

1. Before installation, ensure that the brakes are fully released.
2. Spring brake chambers, must be under full working pressure (6 bar min).

**IMPORTANT:** If this is not observed, the basic setting will be wrong!

3. Grease the camshaft.
4. Install mounting point strap (3); be sure to use two mounting bolts (4).
5. Install the slack adjuster on the camshaft.
6. The arrow mark (7) points in the braking direction.
7. Turn adjusting screw (1) until the bore in the slack adjuster (8.1) is aligned with the bore in the yoke end (9) (see figure).
8. With the fixed mounting point, ensure that the 2 U-profiles engage correctly in one another.
9. Grease cotter pin and secure.
10. Hook in return spring (10).
11. Fix the slack adjuster on the camshaft.
12. Axial clearance: Adjust the nominal value of 0.5 - 2 mm using shims.

13. Adjust the control arm.

14. Observe the possible setting range for the control lever position.



15. Adjust the clearance of the brake lining by turning adjusting screw (1) in clock-wise direction until the brake lining is in contact with the brake drum. Then back off adjusting screw (1) by 3/4 turn.

**Do not use an impact wrench!**

### FUNCTION CHECK

- If the adjustment coupling is functioning correctly, a torque of at least 18 Nm must be felt when backing off adjusting screw (1); a ratchet noise should also be clearly audible.
- Actuate the service brake several times, check the free running of the brake drum, check the clearance. If necessary, repeat the adjustment of the slack adjuster.

## Semi-trailer tilt angle

### Ride Heights

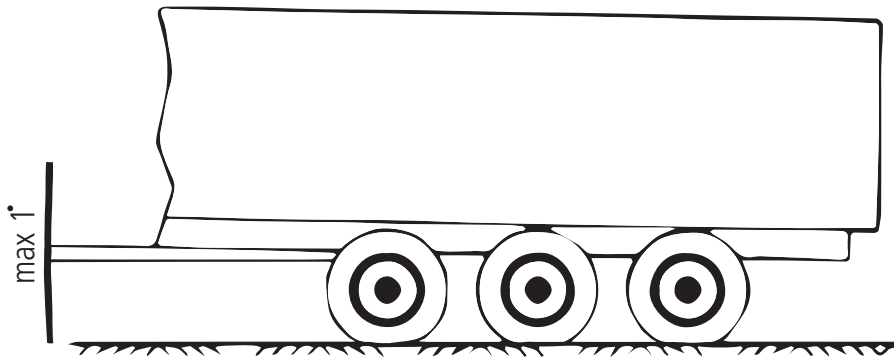
Adjust the ride height of the air suspension axles to the permissible range indicated in the corresponding SAF-HOLLAND documents.

With single axles, allow for a minimum suspension travel of 60 mm.

For trailers with multiple axles, allow for a minimum suspension travel of 70 mm.

### Exception:

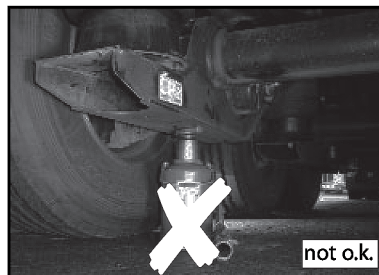
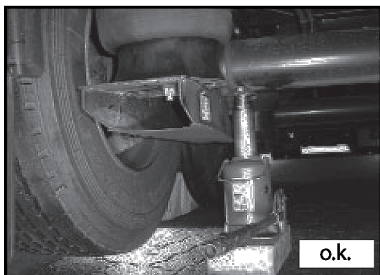
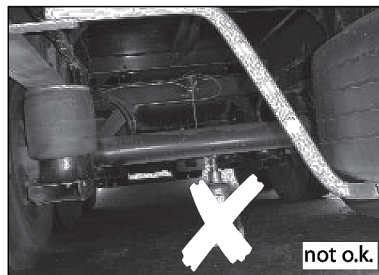
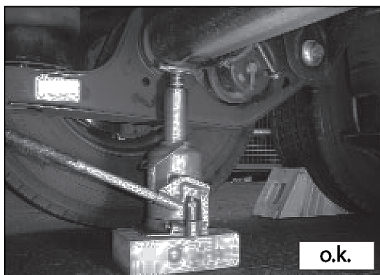
For multi-axle trailers with lift axles, the minimum suspension travel at the lift axle should not be less than 100 mm in order to ensure an adequate ground clearance.





## Tyre changing on fully loaded trailer with INTRA axle

Jack positioning points:



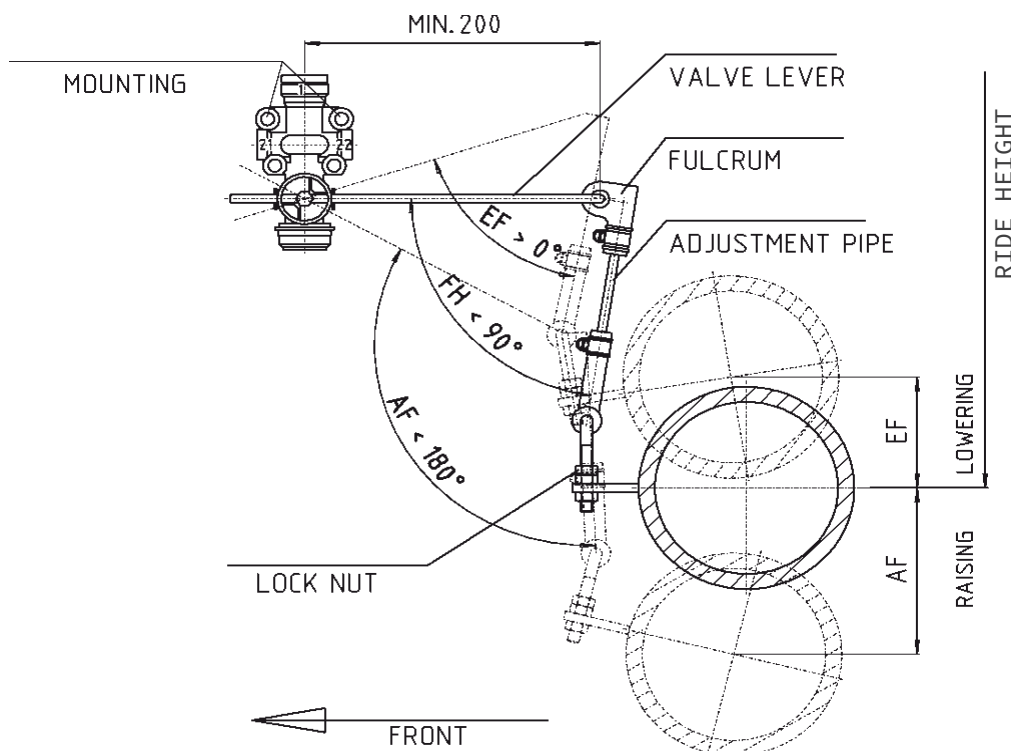
## Adjustment of the air suspension system ride height

### Air suspension valve

As standard, SAF-HOLLAND air suspension axles and system require only one air suspension valve. The air suspension valve controls the air bag pressure in relation to the trailer load in order to maintain a constant ride height in every load condition.

The air suspension valve is fastened to the trailer frame with screws and connected to the axle via the pivot joint (valve lever and adjustment pipe). On triple-axle trailers, the system is generally connected to the middle axle (normally in the middle of the axle), and on twin-axle trailers to the rear axle. In special cases (e.g. large trailer tilt angle), the air suspension valve can be installed in the rear axle.

For trailers with axle lifting system, the axle to which the system is connected depends on the axle to be lifted.



### Installation

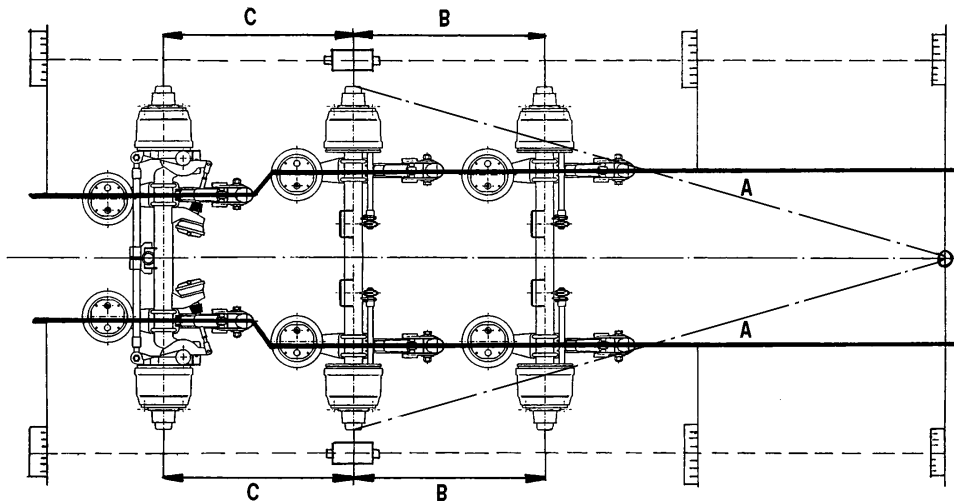
The valve lever should be at least 200 mm long and is horizontal when the trailer is in the driving position. As a function check, move the lever down slightly. Air must now escape via the venting cap into the atmosphere. If air flows into the air bags when the lever is pushed down, the valve lever has to be turned through 180°. For this, the valve lever has to be disconnected. The ride height is set by adjusting the adjustment pipe in the fulcrums and by turning the locknuts.

The adjustment must be carried out with the trailer standing on level ground. It can be carried out with the trailer either empty or loaded.

### Note

For a final check, the air suspension system should be lowered to the suspension stop or raised to the limit (shock absorbers, stop ropes, air bag length). During this process, the specified angle (marked in the position EF, FH & AF) between valve lever and adjustment pipe must be observed in order that the valve lever does not move in the wrong direction.

For track control, the air suspension ride height must be adjusted to the values specified by SAF-HOLLAND.

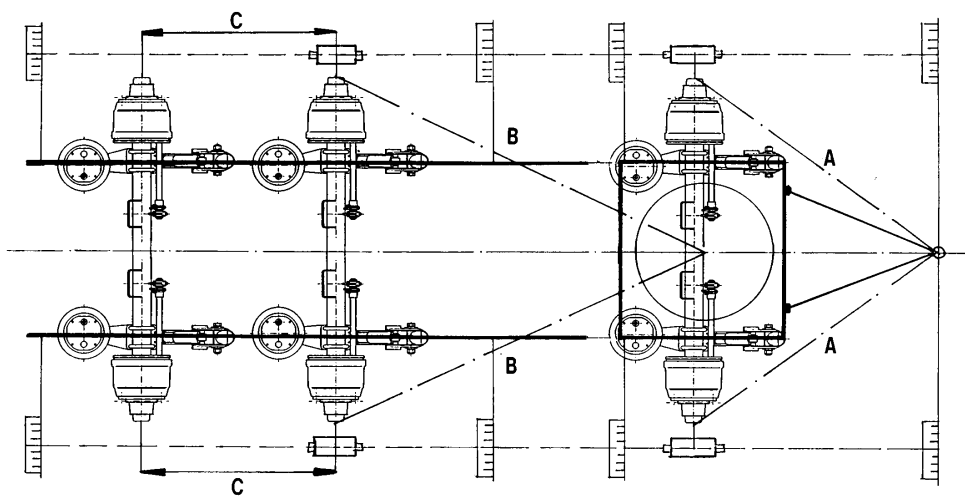


**Semi-trailers with trailing steering axle**

Distance A, B, C, max. permissible deviation 1.0 mm Toe setting  $\pm 3.0$  mm/m Camber  $\pm 3.0$  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  $\pm 3.0$  mm/m Camber  $\pm 3.0$  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.









TRAILER AXLES AND  
SUSPENSION SYSTEMS



COUPLING AND LIFTING  
TECHNOLOGIES



SUSPENSIONS FOR  
TRUCKS AND BUSES



SUSPENSIONS AND COMPONENTS  
FOR COMMERCIAL VEHICLES



BUS AIR SUSPENSION  
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COUPLING AND LIFTING  
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TRAILER AXLES AND  
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[safholland.com.au](http://safholland.com.au)

SAF-HOLLAND (Aust.) Pty. Ltd.  
PO Box 63 · 115 High St · Melton Vic 3337  
Tel: (03) 9971 7900 Fax: (03) 9743 6763

ABN: 79004371215  
Sales: 1300 131 613  
Email: [sales@safholland.com.au](mailto:sales@safholland.com.au)  
Web: [www.safholland.com.au](http://www.safholland.com.au)