Maintenance and Repair Manual for SAF Disc Brakes

SK RZ 9019 W with WABCO brake calliper

Edition 02/2003

SAF Service

Transpecs
QUALITY ON THE MOVE

TRANSPORT SPECIALTIES LIMITED - An ISO 9001 Certified Distributor - P.O. Box 98 971, S.A.M.C
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Manufacturer.....

Address.....

Body type.....

Chassis no.....

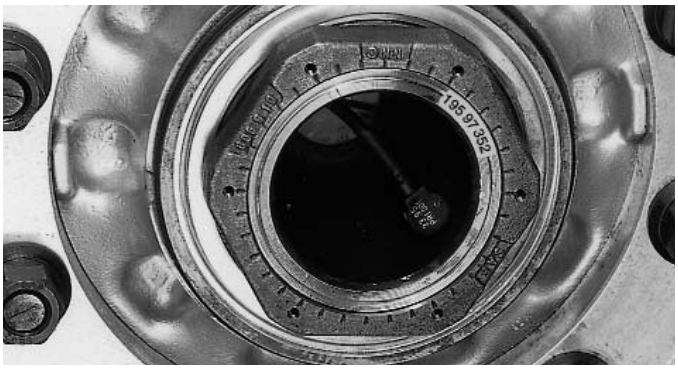
Year of manufacture .....

Registration date.....

Spare parts service
for SAF axles and suspension systems

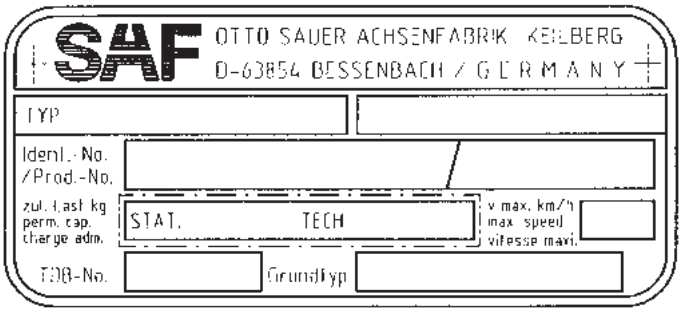
When ordering spare parts quote correct axle identification serial no., refer to the axle type plate.

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



Identification of axles when type plate not available.
Production No. of axle on RH side of axle tube.

Type plate (on the inside of the trailing arm or axle beam)



11353GB Edition 0203

SAF Disc Brake Axle Warranty.

SAF axle assemblies are covered with conditional Warranties for up to 1,000,000 Km or 5 years.

Specifics of the SAF Disc Brake axle warranty for normal Road operation are;

1. Wheel Bearings 1,000,000 Kms
2. Brake Caliper 2 Years against Manufacturing fault
3. Disc Rotor 2 year's unlimited mileage, Manufacturing failure only.

Excluded from the warranty are normal wear and tear parts, damage due to extreme force, incorrect operation and subsequent damage.

Brake Balance between Truck and trailer must be checked regularly and damage of wheel bearings and brake components will not be warrantable if balance is outside recommendation.

Damage to brake components including premature Pad wear, Caliper or rotor damage through Brake code specification being used which differ from our specified data will not be covered under the terms of this warranty.

Regular inspection and preventative maintenance procedures must be carried out in accordance to SAF maintenance manual.

Use Of Non Genuine parts including Brake Pads null and void warranty.

Before any repairs are carried out that may involve warranty, authorisation must be obtained from Transport Specialties Ltd.

Introduction

This manual is intended for vehicle operators and workshop service engineers for use with the SAF axles and suspensions units.

Always read the entire instructions before operating the trailer or proceeding maintenance and repair works. Failure to comply with this instructions without written permission from SAF will void the axle or suspension warranty.

The maintenance schedules are recommended by SAF, but as operating conditions and milages dictate frequency in servicing, a maintenance schedule to suite each individual operation must be established by the operator.

This manual does not cover all specifications manufactured by SAF. The information contained herein is general in nature. The parts shown in the illustrations are representative, they can vary in some details to your axle / suspension equipment.

Every precaution for accuracy has been taken in the preparation of this manual.
However, SAF neither accepts responsibility for any omissions or errors that may appear, not accepts legal liability for any loss in connection with the information contained within this manual.

Personal Safety Precautions

Maintain workshop fitters safety precautions to avoid serious personal injury or loss of life. Only qualified staff are permited to install, operate, maintain or repair brakes, axles and suspension components.

Warning!

On all suspensions a system failure may occur, this can cause the trailer chassis or axle to drop violently down. It is recommended that on air suspensions the system is completely deflated during repair works.

Before jacking up the axle or the trailer, check for solid ground, chock the wheels.
Always firmly secure the chassis and axles on strong support stands. This removes all imposed weight from the suspension and ensures that any work required underneath the trailer is carried out in safety.

SAF Contents

The item numbers indicated are given only for identification and to distinguish between different versions.

Use the part numbers from the valid spare parts documents for identification of spare parts.

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

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

The issue of this publication invalidates all earlier maintenance and repair manuals.

Note: We wish to thank WABCO for providing various illustrations!

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 additional 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, functionability 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 Transport Specialties Limited before starting the work.

3.3 The warranty period commences 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.

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

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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with WABCO Disc Brake type PAN 19-1

Maintenance intervals		After first 5,000 km or	Periodic checks		
	Mileage intervals >		every 30,000 km	every 75,000 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 to recommended torque setting, also after any removal of the wheel.					
Visual and safety inspection					
Hub unit maintenance-free. Visual inspection for grease leakage.					●
Inspect the brake calliper guide system. Check for free movement and sliding action.					●
Check rubber dust covers for cracks and damages. Check adjuster cap for correct seating.					●
Inspect the brake pad thickness at regular intervals (e.g. when ever tyre pressure is checked) but at least every 3 months.			●		
Inspect the brake disc for cracks.				●	
– **Perform general annual inspection** (brakes, air bags, tyres, etc.)					●
– **Perform general annual safety check** (tractor/ (semi-) trailer brake compatibility, ABS etc.)		●			●

Special service conditions

Vehicles with long standing periods:	**service at specified time intervals**
Vehicles used under extreme conditions: e.g. construction site operation, multi-shift operation	**shorten the service interval to 6 months / 75,000 km**

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Hub unit inspection

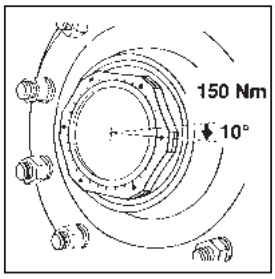
The Hub Unit is maintenance free.
Do not dismantle the hub bearing assembly.
Inspect the Hub Unit at any brake disc replacement.
Check for excessive grease leakage and any abnormal noises whilst rotating the hub.
When replacing brake pads inspect the rubber boot seals of the calliper guide pins and the tappet seals.
Never use high-pressure cleaners or cleaning fluids on the brake disc or Hub Unit.
Clean stub axle of any old grease and apply fresh SAF fitting paste.

Lubricant specifications:

Grease for repairs is contained in every repair kit.

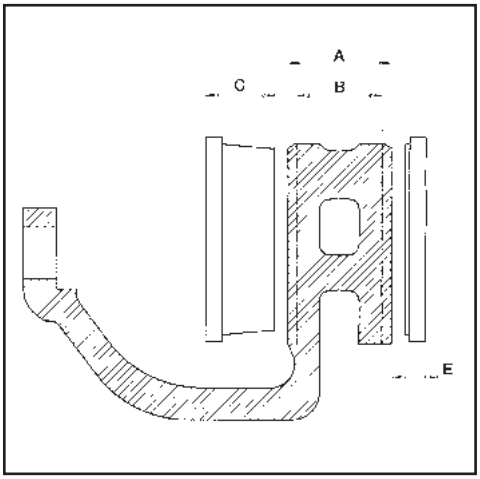
Stub axle:
SAF Part No. 4 387 0015 06
SAF fitting paste

Tightening the hub nut



On LH side – LH thread
On RH – RH thread
Pretighten to 150 Nm whilst rotating wheel hub and disc. For final torque, continue tightening by one graduation (10°). Hub nuts with LH thread are marked with a groove milled into the outside of the hexagon.

Hub Unit bearing axial endfloat 0 - 0.50 mm



NOTE!
Failure to observe these instructions could result in a road traffic accident. Worn brake linings or excessively worn brake discs result in a reduction in the braking efficiency or in a complete failure of the brake system.

Maximum wear limits

Brake Rotor			Brake Pad	
Diameter (mm)	„A" new (mm)	„B" max. wear limit (mm)	„C" new (mm)	„E" max. wear limit (mm)
370	45	37.0	30	11.0

Brake pads, use only original SAF spare parts for replacement.

Tightening torque in Nm

Attention! Bolts must not be oiled!

Bolt assembly's	Pos.-No.	SK RZ 9019 W
Brake chamber / spring brake chamber 2 hex. nuts M16x1.5		210
Guide pin bolts on brake calliper	70 80	340 ± 20
Brake calliper mounting on axle M16x1.5x55	56 56.1	290
Pad retainer clamp	63.1 63.2	30 ± 15

Assembly tools	SAF Part No.
Hub nut socket	1 012 0024 00
Hub puller	4 434 3822 00
Lever for hub cap	1 434 1041 00
Tool box WABCO	3 434 6010 00 (TSL part no. 12/851/021)

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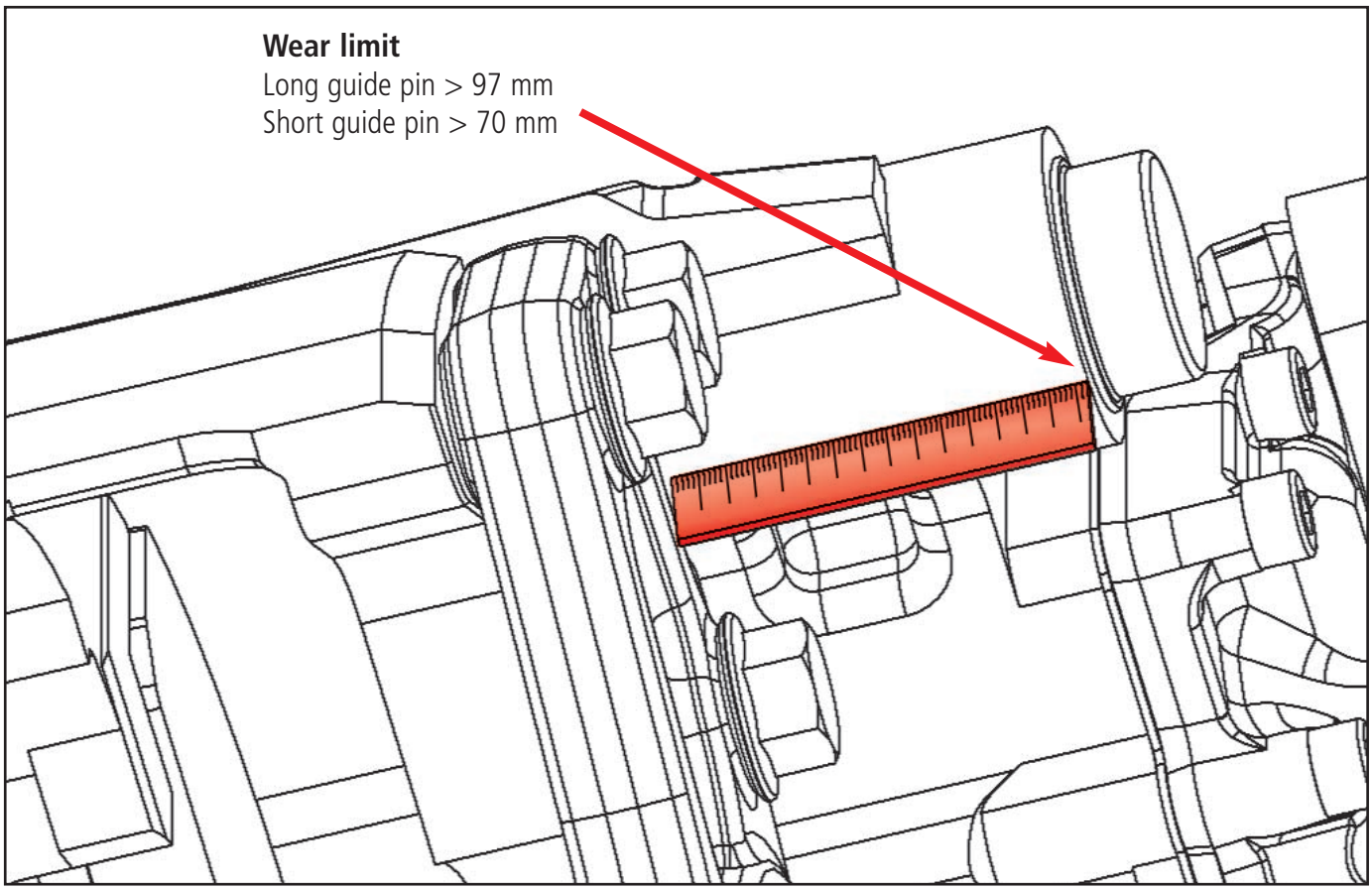
with WABCO Disc Brake type PAN 19-1

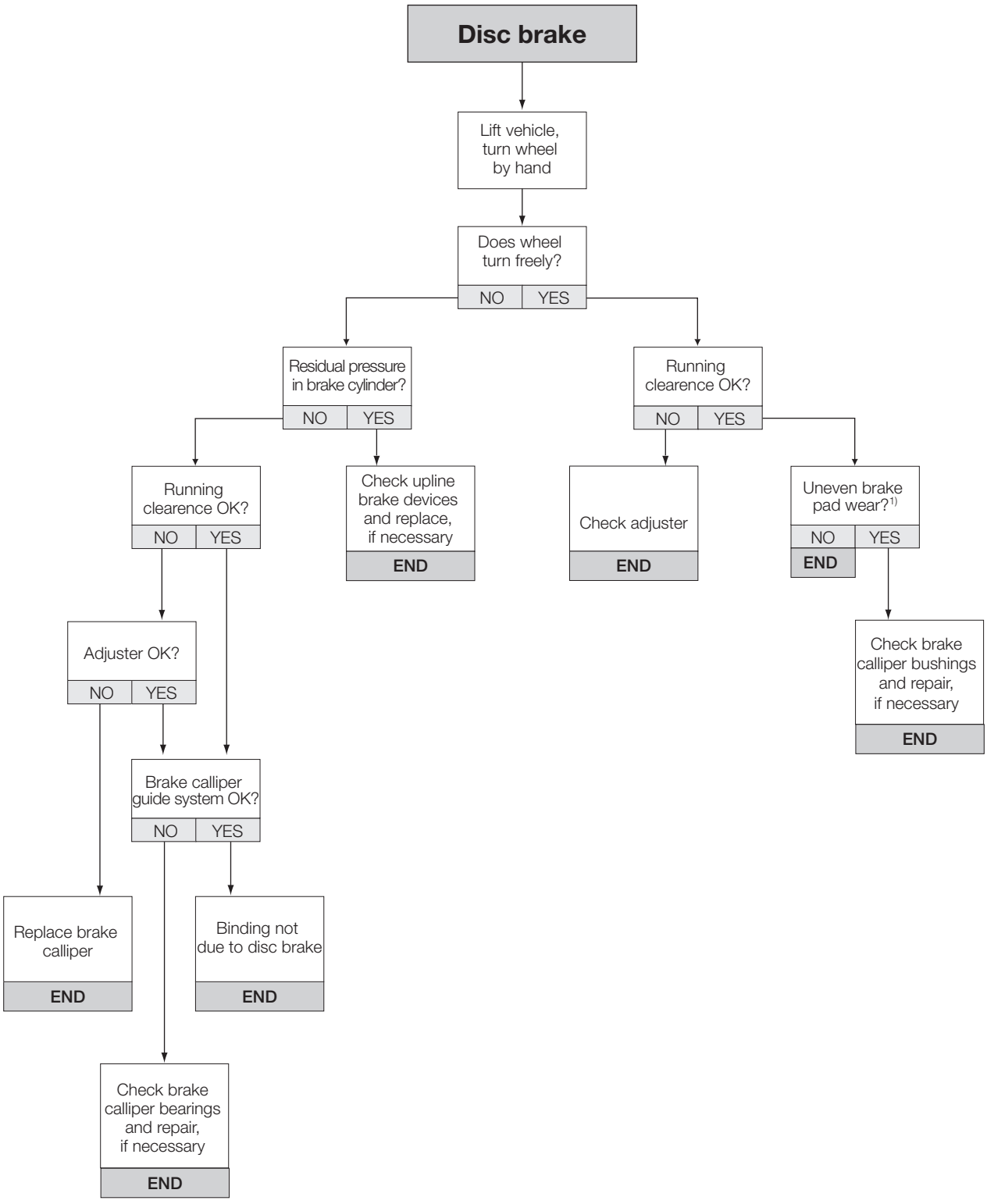
Check brake pads for wear



Check wear limit of brake pads and brake disc replace if necessary.
When distance on long guide pin is exceeding 97 mm or on short guide pin exceeding 70 mm.

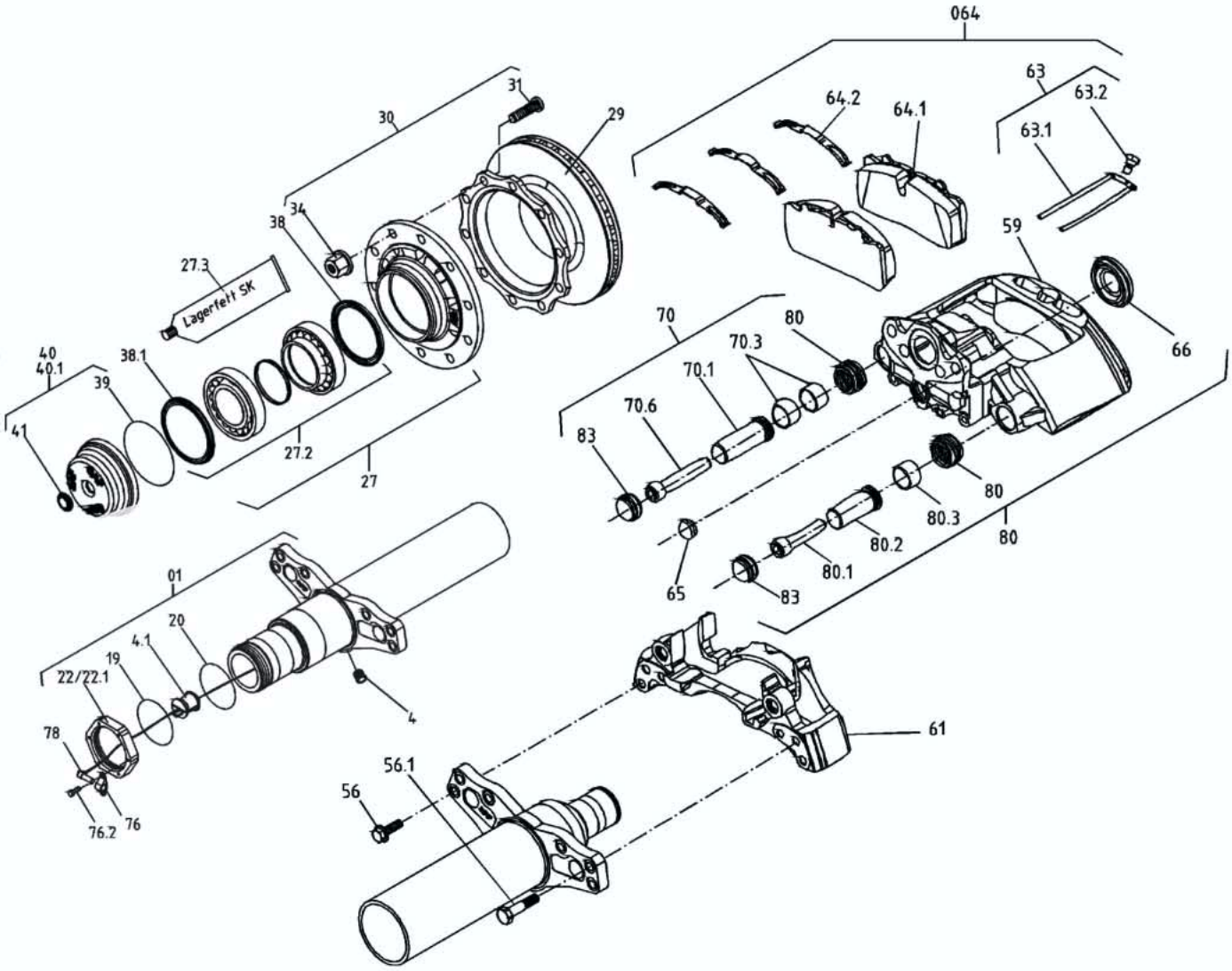
Brake testing

Fault-finding procedure



1) Difference between wear of inboard and outboard pad, and diagonal wear ≤ 5 mm.

SK RS/RZ 9019W Axle - (Wabco Caliper)



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SK RS/RZ 9019W Axle - (Wabco Caliper)

Item	Part Number	Qty	Description	Notes / Alt no.
19	4 315 0052 00	2	Axle Nut Lock Oring	
20	4 315 0056 00	2	Axle Spindle Oring	
22	1 011 0070 00	1	R/H Axle Nut M120x2/SW140	
22.1	1 011 0071 00	1	L/H Axle Nut M120x2/SW140	
27	3 307 3025 00	2	Hub and Bearing Assy Dual Steel Wheels	
27	3 307 3026 00	2	Hub and Bearing Assy Dual Alloy Wheels	
27.2	**3 434 3012 00**	**2**	**Bearing and Seal Kit**	
27.3	**4 387 0011 05**	**2**	**Hub Grease Pack**	
29	**4 079 0004 00**	**2**	**Brake Disc Rotor**	
31	1 303 1075 11	16	Wheel Bolt	
34	24738/ISO	16	Wheel Nut Dual Steel	
34	B5781/32	16	Wheel Nut Dual Alloy (Sleeved)	
38	4 373 0043 00	2	Inner Hub Seal	
38.1	4 373 0044 00	2	Outer hub Seal	
	3 434 3014 01	**2**	**Hub Seal Kit**	
39	4 315 0054 00	2	Hub Cap Oring	
40	3 304 0092 00	2	Hub Cap	
40	3 304 0092 20	2	Chrome Hub Cap	
	1 094 0037 00	**1**	**Hubo Mount Washer**	
41	4 337 2026 01	2	Protection Plug	
56	4 343 2914 10	10	Caliper Mount Bolt M16	
56.1	4 375 1004 10	2	Caliper Mount Bolt	
59	PAN19-1RH	1	R/H WABCO Brake Caliper	
60	PAN19-1LH	1	L/H WABCO Brake Caliper	
64	**12/999/737**	**1**	**Brake Pad Set**	
70	**12/999/738**	**2**	**Tappet and Guide Pin kit**	65,66,70,80
76	4 189 0051 00	2	ABS Sensor Mount Bracket	
76.2	4 343 2067 00	4	ABS Sensor Mount Screw	
78	4 029 1042 00	2	ABS Sensor	441 032 579 0
Tools				
	1 012 0024 00	1	Hub Nut Socket	
	4 434 3822 00	1	Wheel and Hub Puller	
	12/851/021	1	Wabco Caliper Tool Kit	
	TP42-KG	1	SAF Fitting Paste - 1kg Tin	
	4 387 0015 06	1	SAF Fitting Paste - 230gm Tube	

Special notes

Storage instructions

During storage outdoors, ensure that moisture cannot enter the inside of the brake calliper through the brake cylinder connection.

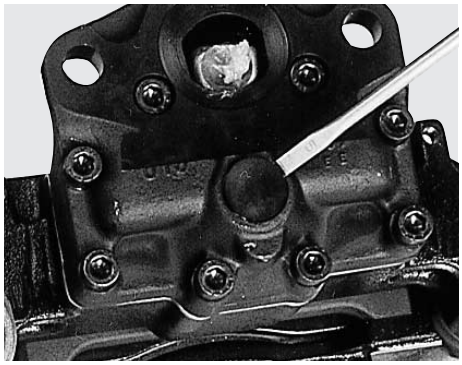
Painting instructions

During painting work, all rubber parts must be covered as otherwise the rubber will become brittle and thus be damaged.

Only brake cylinders approved by the brake or axle manufacturer may by used

BRAKE BALANCE

To obtain maximum performance from the disc-brakes, brake balance between the truck and trailer must be carried out before going into service and again at 5000km service, and then every 12 months thereafter.
Maximum lead to trailer must not exceed 0.14 bar (2 psi).



Self-Adjuster check

Remove adjusting screw cap.

Caution!

Do not overload or damage the hexagon drive (8 mm) of the adjusting screw. Do not use an open-ended spanner.

Turn the adjusting screw clockwise using an 8 mm ring spanner.

Actuate the brakes 5 times (approx. 1 bar)

When the self-adjuster is functioning correctly the ring spanner must turn anti-clockwise.

Caution!

Ensure that there is sufficient room for the ring spanner to rotate freely during adjustment.

Keep your hands off from the spanner whilst actuating the brakes. Danger for serious personal injury.

Note:
As the number of rotation steps of the ring spanner increases, the turn angle or movement of the ring spanner must reduce.

If the spanner rotates as described above, the self-adjuster is functioning correctly.

If the following faults occur:

The adjusting screw or ring spanner
a) does not turn,
b) turns only with the first application of the brakes,
c) turns forward and then back again at each application of the brakes,

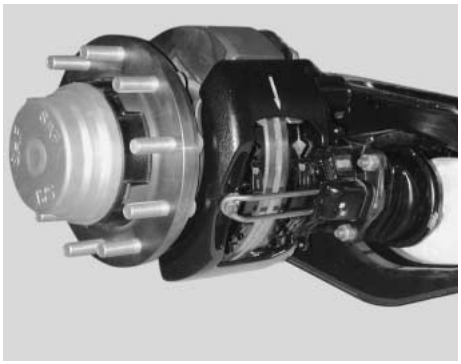
the self-adjuster is not functioning correctly and the brake calliper has to be replaced.

Remove the ring spanner.

Coat the adjusting screw cap with grease in the snap-fit area, then push on the cap and ensure that it is firmely seal tight fitted.

Inspect condition of adjusting screw cap for proper seal function to avoid water entry into the self-adjusting gear.

Replace adjusting screw cap if found worn or damaged.



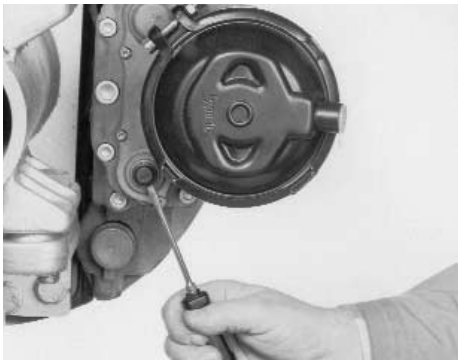
Repairing the brakes

Removal of the brake calliper.

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

Lift the axle using a jack.

Loosen the wheel nuts and remove the wheel.



Remove the adjusting screw cap.

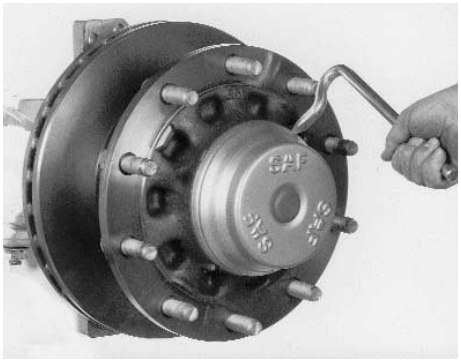
Turn the adjuster in anti-clockwise direction up to the stop until it clicks 2 - 3 times.

Unbolt the diaphragm cylinder, if necessary.

Remove the pad retaining clamp.

Remove the brake pads.

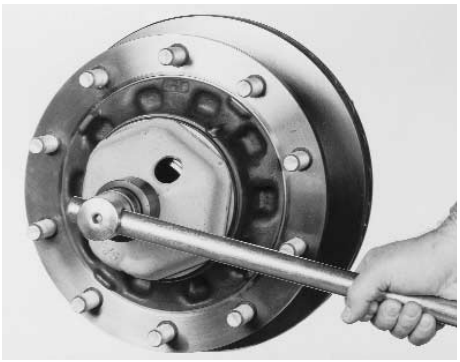
Unbolt the brake calliper.



Lever the hub cap off the hub unit by inserting a tyre lever into one of the recesses around the circumference of the hub cap.

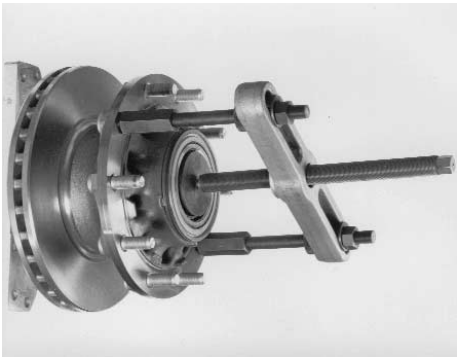
Press the ABS sensor completely out of the sensor mounting block and place inside the axle tube.

The sensor holder can remain on the axle nut.



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

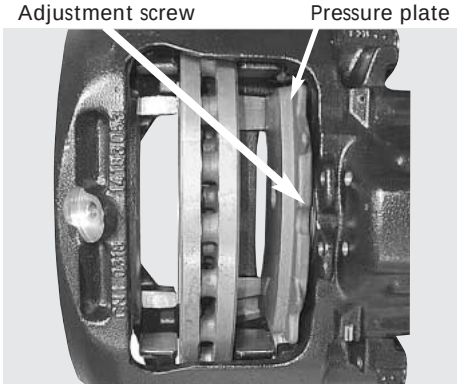
Note:
Axle nut: W.A.F. 140
On left-hand side of vehicle
(as seen in direction of forward travel) – **left-hand thread**.
Identification of axle nut with left-hand thread:
Milled groove on outside of hexagonal head.



The complete hub unit with brake disc can be easily pulled off the stub axle.

If the bearing inner races tilt on the stub shaft, the hub unit can be pulled off using a normal workshop puller or SAF Part No. 4 434 3822 00.

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

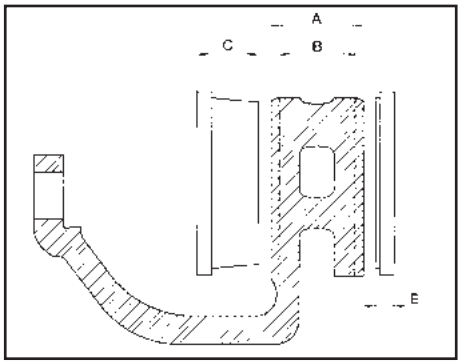


Check the brake calliper for free movement, and sliding action.

Back off the tappets on the adjuster until the boots are visible.

Perform a visual inspection of the boots and all seals.

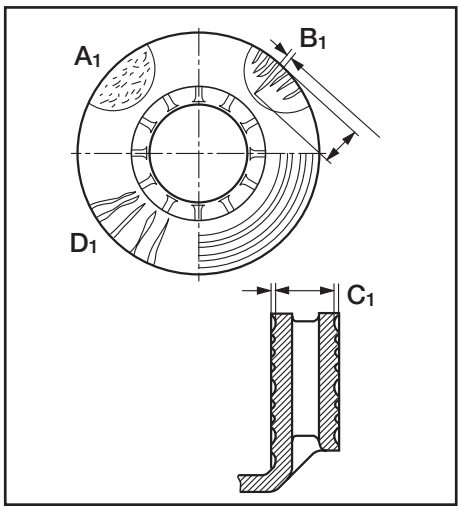
Screw in the tappets again completely.



Brake disc

See table in chapter “Maintenance instructions”.

The brake disc may only be cleaned using a dry cleaning agent.



Inspecting the brake disc

Inspect the braking surface of the brake disc carefully for serviceability.

A_1 – Network-like cracks are permissible.

B_1 – Cracks up to max. 1.5 mm (width and depth) running towards the middle of the hub are permissible.

C_1 – Unevenness in the disc surface up to 1.5 mm is permissible.

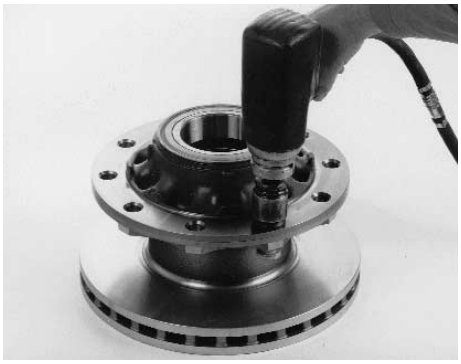
D_1 – Cracks going right through the disc are not permissible.

Check the brake disc thickness and machine, if necessary. For safety reasons, the limit thickness for machining the brake discs is 39 - 40 mm.

Max. wear limit, see table in chapter “Maintenance instructions”.

Replacing the brake disc

To remove the brake disc from the hub unit, drive all the wheel bolts out of the hub unit using a hammer. Removal of the circlips is not necessary. Before reassembling wheel hub and brake disc, remove any corrosion from the contact surfaces.



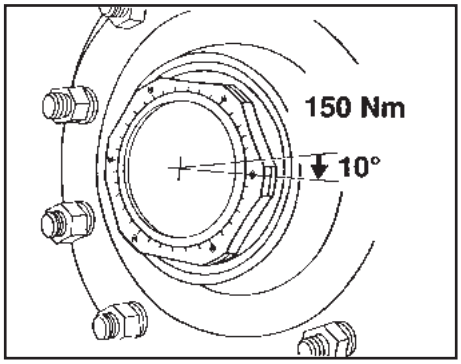
Insert the wheel bolts at an angle from below and hammer into place (observe twist lock).

Draw the bolts completely into the hub unit using a wheel nut and an impact wrench.

Installing the Hub Unit with brake disc

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

See chapter "Maintenance instructions" for recommended media.

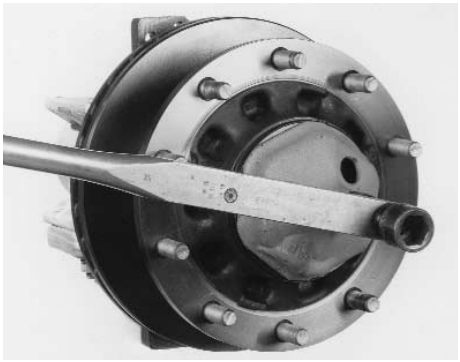


Replace the rear O-ring on the stub shaft.

Inspect the O-ring on the axle nut and replace, if necessary.

Push the Hub Unit brake disc assembly onto the stub axle.

Screw on the axle nut.



Axle nut W.A.F. 140:

On LH side of vehicle (as seen in direction of forward travel) – LH thread.
Identification of axle nut with LH thread: Milled groove on outside of hexagonal head.

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

1. Initial tightening: 150 Nm
   Rotate the hub one full turn
2. Final tightening: 10° turn angle = 1 mark

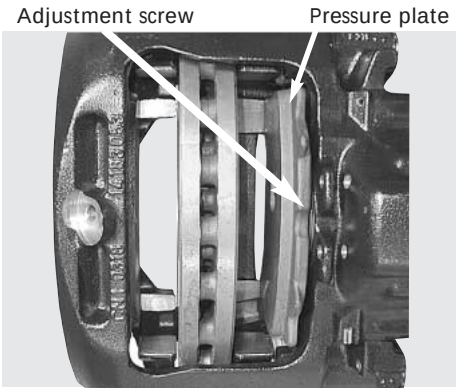
Additional lock of the axle nut is not required.

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

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

Remove the plug from the hub cap and push the ABS sensor until it is contacting the exciter ring. Insert the plug into the hub cap again.

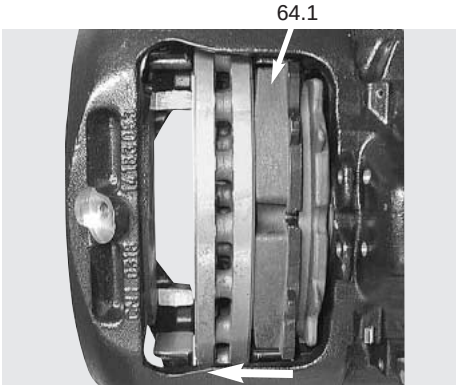
Measure the voltage output on the ABS sensor cable using a voltmeter (approx. 100 mV) whilst rotating the hub.



Move the brake calliper so far so that there is enough distance between the brake disc on the actuation side to insert the brake lining.

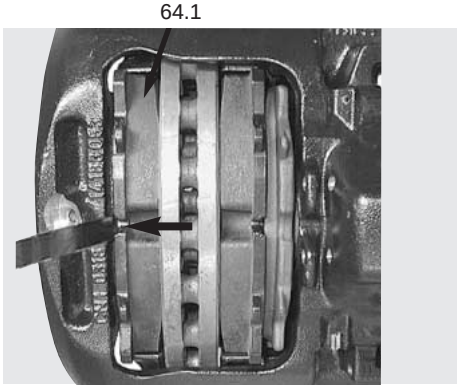
Insert the pressure plate into the brake mounting and push it against the adjustment screw.

Note!
The pressure plate must seat correctly in the brake mounting guide and the pin of the adjustment screw must be seated in the groove of the pressure plate, otherwise the correct functioning of the adjustment mechanism is endangered! Provision is made so that the adjustment screw can be turned until the pin sits correctly in the pressure plate groove. The protection cap must not be rotated during this action.



Inserting new brake linings 64.1 on the actuation pad.

Move the brake calliper in the direction of the rim until the actuation side of the brake lining 64.1 sits on the brake disc.

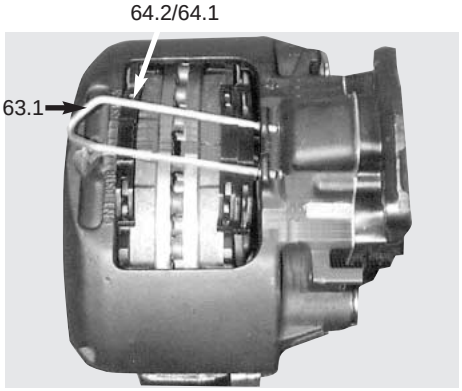


Inserting **new** brake linings 64.1 on the rim side.

With the help of a 1 mm thick feeler gauge (arrow) inserted between the rim side of the lining and the brake calliper, regulate the adjuster with a ring spanner until both brake linings sit on the brake disc.

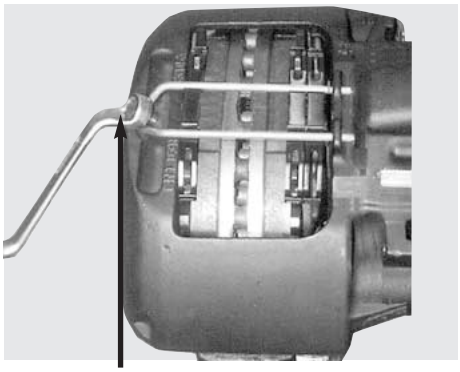
Attention !
Do not use excessive force on the corners of the adjuster.

Note!
Direction of rotation in regulating the adjuster is anti-clockwise. Do **not** assemble the lining retainer hoop until play has been adjusted.

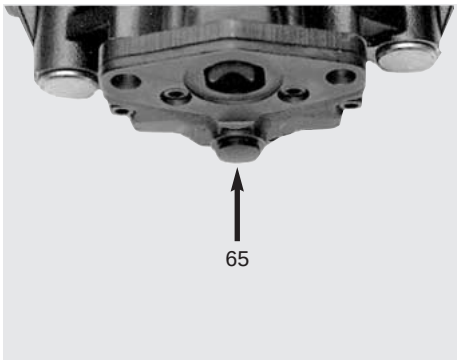


Setting **new** retainer springs 64.2 onto the brake linings 64.1 and pressure plate.

Push and depress the lining retainer hoop 63.1 in the opening of the brake calliper so that the radial lugs of the retainer spring seat in the hoop.

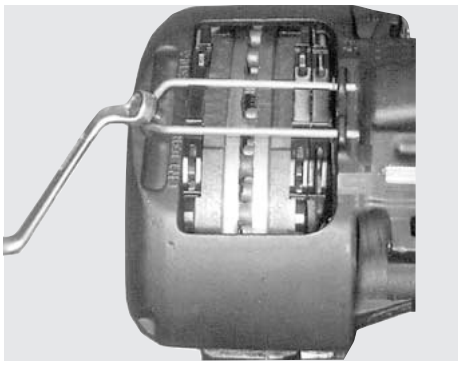


Affixing **new** hex. screw 63.2 with 30±15 using a spanner onto the brake calliper.



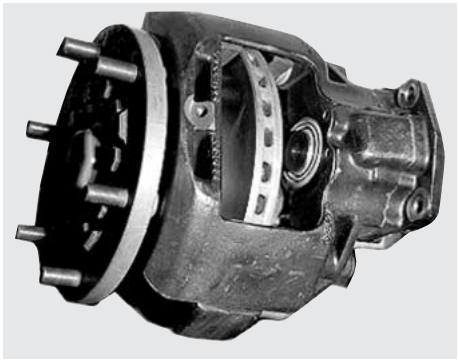
Push the **new** plug 65 into the opening of the brake calliper! Check the wheel hub for freedom of movement.

Note!
Check the brakes on a rolling road test station after completion of work.



Replacing of the tappet rubber boot seals

Dismantle brake linings and pressure plate.



Move brake calliper by hand towards the cylinder.

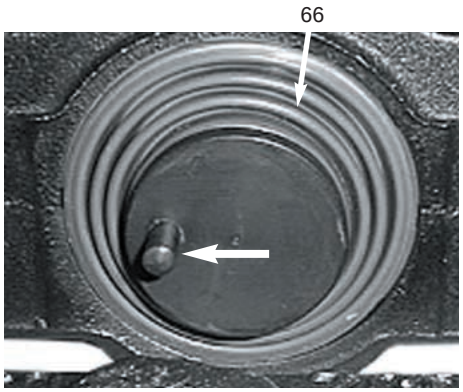
Pull out the protection cap 66 using a screwdriver from the brake calliper seating.

Check the thread on the adjuster screw.

Note! Lay the rim side brake lining in the lining cavity so that the adjuster cannot be screwed out of adjustment. After checking remove the linings again.

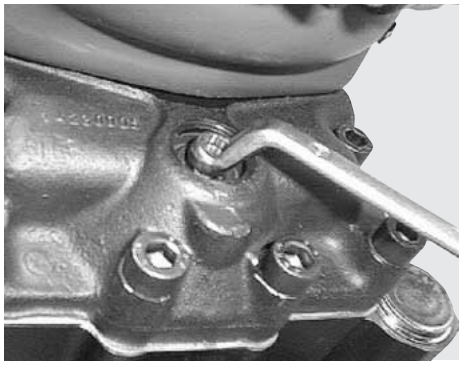
Secure the adjuster screw against turning (arrow) and screw out approx. 30 mm anti-clockwise using a ring spanner on the hexagonals.

During this time check the thread for damage or corrosion.

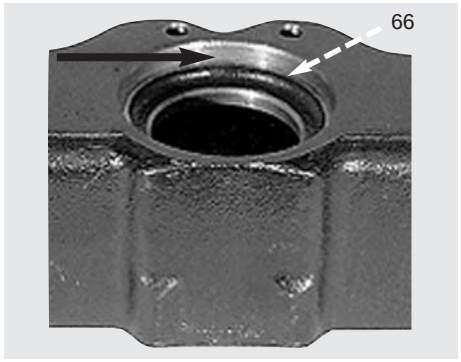


Note!

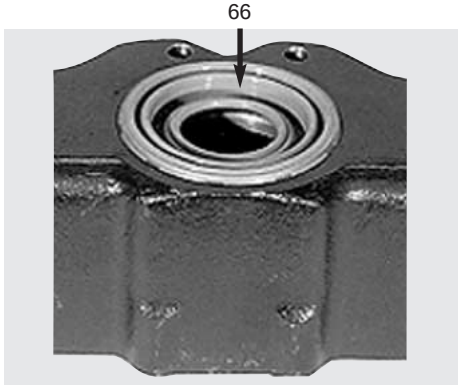
The protection cap 66 can be replaced if dirt or water is seen to be present over the seal seat of the brake calliper, or if the protection cap has been damaged immediately prior to servicing. Should parts be found to be corroded then the brake should be replaced in case of doubt.



After checking, grease the thread and partly screw the adjuster clockwise again.

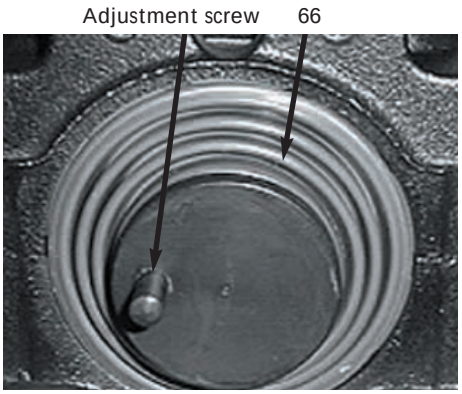


Clean the seating of the protection cap 66 in the brake calliper (arrow) (illustration without adjustment screw).



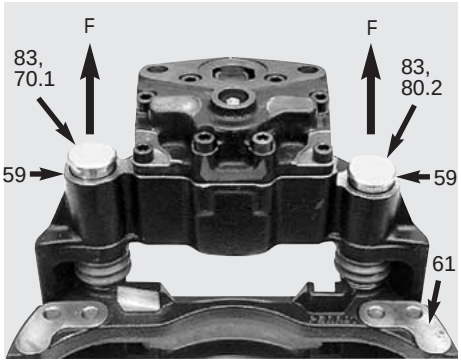
Push the **new** protection cap 66 over the adjuster.
Centralize the press-in tool over the protection cap 66 and insert the protection cap in its seat in the brake calliper 59.

(illustration without adjustment screw)



Insert the protection cap 66 into the adjustment screw seating. Grease the rim lip before insertion.

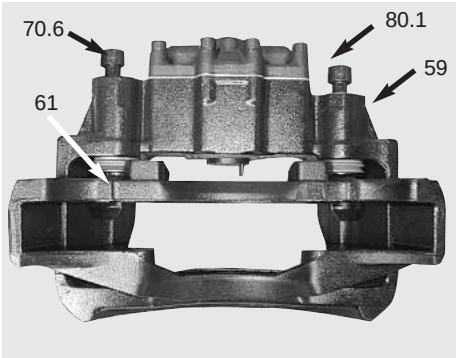
Note! Ensure an even and unwrinkled seating of the protection cap's rim lip in the groove of the adjustment screw.



Repairing the brake calliper bearing with “guide and seal kit”

Dismantle the brake calliper 59 from the brake mounting 61 and additionally remove the cap 83 of the guide pin 70.1/80.2 with a screwdriver from the housing 59.

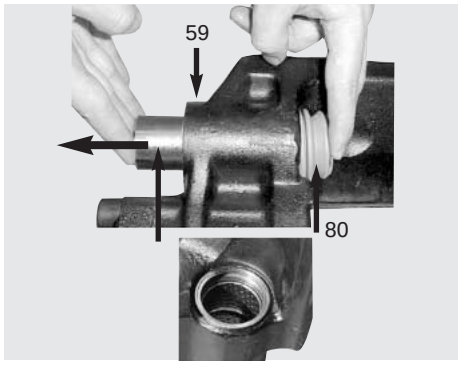
Note!
Do not damage the holes for the cap in the housing.



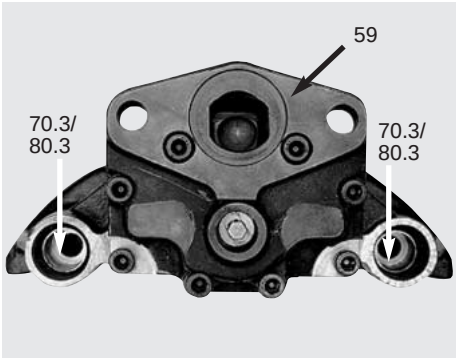
Loosen the screws 70.6/80.1 with a spanner. Remove the brake calliper 59 from the brake mounting 61.

Note!
Danger of trapping through loose brake calliper!

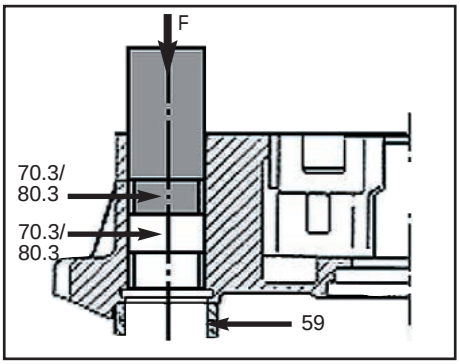
Clean contact surface (flush) on the brake mounting 61 to the guide pin.



Remove the guide pin 70.1/80.2 from the brake calliper 59, remove the protection cap 80 from the groove.

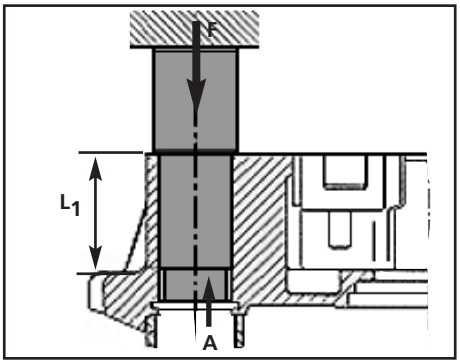


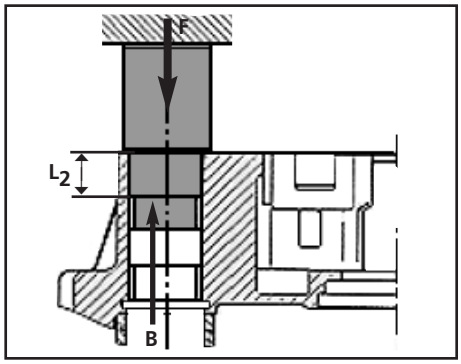
Lay the brake calliper 59 on a firm surface so that the cover opening of the brake calliper is uppermost in order to press out the bushes 70.3/80.3.



Press out the bushes 70.3/80.3 from the brake calliper using a press and mandrel.

Clean the holes in the brake calliper.

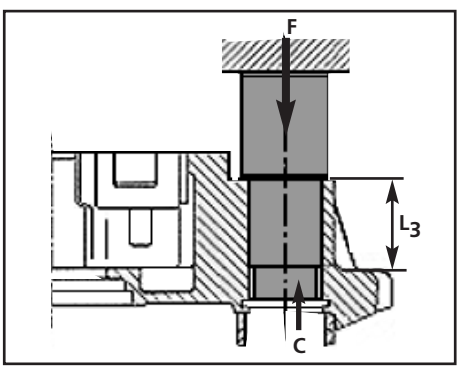




Press in two **new** bushes 70.3 and for the longer guide pin 70.1:

Firstly (A) the inner bush with mandrel (L_1 = 52.2 ± 0.2 mm), and finally (B) the outer bush with a mandrel (L_2 = 13.2 ± 0.2 mm), in both cases press in until they meet the stop.

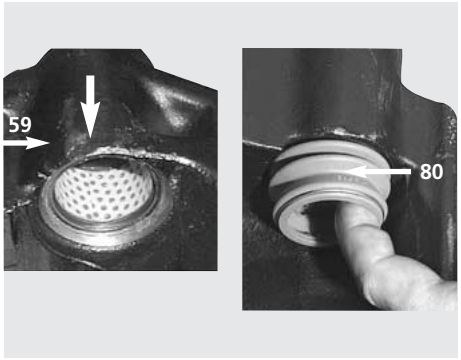
Grease sliding surfaces of the bushes and the space between them.



Press in a **new** bush 80.3 for the shorter guide pin 80.2.

Press in bush (C) with mandrel (L_3 = 38.7 ± 0.2 mm) until it meets the stop.

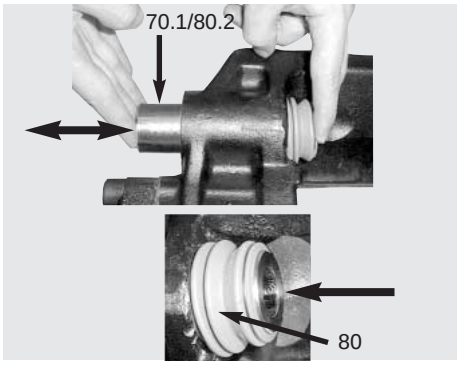
Grease sliding surfaces of the bush.



Insert the **new** protection cap 80 in the seat (arrow) of the brake calliper (59).

Note! Clean seating before insertion. For ease of insertion of the protection cap it is recommended to lightly grease the rim lip.

Note! Ensure an even and unwrinkled seating of the protection cap's rim lip in the groove of the brake calliper.



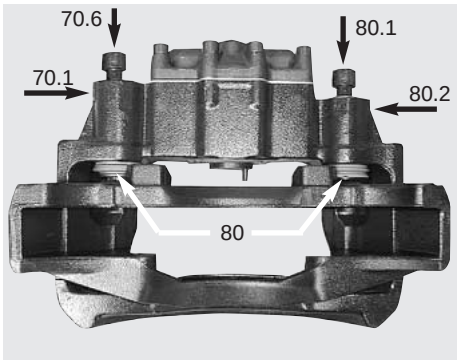
Grease the running surfaces for the guide pins 70.1/80.2 and the rim lip of the protection cap 80.

Insert the **new** guide pins from the direction of the cylinder into the brake calliper 59 and push the protection cap 80 against the seating of the guide pins 70.1/80.2.

Lightly move the guide pins backwards and forwards several times as illustrated in the sketch.

The longer guide pin 70.1 is the shoulder bolt and is fitted on the brake disc run in side. The shorter guide pin 80.2 is the play bolt and is fitted on the brake disc run out side.

Remove excessive grease. The flat surfaces of the guide pins to the brake mounting (arrow) must be free of grease!

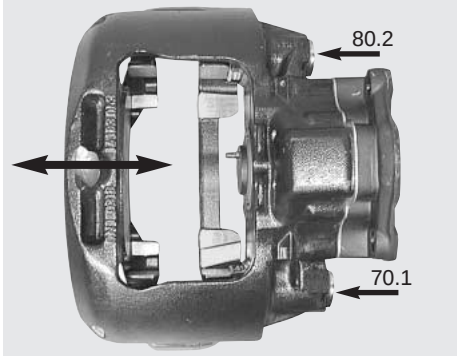


Seat the brake calliper 59 onto the brake mounting 61 and insert the fitted guide pins 70.1/80.2 flush.

Fit the new screws 70.6 (long for the shoulder bolt 70.1), 80.1 (short for the play bolt 80.2) through the previously fitted guide pins in the brake calliper 59 and screw the brake calliper to the brake mounting 61.

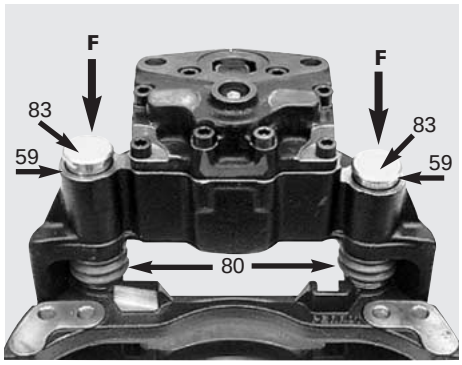
Tightening sequence: 1st screw 70.6 / 2nd screw 80.1

Note!
It must be ensured during tightening of the screws when assembling that the protection cap 80 is not damaged or rotated. First, screw tightly the slide fit longer guide pin 70.1 and then screw tightly the running fit shorter guide pin 80.2.
Should the guide pins 70.1/80.2 be loosened during maintenance work from the brake mounting 61, then these must be replaced with new screws 70.6/80.1 when re-assembling.



Move the brake calliper several times backwards and forwards over the guide pins 70.1/80.2. Ensure ease of movement.

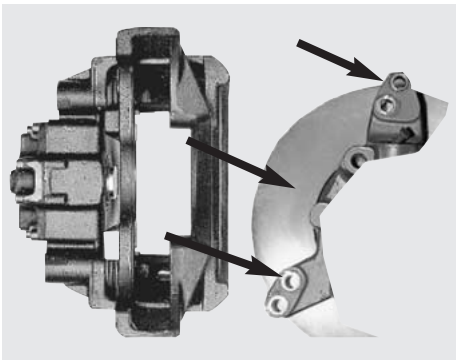
Note!
Do not squash the guide pins against the brake mounting!



Grease the holes for the cover plate 83 in the brake calliper 59.

Insert the **new** cover plate 83 into the holes of the brake calliper 59 and press home using a suitable tool.

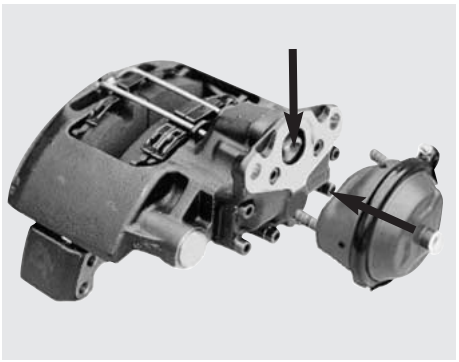
Note!
Avoid damaging the cover.



Fitting the brake calliper

Seat the brakes with brake mounting over the brake disc and fit to the axle.

Tightening sequence of the screws:
RH side clockwise
LH side anti-clockwise
Each time begin the sequence with the shoulder bolt (if applicable).
Position of shoulder bolt: In the direction of wheel rotation – the run out side of the outer corner of the flange.



Replacing the brake cylinder

Before fitting the brake cylinder clean the sealing surface of the brake calliper and grease the bearing on the brake lever (arrow).

Set the brake cylinder onto the brake calliper and screw the nuts tightly with a spanner - torque to 210 Nm.

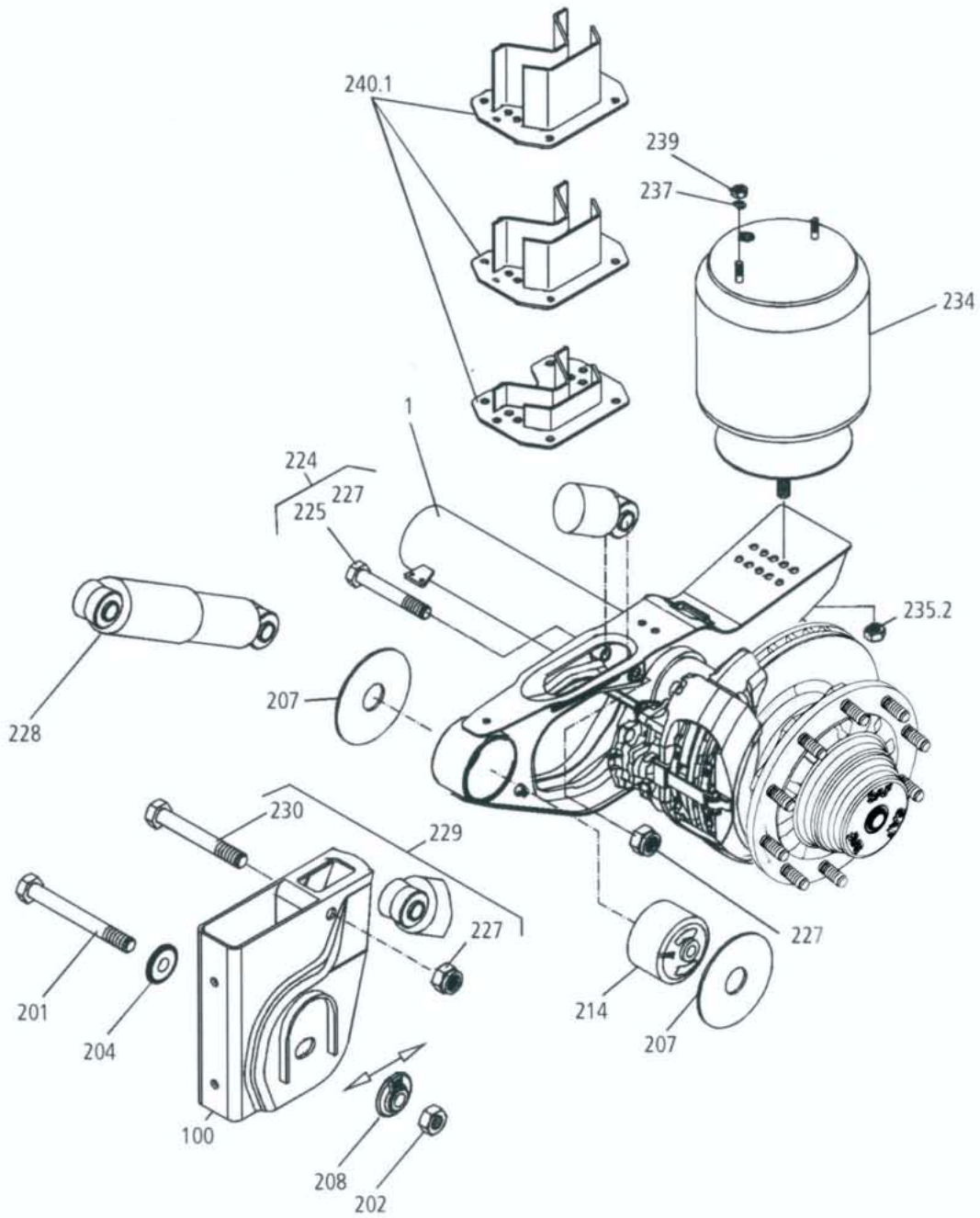
Note!
According to the respective fitting position, the lower drain holes on the bottom of the cylinder must be clear.

1. Knorr Bremse tool box
SAF Part No. 4 434 3823 00

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

3. SAF ratchet wrench
SAF Part No. 3 434 3327 00

Underslung Intradisc Plus Suspension



Transpecs
QUALITY ON THE MOVE

Underslung Intradisc Plus Suspension

Item	Part Number	Qty	Description	Notes / Alt no.
100	SAF0825	2	Mounting Bracket 200mm	2 183 0825 00
100	SAF0826	2	Mounting Bracket 250mm	2 183 0826 00
100	SAF0827	2	Mounting Bracket 300mm	2 183 0827 00
100	SAF0828	2	Mounting Bracket 350mm	2 183 0828 00
200	3 341 1048 19	2	Bolt Kit 201-202	
201	4 343 1048 88	2	Hex Bolt M30 x 200mm	
202	4 247 4022 80	2	Lock nut M30	
204	1 101 2001 00	2	Flanged Washer	
207	4 331 5029 00	4	Nylon Thrust Plate	
208	1 123 0001 01	2	Flanged Eccentric Washer	
214	4 177 3028 00	2	3D Rubber Bush	
225	4 343 2802 10	2	Bottom Shock Bolt M20x150mm	
227	4 247 4044 00	4	Flanged Locknut M20	
228	2 376 0070 00	2	Shock Absorber	
228	2 376 0071 00	2	Shock Absorber	
228	2 376 0072 00	2	Shock Absorber	
230	4 343 2803 10	2	Top Shock Bolt M20x 120mm	
234	S2619V	2	Air Spring 300mm Dia	3 229 0033 00
234	S2923VK	2	Air Spring 350mm Dia	3 229 2128 00
235.2	4 247 4007 80	2	Lock Nut M16	
237	4 141 0003 00	2	Spring Washer M16	
239	4 342 0004 60	4	Hex Nut M12	
240	SAF5	2	Air Bag Pedestal 5mm	1043026101
240	SAF50	2	Air Bag Pedestal 50mm	2237008101
240	SAF100	2	Air Bag Pedestal 100mm	2237008001
240	SAF150	2	Air Bag Pedestal 100mm	2237008201

Axle & Suspension Torque Values

Axle SK RS / RZ 9019

Hub Nut

L/H side direction of travel - L/H thread - Grooved hub nut and Spindle
R/H side direction of travel - R/H thread - Axle serial number on spindle
Pretighten to 150 Nm while rotating Wheel Hub
Final torque, continue tightening through one more scale on nut 10 Degrees

Diaphragm Brake Cylinder (Springbrake) M16	**210 Nm**
Brake Caliper mounting bolt M16	**290 Nm**
Guide/Slide Pin bolts M16	**290 Nm**
Wheel Nuts M22	**600 Nm**

Modular Suspension

Pivot Clamping Bolt Assy M30

Pretighten to **400 Nm**
Final tightening torque **120 Degrees (2 flats of the nut)**

Shock Absorber Nuts M24	**400 Nm**
U/Bolts for Trailing Arms M22 (Diagonally in three Stages)	**650 Nm**
Air Spring Mounting Plate M20	**180 Nm**
Air Spring Upper Nut M12	**40 Nm**
Air Spring Self Tapping Bolt (Plastic Plunger Piston)	**20 Nm**
Air Spring Bolt (Steel Plunger Piston)	**80 Nm**

Intradisc Dual

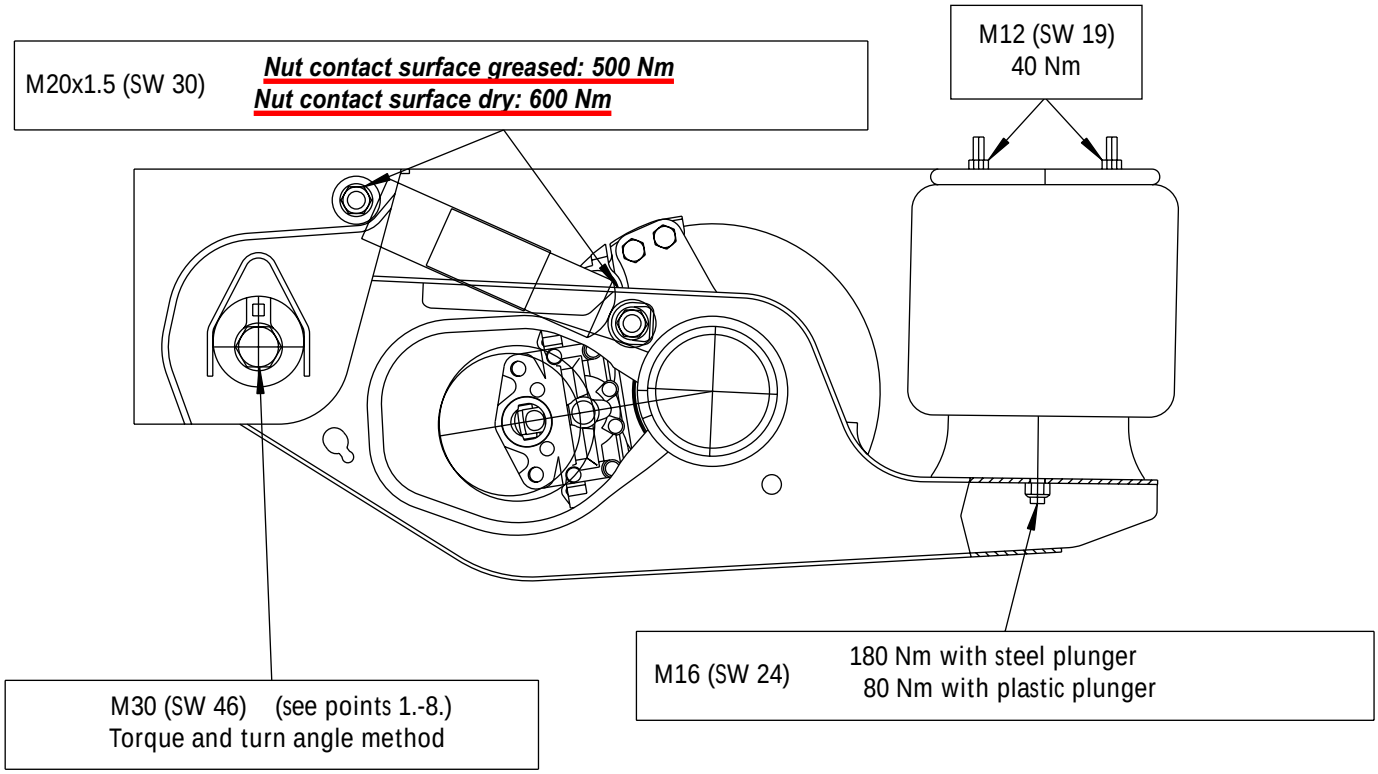
Pivot Clamping Bolt Assy M30

Pretighten to **400 Nm**
Final tightening torque **120 Degrees (2 flats of the nut)**

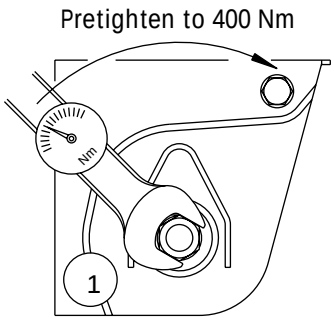
Shock Absorber Nuts M20	Nut Contact Surface Greased	**500 Nm**
	Nut Contact Surface Dry	**600 Nm**
Air Spring Top Nut M12		**40 Nm**
Air Spring Plunger Bolts M16	Plastic Plunger Piston	**80 Nm**
	Steel Plunger Piston	**180 Nm**

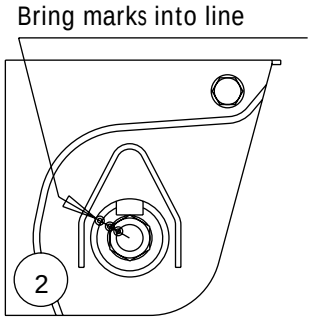
Suspension arms – shock absorbers – air bags/steel hanger brackets

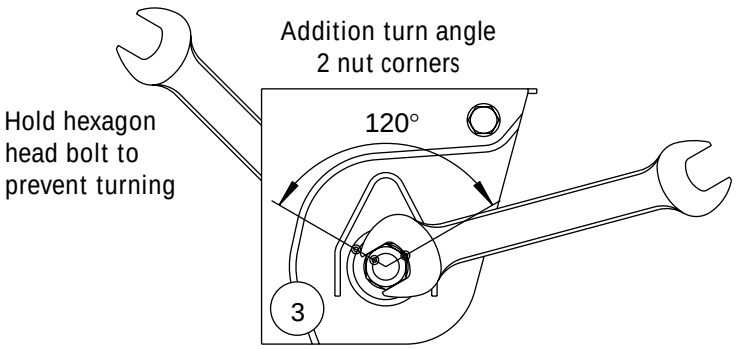
All contact surfaces of the functional suspension arm and shock absorber bolts must not be coated with primers or paints over the existing primer coating. (Coat thickness max. 45 µm)



1. Faces of the HD bearing bush must be free from oil and grease.
2. Install the functional suspension arm bearing parts as shown in the spare parts drawing.
3. Adjust the vehicle to ride height.
4. Pretighten the nuts M30/SW46 to 400 Nm using a torque wrench (see Fig. 1).
5. Align the marks on the welded hub, hexagon head bolt and nut over one corner of the nut (see Fig. 2).
6. Tighten the nut a further 120° (2 nut corners), holding the bolt head to prevent the bolt from turning with the nut (see Fig. 3).
7. Perform a visual check. Correct the turn angle, if necessary.
8. Make marks with a counterpunch on the welded hub, hexagon head bolt and nut in a line after completing the tightening procedure.







Installation situation for INTRADISC *plus* and INTRAAX *plus* shock absorbers

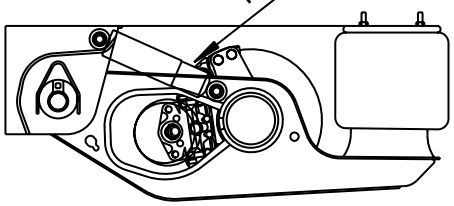
Steel hanger bracket / crossmember and suspension arm

Bolt kit 3 341 2803 10

Collared bolt M20x1.5x120 - 10,9
4 343 2803 10
- dacromet coated -
Collared nut M20x1.5 - 10
4 247 4044 10
Tightening torque:
Contact surfaces greased: 500 Nm
Contact surfaces dry: 600 Nm

ATTENTION:

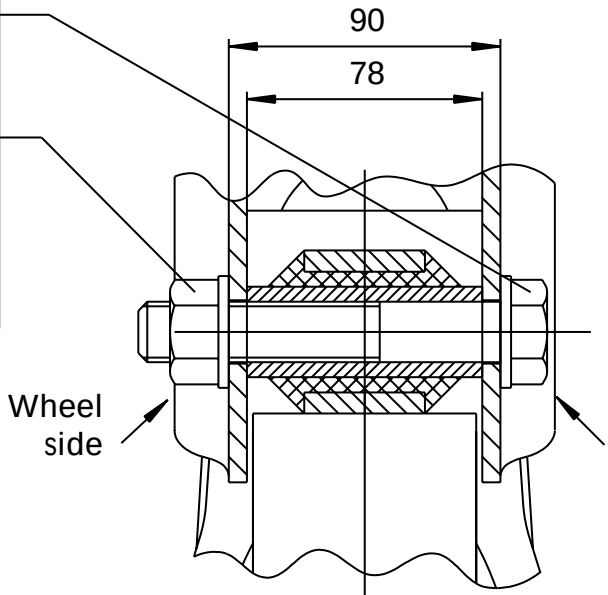
TOP mark facing upwards in working position

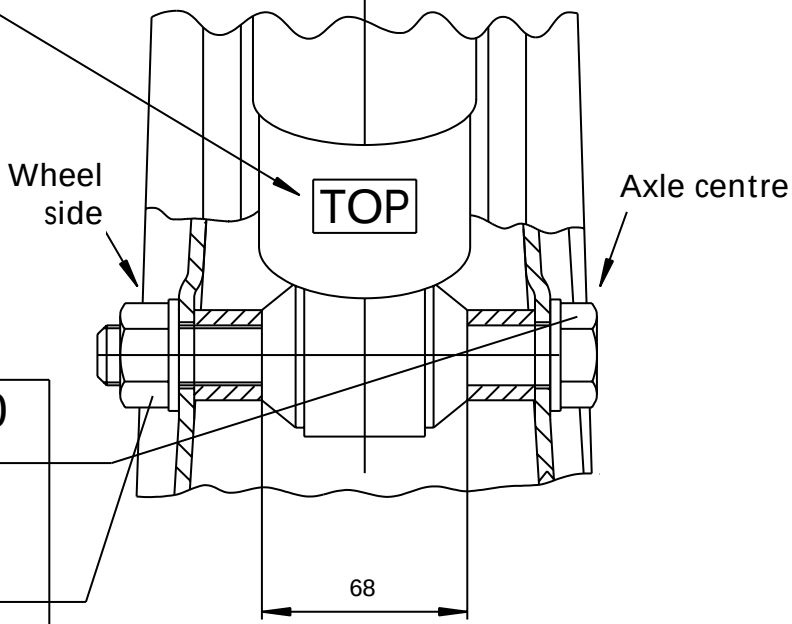


Bolt kit 3 341 2802 10

Collared bolt M20x1.5x150 - 10,9
4 343 2802 10
- dacromet coated -
Collared nut M20x1.5 - 10
4 247 4044 10
Tightening torque:
Contact surfaces greased: 500 Nm
Contact surfaces dry: 600 Nm

Steel hanger bracket / crossmember

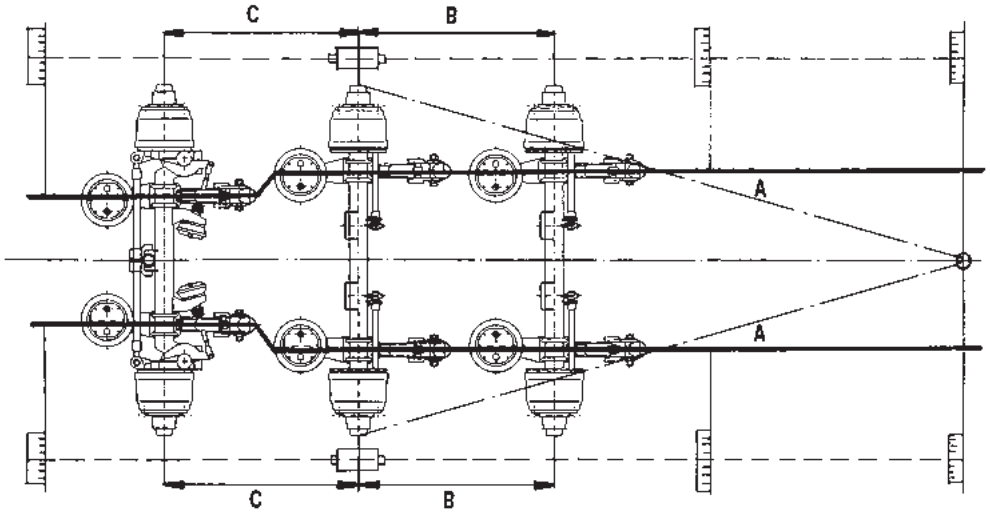




Functional suspension arm

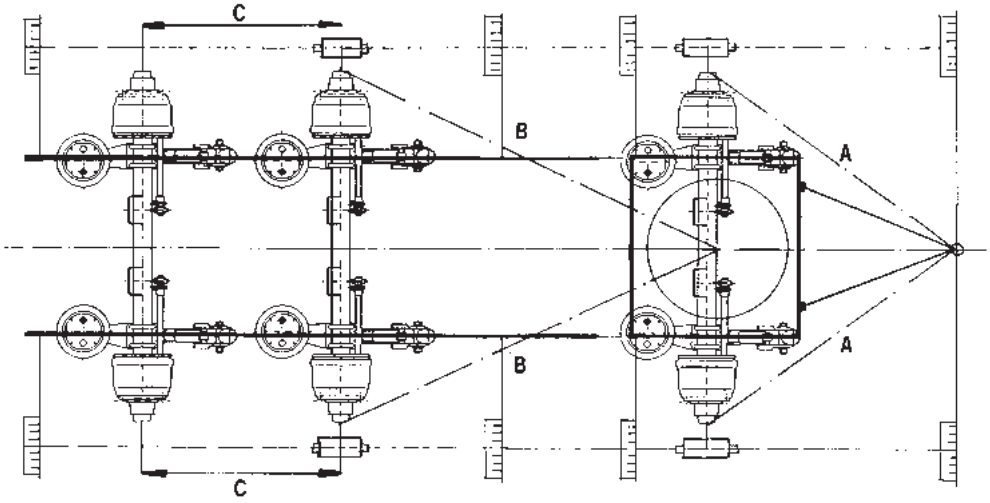
Ref. No.: 0 378 0028 00 A

For axle alignment, the air suspension must be adjusted to the ride height specified by SAF.



Semi-trailers with self steering axle
Distance A, B, C max. permissible deviation 1.0 mm
Toe setting ± 12' = ± 3.0 mm/m Camber ± 12'
Values apply to unloaded vehicle.
Air suspension must be in Ride Height for axle alignment check and re-adjustment works.

In the case of self steering axles the stabilizing chambers must be pressurised to 2.0 bar.
Total toe-in 4.0 mm/m.



Trailer
Distance A, B, C max. permissible deviation 1.0 mm
Toe setting ± 12' = ± 3.0 mm/m Camber ± 12'
Values apply to unloaded vehicle.
Air suspension must be in Ride Height for axle alignment check and re-adjustment works.

The max. permissible deviation values for axle aligment are according to the tyre manufacture specifications.
To avoid excessive tyre wear we recommend having the alignment checked at regular intervals.
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.

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SAF Bolt / Nut torque values

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