

New Zealand Maintenance & Repair Manual

SAF disc brake axles with WABCO brake
caliper for Dual Wheeled Axles

ZI9-19W Intradisc INTEGRAL

SK RZ 9019 W Intradisc



This manual supersedes all previous information or publications
referring to SAF Dual Wheel disc brake axles. 12 March 2014

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The item numbers indicated are given only for identification and to distinguish between different versions.
 Use the part numbers from the valid spare parts documents for identification of spare parts.
 SAF axles and suspension units are subject to continuous further development; the data and drawings
 contained in the manual may therefore differ from the details given in the operating permit.
 The contents of the manual does not constitute the basis for a legal claim.

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-HOLLAND will void the axle or suspension warranty.

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

This manual does not cover all specifications manufactured by SAF-HOLLAND. 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-HOLLAND neither accepts responsibility for any omissions or errors that may appear, nor 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 permitted to install, operate, maintain or repair brakes, axles and suspension components.

Notes, Cautions and Warnings

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. You must read and understand all of the safety procedures presented in this manual before starting any work on the suspension/axle.

Throughout this manual, you will notice the terms "NOTE", "IMPORTANT", "CAUTION", and "WARNING" followed by important product information. So that you may better understand the manual, those terms are as follows:

⚠ WARNING Failure to follow the instructions and safety precautions in this manual can result in death or serious injury.

Proper tools must be used to perform the maintenance and repair procedures described in this manual. Many of these procedures require special tools.

NOTE: Includes additional information to enable accurate and easy performance of procedures.

IMPORTANT: Includes additional information that if not followed could lead to hindered product performance.

CAUTION Used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, may result in property damage.

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

General Safety Instructions

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠ WARNING Failure to properly support the vehicle and axles prior to commencing work could create a crush hazard which, if not avoided, could result in serious injury or death.

NOTE: Several maintenance procedures in this manual require pre-positioning of the brake chamber, brake calipers and/or ABS system. Consult the manufacturer's manual for procedures on the proper operation of brake chamber, brake calipers and/or ABS system.

IMPORTANT: Key components on each axle's braking system, including brake pads and brake discs, are intended to wear over time. Worn parts should be replaced in sets on both the driver and curb side of an axle.

⚠ WARNING Failure to follow manufacturer's instructions regarding spring pressure or air pressure control may allow uncontrolled release of energy which, if not avoided, could result in serious injury or death.

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

1. The rim contact surfaces between the rim and hub must not be additionally painted. The contact surfaces must be clean, smooth and free from grease.

⚠ WARNING Failure to keep rim and hub contact surfaces clean and clear of foreign material could allow rim/hub separations which, if not avoided, could result in serious injury or death.

2. Only the rim and tyre sizes approved by the trailer builder may be used.
3. Before operating vehicle, ensure that the maximum permissible axle load is not exceeded and that the load is distributed equally and uniformly.

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

⚠ WARNING Failure to minimize the use of brakes during overheating conditions could result in deterioration of brake efficiency which could result in serious injury or death.

5. The parking brake must not be immediately applied when the brakes are overheated, as the brake discs may be damaged by different stress fields during cooling.
6. Observe the operating recommendation of the trailer builder for off-road operation of the installed axles.
7. SAF axles require routine service, inspection and maintenance in order to maintain optimum performance, operational and road safety and to be able to recognize natural wear and defects before they become serious. Refer to the Routine Service Schedule in Section 12.

Only use SAF-HOLLAND Original Parts for all service and maintenance work.

Type plate location

The axle type designation (Version), identification number and serial number (Figure 1) are required for the warranty procedure.

Intra suspension

Type plate location is on the LH trailing arm vertical wall just below the air bag (**Figure 2**).

MODUL suspension

Type plate location is in the middle of the axle tube (**Figure 3**).

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 (**Figure 4**).

Figure 1

SAF-HOLLAND GMBH D-63856 BESENBACH • GERMANY		
Version	ZI9-19W	Serial No. 11 09 156 0020
Type	SBW1937-10Z	Ident No. 347 96 21 7 49 01
Test Report	36110303	Perm. axle cap. stat. 9000 kg
Made in Germany		V max. 105 km/h
		
AN 3335528		SN 11091560020

Figure 2



Figure 3

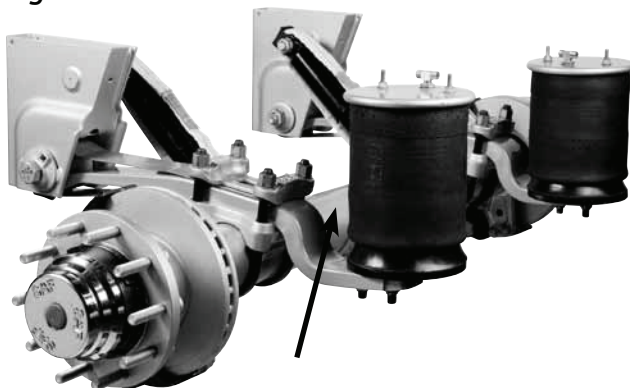



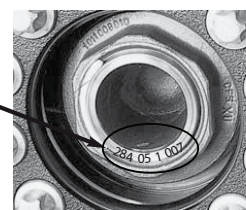


Figure 4

SAF-HOLLAND GMBH D-63856 BESENBACH • GERMANY		
Version	ZI9-19W	Serial No. 284 05 1 007
Type	SBW1937-10Z	Ident No. 147 84 60 2 58 0
Test Report	TDB0381	Perm axle cap. stat. 9000 kg
		V max. 105 km/h
		
AN 1754524		SN 284051007



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 "ZI9-19W" 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.)

Axle serial number code (up to July 2009)

The serial number looks like this:

DDYYXNNN

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

Type plate up to mid-2004

Type plate from mid-2004

Type plate from July 2009

SAF Intradisc axle suspension assemblies are covered with conditional Warranties for up to 1,000,000 km or 5 years on sealed road application only and 500,000 km or 3 years off-road application.

Specifics of the SAF Intradisc warranty for normal Road operation are:

1. Shock absorber 1,000,000 km or 5 years on sealed road application
- 1a. Shock absorber 500,000 km or 3 years on off-road application
2. Wheel Bearings 1,000,000 km or 5 years on sealed road application
- 2a. Wheel bearings 500,000 km or 3 years on off-road application
3. Pivot Bush 1,000,000 km or 5 years on sealed road application
- 3a. Pivot Bush 500,000 km or 3 years on off-road application
4. Brake Caliper 2 years against Manufacturing fault
5. Disc Rotor 2 years' unlimited mileage, Manufacturing failure only
6. All other parts (including Airbags) 1 year 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 were outside recommendation (± 2 PSI).

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 the warranty.

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

Hubodometer or certified electronic distance recording device must be fitted to each trailer to ensure warranty is valid. If not fitted the warranty is null and void. Records will be compared to inspection and preventative manual to ensure accuracy.

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

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

In order to be able to handle customers' complaints quickly and thoroughly, SAF-HOLLAND has simplified its warranty processing system. In order for you to be able to utilize this service when necessary, we would ask you to observe the following information:

- The first contact for a warranty claim should where ever possible be the vehicle builder. If this is not possible, then any of the SAF service network Agents within New Zealand can handle the repairs for you.
- For repairs under the warranty, we insist on the use of original SAF spare parts. The original SAF spare parts for repairs under the SAF-HOLLAND warranty must be purchased directly from SAF-HOLLAND service partners in New Zealand.
- For work associated with repairs under warranty, only spare parts costs for original SAF spare parts will be acknowledged and refunded.
- For repairs under the SAF-HOLLAND warranty, country-specific workshop hourly rates in conjunction with the currently valid reference times for the performance of work associated with repairs under the warranty apply throughout New Zealand. No further labour or material costs beyond these figures will be refunded.
- All costs refunded in conjunction with complaints under the warranty will be made through credits for original SAF spare parts.
- For service and repair work outside repairs under the warranty, SAF-HOLLAND recommends the use of original SAF spare parts.
- In the event of a complaint, always complete first the SAF Service Report (template available on website www.transpecs.co.nz) and a copy follows. The service report must be submitted to Transpecs on the same day as the trailer is brought into the workshop - in exceptional cases on the next working day, at the latest.
- Complete the SAF Service Report carefully and completely (vital data here is the data on the axle type plate or stub axle and in particular the Serial No. and Ident. No.).
- Details of wear dimensions of the individual brake pads in mm are important for assessing the damage: Please do not forget the necessary information on the towing vehicle.
- Please always submit complaints in a complete and as detailed a form as possible and supply photographs as required.
- Send the completed SAF Service Report and photographs of the damage to Transpecs; if necessary, also make contact by telephone.
- Costs and invoices incurred will be required by Transpecs.
- Do not send in damaged parts to Transpecs unless requested to do so.
- Please always indicate the exact address, contact person and telephone number of the company where the damaged parts are and where the repair is taking place.
- Where appropriate, mark the damaged parts according to their installation location.

For any warranty issues, please consult with the Transpecs Warranty Co-ordinator:

Direct Phone: 09 980 7311
Reception: 09 980 7300
Website: www.transpecs.co.nz

Service Report

Transport Specialties Ltd, Cnr Kerrs & Ash Rds, Wiri.
PO Box 98 971, Manukau City 2241. 09-980-7300



*Date: ____ / ____ / ____

Reference No. RS

*Fault: _____

*Cause: _____

*Rectification: _____

*Part(s) Required: _____

Order No for Parts

* _____

*Garage/Repairer: _____

*Contact: _____ *Tel: _____

*Trailer Owner: _____

*Contact: _____ *Tel: _____

*Vehicle Manufacturer : _____

*Registration No. : _____

*Chassis No. : _____

*Total Mileage: _____








*Date of Registration : _____

*Date Parts fitted: _____

Date of Repair : ____ / ____ /20

VOR YES ☐ NO ☐

Tick appropriate box*:

Vehicle type			Position on vehicle			Body type			
	<input type="checkbox"/>			Left	Right	Front "B"		Rear 'B'	EBS: Yes <input type="checkbox"/> No <input type="checkbox"/>
	<input type="checkbox"/>		1 st Axle			Tipper		Tanker	Trailer: Yes <input type="checkbox"/> No <input type="checkbox"/>
	<input type="checkbox"/>		2 nd Axle			Stock		Low Loader	Truck: Yes <input type="checkbox"/> No <input type="checkbox"/>
	<input type="checkbox"/>		3 rd Axle			Flatdeck		Curtainsider	EBS down load: Yes <input type="checkbox"/> No <input type="checkbox"/>
Other	<input type="checkbox"/>		4 th Axle			Container		Logger	Date of last brake compatibility
	<input type="checkbox"/>		5 th Axle						test: ____ / ____ /20

Important:

Stage One: All items/boxes marked * must be completed in full and returned to Transpecs before any replacement parts can be dispatched.

Stage Two: Pro Forma invoice, completed documentation, photos, with a completed copy of this Report, to be returned to Transpecs within 5 days of the date of repair.

Stage Three: All replaced parts subject to this claim required to be returned to Transpecs within 7 days.

Failure to submit all the required information and parts will result in an invoice being raised to cover costs of replacement parts, labour, transportation and/or any other costs involved.

Fax Back To Transpecs 09-980-7348*

Service Report

Transport Specialties Ltd, Cnr Kerrs & Ash Rds, Wiri.
PO Box 98 971, Manukau City 2241. 09-980-7300



Reference No. RS

Axle Model : _____

Disc : ☐

Drum : ☐

***Ride Height :** _____ mm

***Suspension Type :**

Intradisc : ☐

Modular : ☐

Mechanical : ☐

Other : ☐

Axle Serial No.

Hub - Wheel Rock Test

**Axle - Spindle Damage
Tolerance Measurement**

L

R

L

R

***1st Axle:** _____

mm

mm

mm

mm

*** 2nd Axle:** _____

mm

mm

mm

mm

*** 3rd Axle:** _____

mm

mm

mm

mm

*** 4th Axle:** _____

mm

mm

mm

mm

*** 5th Axle:** _____

mm

mm

mm

mm

**Hub - Grease Escape Test
(Within SAF Tolerances)**

L

R

Y

N

Y

N

***1st Axle:**

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

<input type="checkbox"/>	<input type="checkbox"/>
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*** 2nd Axle:**

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<input type="checkbox"/>	<input type="checkbox"/>
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*** 3rd Axle:**

<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

*** 4th Axle:**

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

*** 5th Axle:**

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

**Wheel Bearing Noise Test
(Rough/Grinding)**

L

R

Y

N

Y

N

<input type="checkbox"/>	<input type="checkbox"/>
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[Transpecs Office to fill out](#)

Warranty Approval Number: _____ **Signed:** _____ **Date:** _____

Important:

Stage One: All items/boxes marked * must be completed in full and returned to Transpecs before any replacement parts can be dispatched.

Stage Two: Pro Forma invoice, completed documentation, photos, with a completed copy of this Report, to be returned to Transpecs within 5 days of the date of repair.

Stage Three: All replaced parts subject to this claim required to be returned to Transpecs within 7 days.

Failure to submit all the required information and parts will result in an invoice being raised to cover costs of replacement parts, labour, transportation and/or any other costs involved.

Fax Back To Transpecs 09-980-7348*

1. Instructions and tips for vehicle operations

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

Furthermore, ensure that

- 1.1 the disc brake is not overheated due to continuous braking action as 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 each other.
- 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 / drums.
- 1.4 the maximum permissible axle loads and speeds are not exceeded.
- 1.5 the cargo is evenly distributed over the loading area and safely secured
- 1.6 on vehicles with air suspension, the air bags are always fully inflated before moving the vehicle.
- 1.7 the prescribed wheel rims and tyre sizes are employed.
- 1.8 the location and securing of the wheels is correctly maintained. Do not repaint the contact faces on either the wheels or hubs. On the contact surface of the wheel the maximum permissible coating thickness of 50 µm (primer plus paint) must not be exceeded. All attachment faces must be clean with plain smooth surfaces free from any contamination of dirt, rust, grease, excessive paint and damage. In general refer to the wheel manufacturers recommendations, or consult your trailer builder for any wheel mounting details.
- 1.9 the tyres are inflated to the prescribed inflation pressure.
- 1.10 your driving style is matched to the road and weather conditions.
- 1.11 chassis support legs are used when loading/unloading construction machinery.
- 1.12 the use of auxiliary trailer braking facilities (trailer under run brake) is not permitted.

2. Vehicle safety

- 2.1 The daily check of the vehicle for road safety before moving the vehicle 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, observing the specifications in the vehicle operating manual, vehicle inspection intervals and the regular maintenance intervals is the responsibility of the vehicle owner.
- 2.4 We strongly recommend using only SAF-HOLLAND approved replacement and spare parts which are covered by SAF-HOLLAND product liability. These products have been thoroughly tested by SAF-HOLLAND for safety, functionality and suitability. Usage of these parts guarantees not only safety on the roads but satisfies the legal operational requirements. SAF-HOLLAND 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 SAF-HOLLAND approved spare parts have been utilized.
- 3.2 Warranty claims must be reported to Transpecs prior to starting the work.
- 3.3 The warranty period is as stated on page 5 after the vehicle registration date.

4. Service and spare parts

The service network of SAF-HOLLAND 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 using 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. The content of this manual does not constitute a basis for a legal claim. Reprinting, reproduction or translation in whole or in part of this manual is not permitted. This manual supercedes all earlier maintenance and repair manuals.

General Service / Maintenance

CAUTION

After every wheel change, always retighten the wheel nuts to the prescribed torque after 50 km and again after 150 km.

1. Carry out regular visual checks of the brakes, tyres and all chassis components. Refer to detailed explanation in related section of this manual for more information:
 - a. Inspect for secure mounting, wear, leaks, corrosion and damage.
 - b. Check for loose, broken or cracked air hoses, air system leaks, and damaged components.
 - c. Check that brake hoses and cables are properly secured.
 - d. For proper brake pad wear, check that there is enough clearance to allow the caliper full movement during normal operation.
2. Check the brake pads at regular service intervals to ensure that the brake pad hold down springs are in the correct position, and that brake pads are not worn beyond the minimum wear limits described in this manual.
3. When replacing brake pads, inspect the rotors for signs of wear, cracks, grooves, scoring or hot spots.
4. Visually check the brake caliper at regular service intervals as defined by the brake caliper manufacturer's 'Basic Inspection Program'. Refer to detailed explanation in related section of this manual for more information.
5. Check the spring brake chambers to be sure the parking springs are not caged in the released position. Be sure the dust plugs are properly installed.
6. Make sure that the vent holes in the air brake chamber are not covered with mud, dirt, etc.
7. Inspect the wheel bearing unit for grease leaks at every brake pad change.
8. Visually check the brake assembly (eg. pads, rotor, etc.) for oil or grease contamination.
9. Check that all dust caps and boots are present and in good condition.
10. Regularly carry out general safety checks in accordance with any applicable laws.

CAUTION

Failure to retighten wheel nuts at specified intervals may result in component failure which, if not avoided may result in damage to property.

We only recommend the use of only SAF-HOLLAND Original Parts.

Special notes

Storage instructions

During storage outdoors, ensure that moisture cannot enter the inside of the brake caliper 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.

Brake cylinders

Only brake cylinders approved by the brake or axle manufacturer may be 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 5000 km service, and then every 12 months thereafter. Maximum lead to trailer must not exceed 0.14 bar (2 psi). If the balance were outside of these values, there would be no warranty on parts or labour!

ZI9-19 W

SK RZ 9019W

with WABCO Disc Brake type PAN 19-1

			PERIODIC CHECK		
MAINTENANCE INTERVALS WHICHEVER COMES FIRST	DISTANCE INTERVALS>	AFTER FIRST 5,000 KM	EVERY 30,000KM	EVERY 60,000KM	EVERY 120,000KM
	TIME INTERVALS >	AFTER FIRST MONTH	EVERY 3 MONTHS	EVERY 6 MONTHS	EVERY 12 MONTHS

MECHANICAL CHECK

Attention: Torque check wheel nuts after the first 50km and 150km to recommended torque setting, also after any removal of the wheel.

VISUAL AND SAFETY INSPECTION

Hub unit. Remove hub caps check the security and condition of the cap and o-ring. Inspect the seal for lubricant loss and the hub nut for security. Rotate the hub and check for bearing noise and inspect the bearings for free play (max 0.20mm).	•	•		
Inspect all the condition of components and any fasteners for security, tighten accordingly. Pay special attention to the shock absorber and pivot bolts and wheel nuts.	•	•		
Check the caliper dust covers for damage; ensure the adjuster and slide pins caps are correctly fitted and the lower drainage hole plug is removed from the brake chambers.	•	•		
Inspect the brake pad thickness at regular intervals (eg. whenever tyre pressure is checked) but at least every 3 months.		•		
Ensure the calipers slide freely; inspect the brake disc rotors for cracks. Blow out any dust and debris from the ventilation slots and around the caliper area.		•		
On aluminium hanger brackets inspect the pivot-bush assembly bolts and shock absorber bolts with the recommended torque setting.	•		•	
Inspect suspension for correct ride-height setting, readjust if required.	•		•	
Perform General Annual Inspection- (Brake components for condition, security and operation. Air suspension system for security and operation, Torque check pivot bolts, shock absorber bolts and hub nuts, etc).	•			•
Perform general annual safety check [tractor/(semi) trailer brake compatibility balance, ABS, etc.]	•			•

SPECIAL SERVICE CONDITIONS

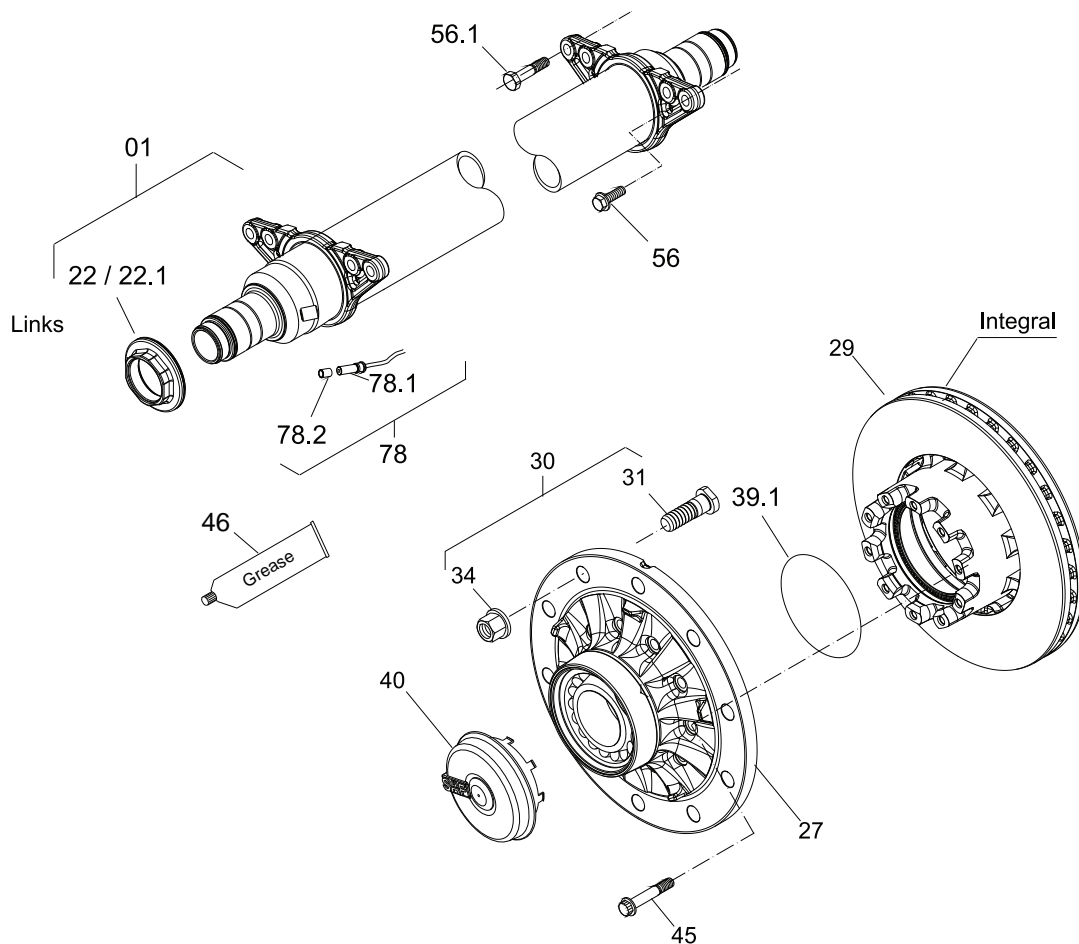
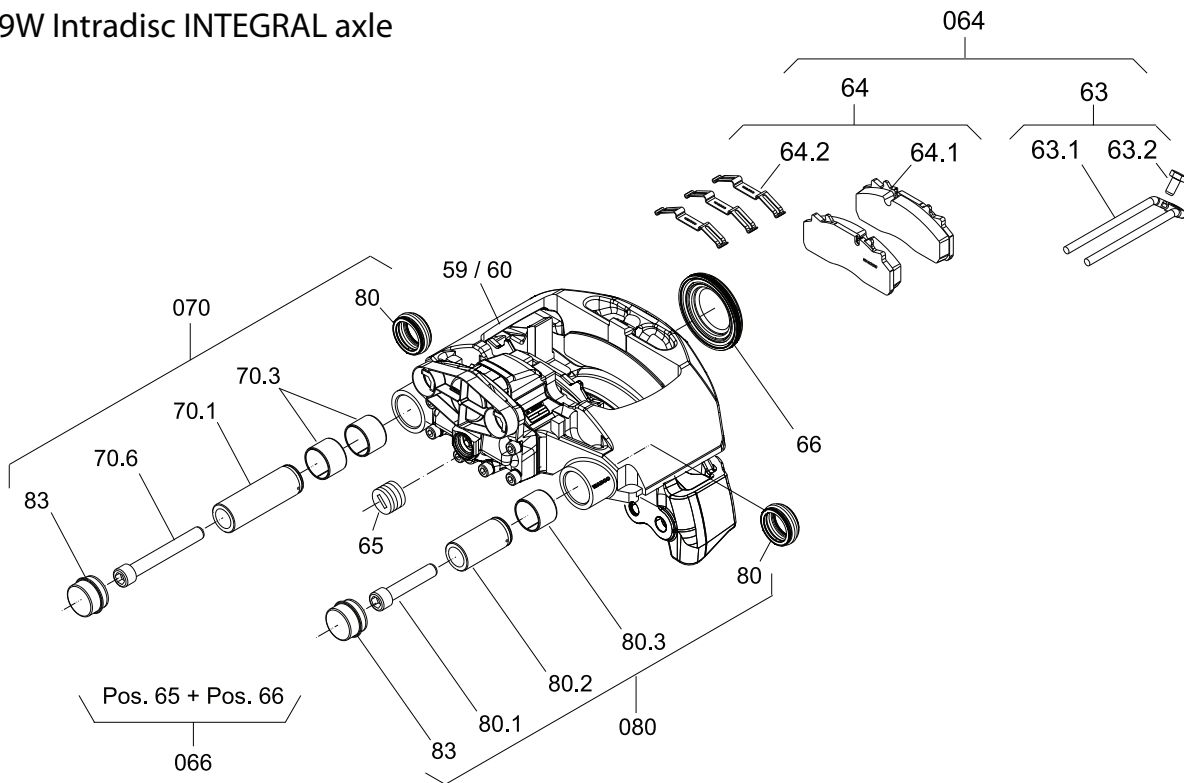
Vehicles with long standing periods	Service at specified intervals
Vehicles used under extreme conditions	Service at suitably reduced intervals e.g by ½, for trailers operating in multi- shifts, construction site or off road operations.

Warranty claims will only be accepted as long as the operating and maintenance instructions have been completed and Genuine SAF-Holland spare parts have been fitted.

For detailed information on the brake caliper maintenance please refer to the WABCO manual – Assembly and Maintenance Instructions for the Type PAN19-1 plus sliding disc brake caliper, which can be found in INFORM at www.wabco-auto.com or on the Transpecs web site at http://www.transpecs.co.nz/products/running_gear/running_gear_technical

For Hub Re-Lubrication Please Refer to Appendix 1.

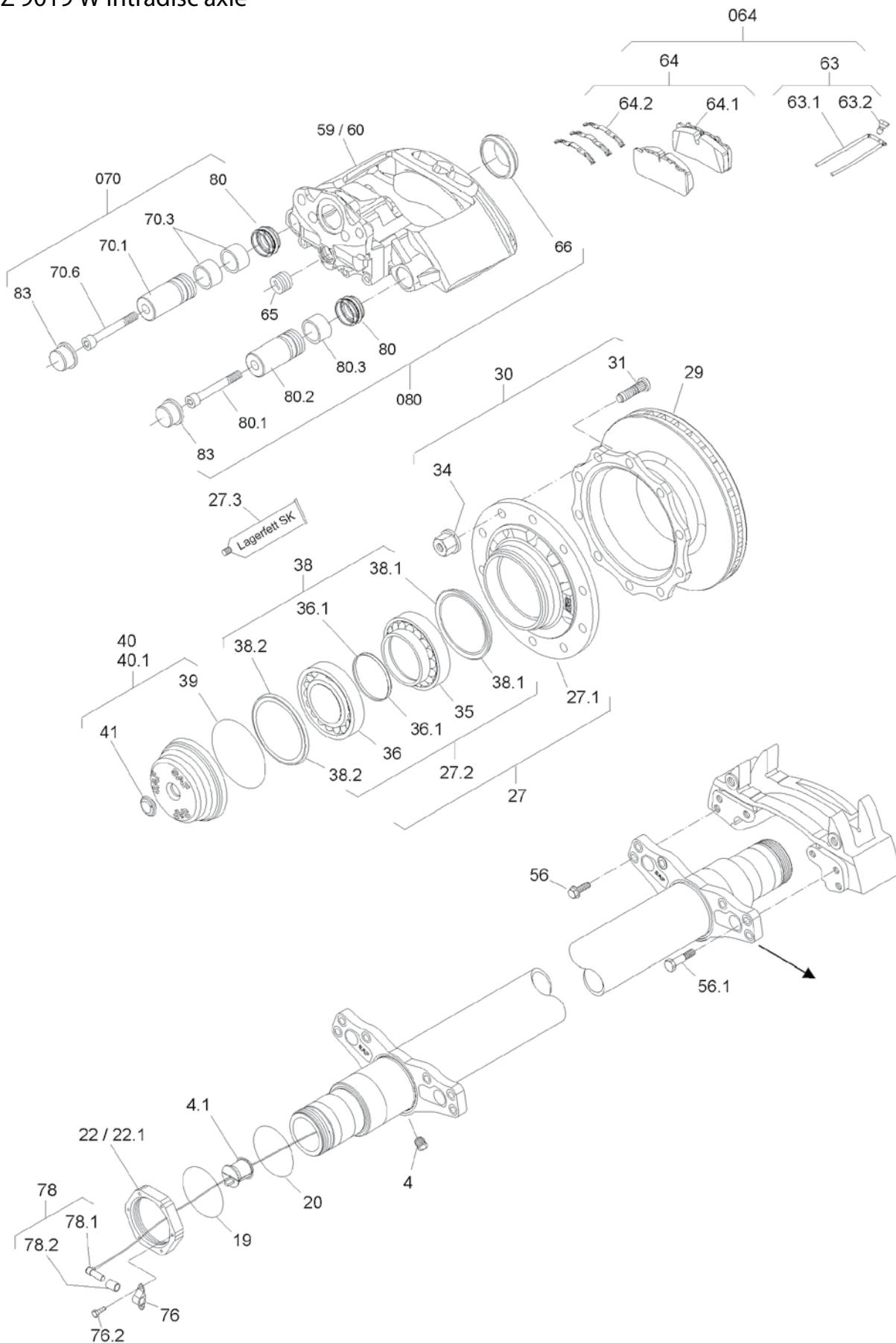
ZI9-19W Intradisc INTEGRAL axle



IPL_17_300_0

ITEM	PART NO.	DESCRIPTION	QTY
1	See type plate	Axle beam assembly (See Ident. No. on the type plate)	1
22	1 011 0086 01	Axle nut RH - M75x1.5/SW85 (without groove)	1
22.1	1 011 0085 01	Axle nut LH - M75x1.5/SW85 (with groove)	1
27	3 307 3049 00	Hub unit - INTEGRAL - 10x285.75PCD	2
27	3 307 3048 00	Hub unit - INTEGRAL - 8x275PCD - Dual Aluminium Wheels	2
27	3 307 3051 00	Hub unit - INTEGRAL - 8x275PCD - Dual Steel Wheels	2
27	3 307 3055 00	Hub unit - INTEGRAL - 10x335PCD	2
29	4 079 0016 00	Brake disc (INTEGRAL rotor) - Dual steel/alloy wheels - 10x285.75PCD	2
31	1 303 1128 10	Wheel stud - M22x1.5x103 - Dual steel/alloy wheels	16/20
34	24738/ISO	Wheel nut M22x1.5x27 - SW32	16/20
34	B5781/32USA	Wheel nut M22x1.5x27 - SW32 - Dual alloy sleeved	16/20
34	24738/33	Wheel nut M22x1.5x27 - SW33	16/20
39.1	4 315 0075 00	O-Ring	1
40	4 304 0102 00	Hub cap - Black Plastic	2
40	4 304 0105 00	Hub cap - Chrome	2
40.2	4 304 0103 00	Hub cap for hubodometer - Black Plastic	2
40.2	3 304 0106 00	Hub cap for hubodometer - Chrome	2
45	3 434 3663 00	Hub/rotor bolt kit - ONE HUB ONLY	2
46	5 387 0015 03	Axle spindle grease (5gr)	2
56	3 434 3660 00	Caliper bolt kit - ONE CALIPER	6
56.1	See 56	Centering bolt M18 - Part of 3 434 3660 00 Kit	2
59	3 080 0072 00	Brake caliper assy, WABCO RH	1
60	3 080 0071 00	Brake caliper assy, WABCO LH	1
064	3 057 0080 00	Brake pad kit (incl. 63, 64.1, 64.2 & 65)	1
066	3 434 3829 00	Repair-kit (incl. 65 & 66)	2
070	3 434 3827 01	Guide pin kit (incl. 65, 66, 70.1 - 70.6 & 080)	2
78	3 029 0242 00	Sensor and clamping sleeve kit	2
TOOLS			
	4 434 3828 00	Hub nut socket (SW85mm)	1
	4 434 3822 00	Universal hub puller	1
	3 434 3328 00	SAF universal toolbox (Wabco & Knorr calipers)	1
	3 434 3327 00	SAF ratchet wrench	1
	3 434 3326 00	3D bush replacement tool	1
	4 387 0015 06	Anti-Fret paste or a nickel based anti-seize 77164	1

SK RZ 9019 W Intradisc axle



ITEM	PART NO.	DESCRIPTION	QTY
4	4 337 2028 00	Protection plug - for ABS sensor	2
4.1	4 337 2029 00	Spindle plug	2
19	4 315 0052 00	O-Ring Φ 116x3	2
20	4 315 0056 00	O-Ring Φ 110x2	2
22	1 011 0070 01	Axle nut RH - M120x2 - Socket 140mm	1
22.1	1 011 0071 01	Axle nut LH - M120x2 - Socket 140mm	1
27	3 307 3025 01	Hub Assy - Dual Steel Wheels - 8 x 275PCD	2
27	3 307 3026 00	Hub Assy - Dual Alloy Wheels - 8x275PCD	2
27	3 307 3033 00	Hub Assy - Dual Alloy Wheels - 10x285PCD	2
27.2	3 434 3012 00	Bearing kit - Incl. pos.20, 27.3, 35, 36, 36.1 & 38	2
27.3	5 387 0011 05	Bearing grease	2
29	4 079 0004 00	Brake disk (rotor) - Dual steel only wheels - 8x275PCD	2
29	4 079 0014 01	Brake disk (rotor) - Dual steel/alloy wheels - 8x275PCD - 27mm Hole	2
29	4 079 0012 01	Brake disc (rotor) - Dual steel/alloy wheels - 10x285.75PCD	2
31	1 303 1075 11	Wheel bolt - 93mm for dual steel wheels	16/20
31	1 303 1112 10	Wheel bolt - 112mm for dual steel/alloy wheels - used with spacer 1 095 1057 00	16/20
31	1 095 1057 00	Wheel bolt spacer - (used with 1 303 112 10 stud)	16/20
31	1 303 1125 10	Wheel bolt - 112mm for dual steel/alloy wheels - stepped shoulder	16/20
34	4 247 3012 01	Wheel nut - 27mm long - socket 32mm	16/20
34	33272215	Wheel nut - 27mm long - socket 33mm	16/20
38	3 434 3014 01	Hub seal kit - Incl. pos.20, 27.3, 36.1,38.1 & 38.2	1
38.1	4 373 0043 01	Hub Seal - inner	2
38.2	4 373 0044 01	Hub Seal - outer	2
39	4 315 0054 00	Hub Cup O-Ring Φ 182x4	2
40	3 304 0092 00	Hub Cap Assy - Incl. Pos. 39-41	2
40	3 304 1092 00	Chrome Hub Cap Assy - Incl. Pos. 39-41	2
41	4 337 2026 00	Protection plug	2
na	1 094 0037 00	Hubo Mount Washer	1
56	4 343 2914 10	Caliper Mount Bolt - M16 with collar	10
56.1	4 375 1004 10	Caliper Centering Bolt - M16	2
59	3 080 0032 00	Wabco Brake Caliper Assy - RH	1
60	3 080 0033 00	Wabco Brake Caliper Assy - LH	1
064	3 057 0080 00	Brake lining kit - Incl. Pos. 63, 64.1, 64.2 & 65	1
70	3 434 3827 01	Guide pin kit - Incl. Pos. 65, 66, 70.1-70.6 & 080	2
76	4 189 0051 00	ABS Sensor Mount Bracket	2
76.2	4 343 2067 00	Self-tapping bolt - M6x12	4
78	4 029 1042 00	Sensor	2
78.2	4 029 1013 00	Sensor clamping sleeve	2
	5 387 0021 01	Spindle Paste	9
TOOLS			
	1 434 1041 00	Lever for hub cap	1
	1 012 0024 00	Hub nut socket - 140mm	1
	4 434 3822 00	Wheel hub puller	1
	3 434 3328 00	SAF universal toolbox (Wabco & Knorr calipers)	1
	3 434 3326 00	3-D bush replacement tool	1
	4 387 0015 06	SAF fitting paste (to be applied on spindles)	1
	3 434 3327 00	SAF ratchet wrench	1

Disc Brake / Hub Unit Inspection

IMPORTANT: During removal inspect components for wear and replace worn components.

⚠ WARNING Failure to properly support axle during maintenance may allow axle to fall which, if not avoided, could result in death or serious injury.

Pad Wear Inspection

Check the brake pads for proper thickness at regular service intervals based on vehicle usage. Brake pad inspections should be carried out at least every 3 months and in accordance with any legal requirements. Refer to the service schedule shown in this document.

NOTE: Severe duty applications may require more frequent regular service intervals.

A quick visual inspection of the condition of the brake pads can be performed without removing the wheel:

Replace pads when distance on long guide pin is exceeding 97 mm or on short guide pin exceeding 70 mm. **(Figure 5)**

IMPORTANT: After inspecting the brake pads, check that the brake system is functioning properly.

IMPORTANT: When replacing worn brake pads, all pads on the axle must be replaced.

If the thickness of the brake pad is less than 11 mm at its thinnest area, the brake pad must be replaced.

NOTE: Minor breakouts at the edges are permitted; major breakouts on the surface of the brake pad are not permitted **(Figure 6)**.

Figure 5

Wear limit
 Long guide pin > 97 mm
 Short guide pin > 70 mm

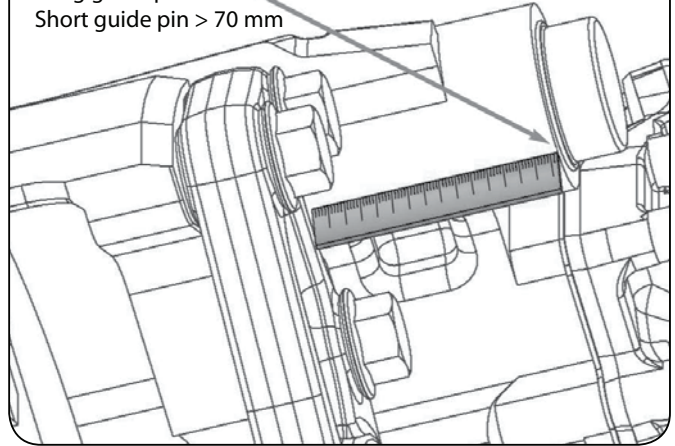
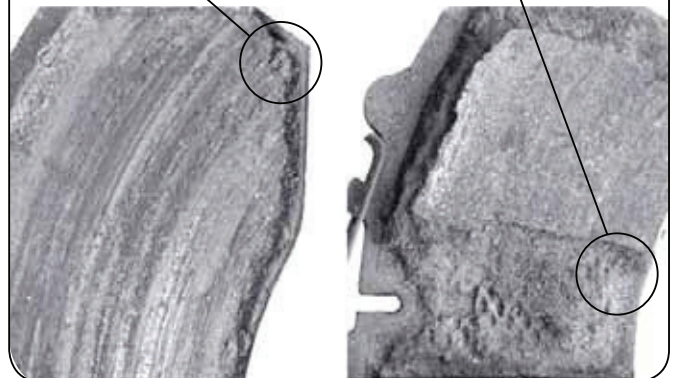


Figure 6

PERMITTED

NOT PERMITTED



Rotor Wear Inspection

1. Carefully inspect both sides of the brake rotor friction surface (**Figure 7**).
 - a. Spider web cracking is acceptable (**Area A**).
 - b. Cracks that run from the outer edge to the hub center are acceptable only if they are less than 1.5mm deep or wide and their length is less than 75% of the width of the rotor friction surface (**Area B**).
 - c. Grooves in the rotor surface are acceptable only if they are less than 1.5mm deep (**Area C**).
 - d. Cracks that run completely from the outer edge to the hub center are not acceptable, regardless of depth (**Area D**).
2. Measure the brake rotor thickness and resurface if necessary. For proper brake function, the minimum thickness for resurfacing the brake rotor is defined as 39 - 40mm.

⚠ WARNING Resurfacing the brake rotor beyond the minimum thickness may cause component failure which, if not avoided, may result in death or serious injury.

IMPORTANT: Do not use high-pressure cleaners or liquid cleaners on the brake rotor.

If the overall wear limits for the brake rotor and brake pads are exceeded (**Figure 8**), the rotor/pads must be replaced (See pad change/rotor change instructions as detailed in this manual).

For both the inner and outer pads, the maximum brake pad wear difference is 4.0 mm.

BRAKE ROTOR			BRAKE PAD	
DIAMETER (mm)	"A" NEW (mm)	"B" MAX. WEAR LIMIT (mm)	"C" NEW (mm)	"D" MAX. WEAR LIMIT (mm)
370	45	37.0	30	11.0

⚠ WARNING Failure to replace brake rotor/pads when minimum wear limits are reached may cause component failure which, if not avoided, may result in death or serious injury.

NOTE: When replacing the brake pads or brake rotor, use only Original SAF-HOLLAND rotors and approved brake pads.

IMPORTANT: When replacing worn brake pads, all pads on the axle must be replaced.

NOTE: During brake repairs, carry out a visual inspection of the seals on the brake caliper. Refer to detailed explanation in related section of this manual for more information.

NOTE: Check the condition of rotor chamfer in case of uneven pad and rotor wear.

Figure 7

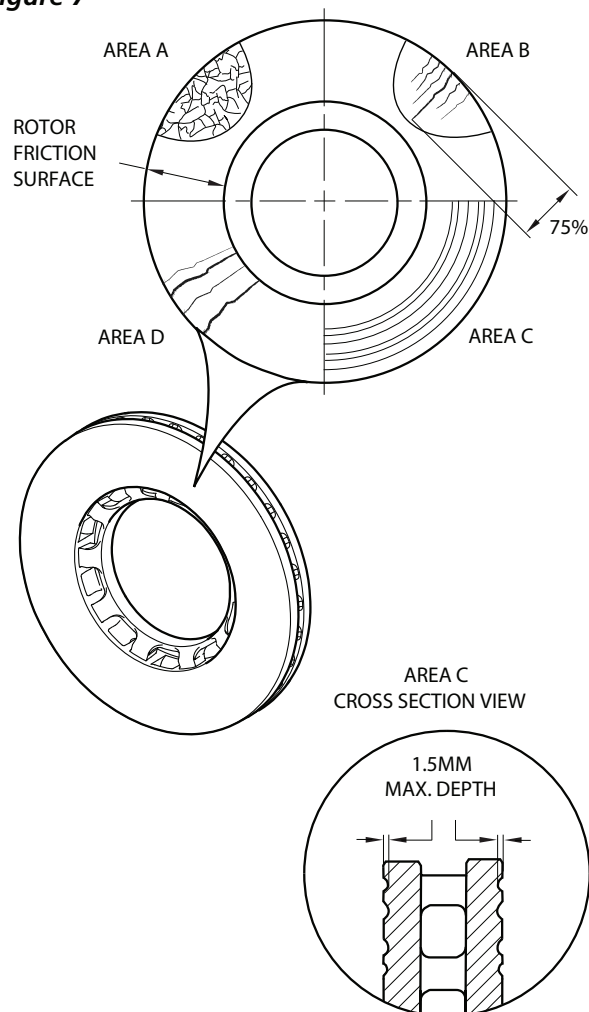
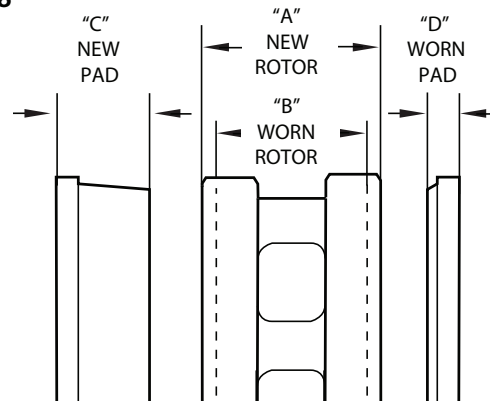


Figure 8



Hub Unit Inspection

The SAF-HOLLAND disc brake hub unit with compact bearing system is designed to be free from adjustment in service. If there is a malfunction with the hub unit, the hub unit compact bearing system must be replaced. The integrated compact bearing system is sealed and requires no additional grease or oil application to the bearing between relubrication services.

1. When changing brake pads / rotors or in the event of damage (e.g. brake overheating), inspect the bearing for signs of wear and grease leakage. Perform the Grease Leak Inspection, Wheel Rock Test and Wheel Bearing Noise Test as described in this manual.

⚠ WARNING Failure to replace bearing system or hub unit when required may cause component failure which, if not avoided, may result in death or serious injury.

2. Visually check the seal system to ensure that it is functioning properly and that there is minimal grease leakage refer to Hub Unit Grease Leak Inspection in this manual for more information.

NOTE: Adjustment of the compact bearing system is not necessary.

IMPORTANT: Do not use high-pressure cleaners or liquid cleaners on the hub unit.

IMPORTANT: The red dot in the middle of the SAF plastic hub cap is permanent. If you attempt to remove it, hub cap failure will result.

⚠ WARNING Failure to replace plastic hub cap when broken may cause component failure which, if not avoided, may result in death or serious injury.

Wheel Rock Test

1. Raise the wheel off the ground to allow for sufficient clearance to perform the test. Do not remove the wheel!
2. Carefully remove the hub cap.
3. Using a size 85 mm socket, check the torque of the axle nut to ensure that it is torqued to 900 Nm by rotating the nut in either a left- or right-handed direction, depending on the road or curb side of the axle.

NOTE: The SAF compact bearing system uses a single piece spindle nut which has a left-hand thread on the curb side of the axle and a right-hand thread on the road side of the axle. The axle nut with a left-handed thread can be identified by a circular groove (**Figure 15**). The left hand threaded axle spindle can be identified by a frontal groove on the end of the axle spindle.

4. Clean the surface of the axle nut, then attach the magnetic foot of the dial gauge to the surface of the nut and spindle, and place the pointer on the rim surface as shown (**Figure 9**).
5. Rock the wheel by first pulling at the top and pressing at the bottom, then pulling at the bottom and pressing at the top. While rocking/moving the wheel record the end play shown on the dial gauge.

NOTE: Rotate the wheel several times before each measurement.

NOTE: If a recorded wheel end play of more than 0.20 mm while applying 250 Nm of force is measured, the hub unit must be replaced or serviced.

Figure 9

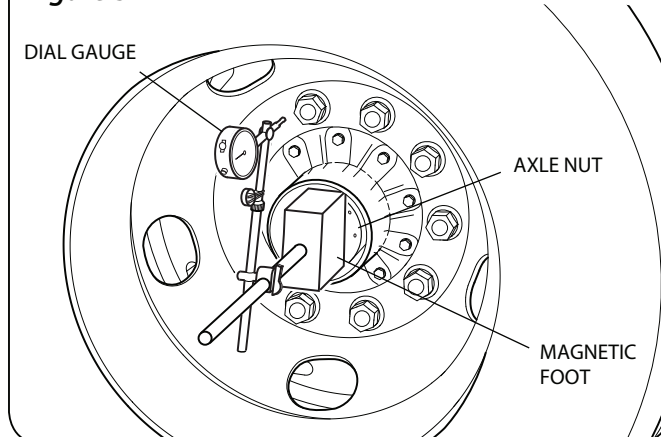
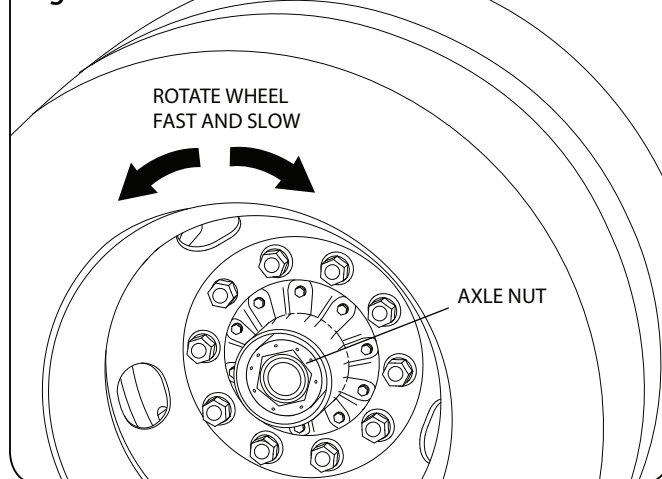


Figure 10



Wheel Bearing Noise Test

1. Raise the wheel off the ground to allow for sufficient clearance to perform the test. Do not remove the wheel!
2. Carefully remove the hub cap.
3. Using a size 85 mm socket, check the torque of the axle nut to ensure that it is torqued to 900 Nm.
4. Rotate the wheel in both forward and rearward directions, using varying speeds (**Figure 10**).
5. If the bearing feels rough and/or a "grinding" noise is heard, the hub must be replaced or serviced.

NOTE: Noises can also be caused by the brakes. Before removing the hub unit, remove the brake pads and repeat the bearing noise test.

Hub Unit Grease Leak Inspection

A hub unit grease leak inspection should be performed if more than half of the wheel flange is covered with grease.

1. Carefully remove the hub cap.
2. Inspect the grease levels inside of the wheel flange including the inside of the hub cap, the axle nut, axle tube spindle and hub seal.
 - a. If the hub seal is not completely covered with grease (**Figure 11**) the hub unit is ok and does not need to be replaced.
 - b. If the hub seal is completely covered with tar-like grease (**Figure 12**), the hub unit must be relubricated.

NOTE: There may be a small amount of grease on the lower edge of the hub seal. This is normal, and does not indicate grease leakage.

Figure 11



Figure 12



Disc Brake / Hub Unit Service

IMPORTANT: During removal inspect components for wear and replace worn components.

⚠ WARNING Failure to properly support axle during maintenance may allow axle to fall which, if not avoided, could result in death or serious injury.

⚠ CAUTION Do not hit steel parts with a steel hammer as parts could break, sending flying steel fragments in any direction creating a hazard which, if not avoided may result in minor to moderate injury.

NOTE: For certain service and repair work, some bolts must be replaced. All bolts must not be oiled or greased for installation. Tighten bolts with a torque wrench following the specified procedure and torque value (see Torque Chart as shown in this manual).

Proper tools must be used to perform the maintenance and repair procedures described in this manual. Many of these procedures require special tools.

Rotor Replacement - ZI9-19W INTEGRAL

⚠ WARNING Failure to observe these instructions may cause component failure which, if not avoided, may result in death or serious injury.

1. Remove the ABS sensor by following the instructions detailed in related section of this manual.
2. Remove the brake chamber from the brake caliper by loosening and removing the two mounting nuts (**Figure 13**).
3. Remove the brake caliper from the brake spider by using a size 24 mm socket to loosen all four brake caliper bolts (**Figure 14**).
4. Remove the plastic hub cap (**Figure 15**) using a hub cap puller at the reinforced undercut on the side of the cap.

IMPORTANT: The red dot in the middle of the SAF plastic hub cap is permanent and must not be removed.

5. Using a size 85 mm socket remove the axle spindle nut by rotating the nut in either a left- or right-handed direction, depending on the road or curb side of the axle.

Figure 13

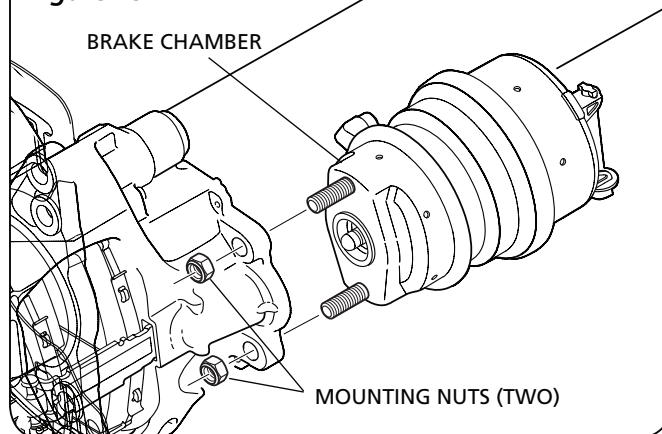


Figure 14

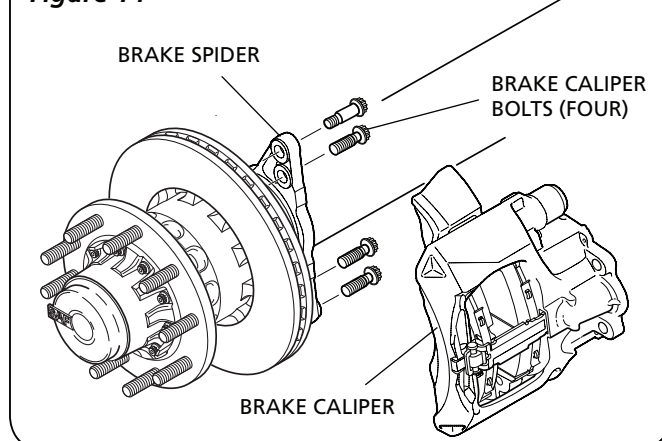
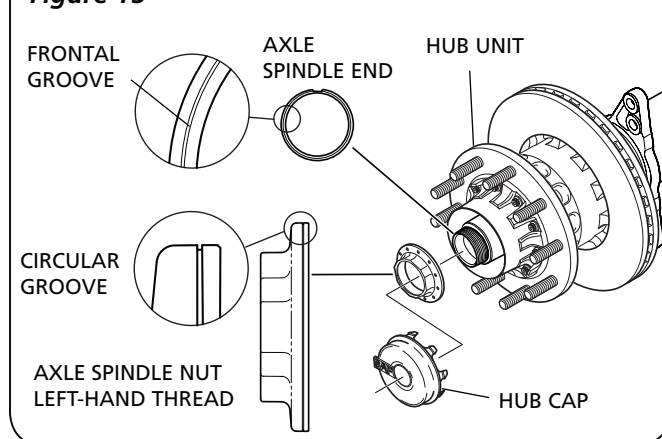


Figure 15



6. Remove the head unit by gently sliding it off the spindle. (**Figure 16**).
7. Remove the bearing o-ring seal from the hub unit and discard (**Figure 17**).

NOTE: The o-ring seal may be stuck to the bearing system or on the axle spindle.

8. Clean the hub unit bearing surface.
9. Remove the hub unit from the rotor by using a size 15mm socket to loosen and discard all ten connection bolts (**Figure 17**).
10. Clean the rotor contact surface on the hub unit. Using compressed air, clean the tapped holes in the disc unit. Check that the threads are in good working condition.
11. Re-install the hub unit to the rotor by using ten NEW SAF specific connection bolts. Use a torque wrench to pre-torque the bolts to 50 Nm. For final torque, tighten the bolts with an additional 120 degree turn using a criss-cross pattern (Refer to the Torque Chart shown in related section of this manual for more information).

IMPORTANT: When re-installing the hub unit and rotor, use only NEW SAF specific connection bolts. Bolts must be clean and free of oil and grease.

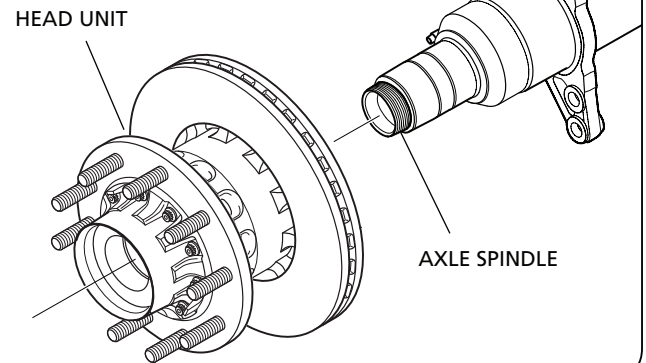
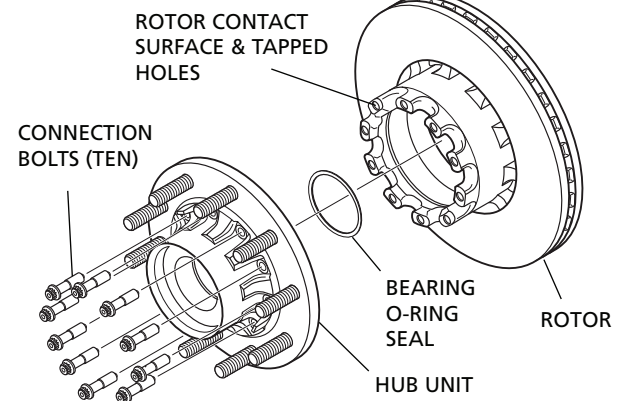
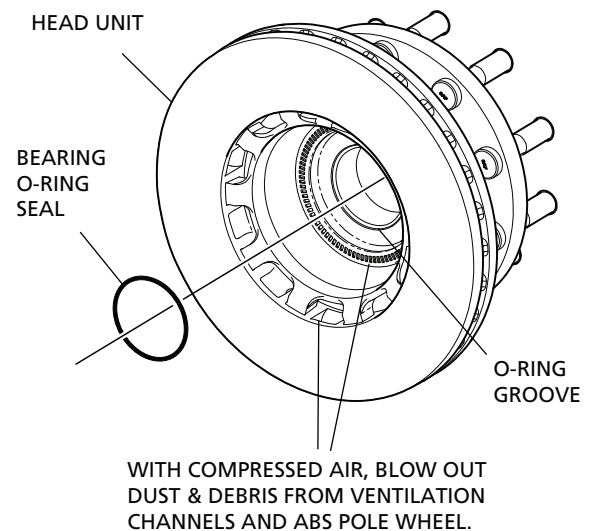
⚠ WARNING Failure to observe these instructions may cause component failure which, if not avoided, may result in death or serious injury.

12. Clean any grease residues from the axle spindle end and recoat the bearing journal with SAF-HOLLAND fitting paste. Do not grease or oil the spindle threads.

IMPORTANT: Do not use high-pressure cleaners or liquid cleaners on the spindle.

13. Insert a new bearing o-ring seal into the groove of the hub unit (**Figure 18**).
14. Re-install the head unit by gently sliding it on the spindle (**Figure 16**). During re-installation be sure the o-ring seal is in the proper position.

NB: A nickel based anti-seize paste such as Loctite 771 can be used in place of the standard anti fret paste on the spindles in harsh conditions.

Figure 16

Figure 17

Figure 18


15. Re-install the SAF specific axle spindle nut by rotating the nut onto the axle spindle in either a left or right-handed direction, depending on the direction of the thread:
 - a. Pre-torque the axle spindle nut with a torque wrench and size 85 mm socket to 150 Nm.
 - b. Rotate the head unit slowly by 5 revolutions.
 - c. Final torque tighten the axle spindle nut by 30°, whilst rotating the hub. Check that the axle spindle nut has a final torque of 900 Nm. For more information refer to the Torque Chart in this manual.

NOTE: The maximum permissible end play of the hub unit is less than 0.20 mm.

16. Check that the hub cap o-ring seal is in good condition and replace if necessary.
17. Re-install the hub cap onto the hub unit by pressing it slowly and uniformly against the hub seat until the snap fit is secure. (**Figure 19**). Visually inspect for a proper o-ring seal.
18. Re-install the caliper to the brake spider using four SAF specific brake caliper bolts (**Figure 20**):

NOTE: The caliper is connected to the disc brake spider using four SAF specific bolts: three standard bolts and one shoulder bolt (**Figure 21**). The shoulder bolt is located at the outer mounting hole where the brake rotor rotates OUT of the caliper when turning in driving direction (**Figure 21**).

⚠ WARNING

Failure to install shoulder bolt in proper location may cause component failure which, if not avoided, may result in death or serious injury.

- a. Pre-torque the bolts to 120 Nm from inner bolts to outer bolts using a size 24 mm socket.
- b. Inspect the pre-torque of the bolts and if necessary re-tighten all bolts to 120 Nm.
- c. Final torque from inner bolts to outer bolts to 450 +/- 30 Nm.

Figure 19

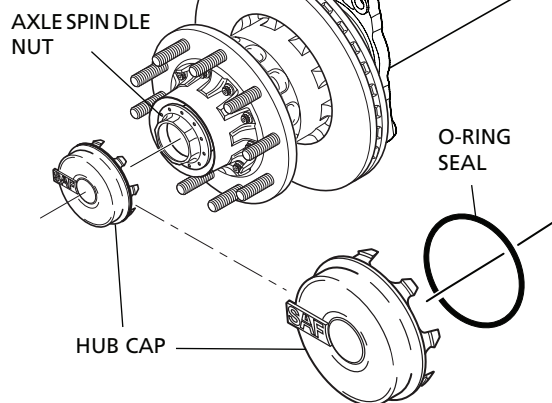


Figure 20

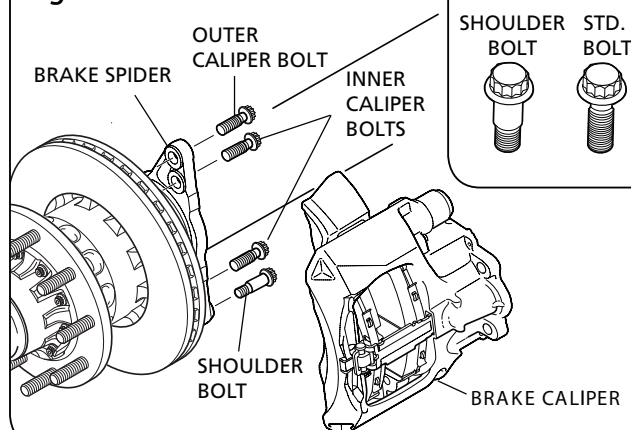
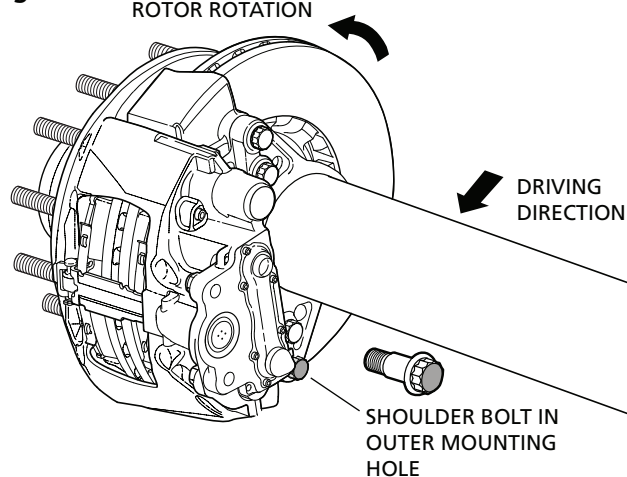


Figure 21



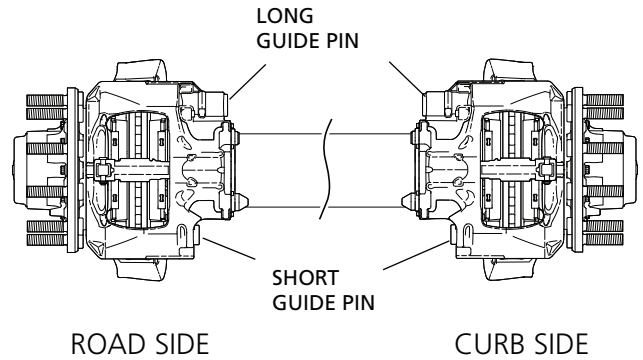
IMPORTANT: Be sure that the brake caliper is mounted on the correct side of the axle. The correct location can be identified by the lengths of the guide pins on the caliper unit. The longer guide pins should be located on the top of the caliper unit when installed on the axle in driving direction. The shorter guide pins should be located on the bottom of the caliper unit (**Figure 22** for fixed axles).

19. Re-install the brake chamber.
20. Re-install the ABS sensor by following the instructions detailed in the related section of this manual.
21. To enable the ABS sensor to function properly press the ABS sensor against the pole wheel at the hub unit to eliminate any clearance between these parts.

IMPORTANT: After replacing the rotor check that the brake system is functioning properly.

NOTE: On steering axles the caliper may be fitted to the rear of the axle, in this case the long pin may be to the bottom. The important detail is that the long pin is always the leading pin when the unit is driving forward.

Figure 22 Fixed Axles



Servicing the Hub Unit

The SAF-HOLLAND disc brake hub unit with compact bearing system is designed to be maintenance-free between relubrications. If there is a malfunction with the hub unit, the hub unit including the compact bearing system can be replaced. The integrated compact bearing system is sealed and requires no grease or oil application to the bearing, between grease renewal.

When replacing the wheel bolts, refer to the hub removal instructions described in the related section of this manual.

1. Remove the wheel studs by pressing them out of the hub unit and discard if necessary (**Figure 23**).
2. Install new studs by pressing them into the hub unit. To ensure correct alignment of the bolts during installation, position the flat side of each wheel bolt head so that it is facing the center of the hub (**Figure 24**).

CAUTION

Do not hit steel parts with a steel hammer as parts could break, sending flying steel fragments in any direction creating a hazard which, if not avoided, may result in minor to moderate injury.

Please see Appendix 1 for relubrication and bearing replacement information.

Figure 23

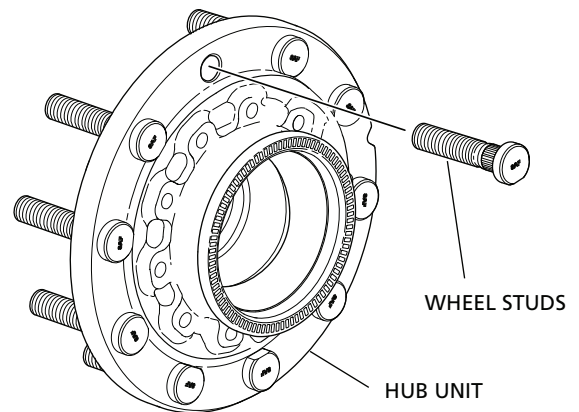
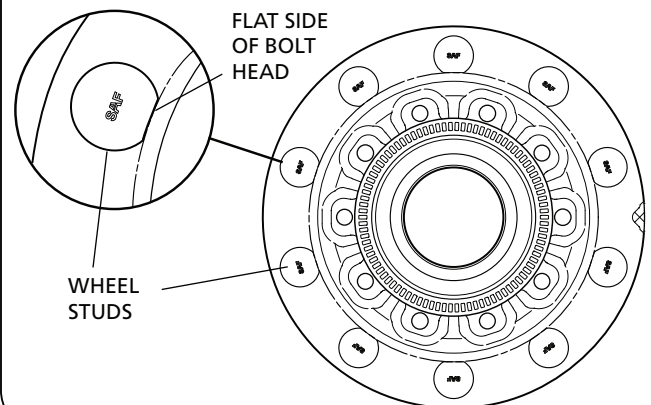


Figure 24



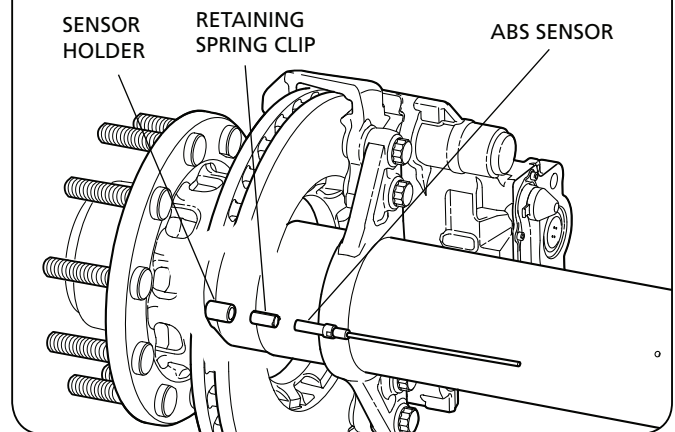
Disc Brake Options

ABS Sensor

NOTE: When replacing the ABS sensor, only install a sensor manufactured by WABCO. Do not mix sensors from different manufacturers. The SAF-HOLLAND INTEGRAL Disc Brake comes with a WABCO ABS mini sensor Ø11. For further ABS sensor information contact Transpecs Customer Service

1. Disconnect the ABS sensor.
2. Remove the ABS sensor from the sensor holder by pulling it straight out from the holder and discard (**Figure 25**).
3. If necessary, remove the sensor retaining spring clip from the sensor holder and replace with new. (**Figure 25**).
4. Install a new ABS sensor by pushing it directly into the sensor holder / spring clip until it contacts the tooth wheel in the hub unit (**Figure 25**).
5. Re-connect the ABS sensor.

Figure 25



Hubodometer

The SAF-HOLLAND INTEGRAL Disc Brake can be factory equipped or retrofitted with a hubodometer hub cap for installation of a hubodometer.

1. Remove the original plastic hub cap (**Figure 26**) using a hub cap puller at the reinforced undercut on the side of the cap.
2. Install hubodometer onto hubodometer hub cap.
3. Check that the hubodometer hub cap o-ring is installed correctly and is in good condition.
4. Install the hubodometer hub cap by pressing it slowly and uniformly against the hub seat until the snap fit is secure (**Figure 27**). Visually inspect the O-ring for a proper seal.

Figure 26

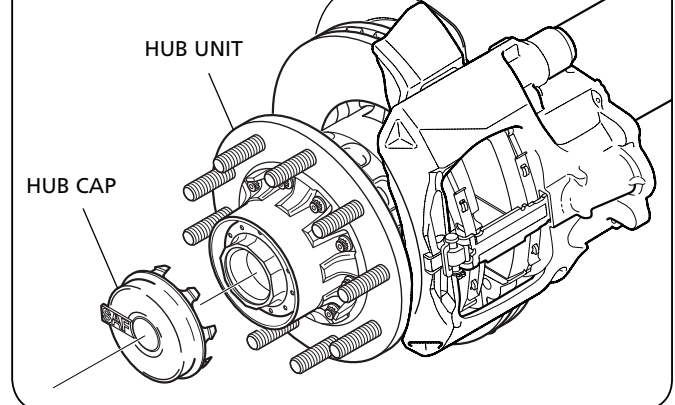
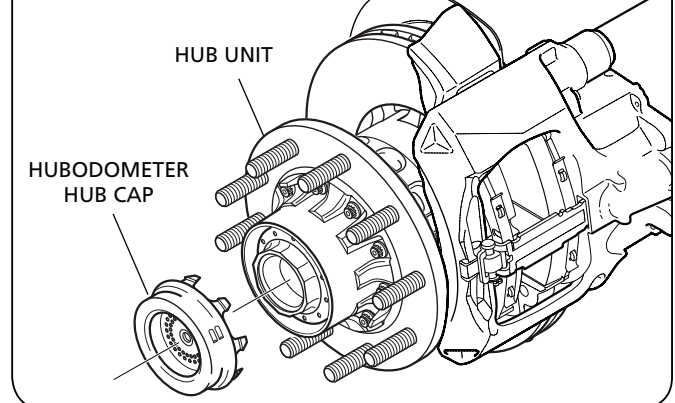


Figure 27



Dust Shield

The SAF-HOLLAND INTEGRAL Disc Brake can be factory equipped or retrofitted with a disc dust shield.

1. Using a size 24mm socket, loosen and discard the two outer brake caliper bolts (**Figure 28**).
2. Install the dust shield with the SAF logo facing towards the hub unit (**Figure 28**).
3. Re-install one new shoulder and one new standard outer SAF specific brake caliper bolts to the brake spider (**Figure 29**):
 - a. Pre-torque the bolts to 120 Nm from inner bolts to outer bolts to outside using a size 24 mm socket.
 - b. Inspect the pre-torque of the bolts and if necessary re-tighten all bolts to 120 Nm.
 - c. Final torque from inner bolts to outer bolts to 450 +/- 30 Nm.

Figure 28

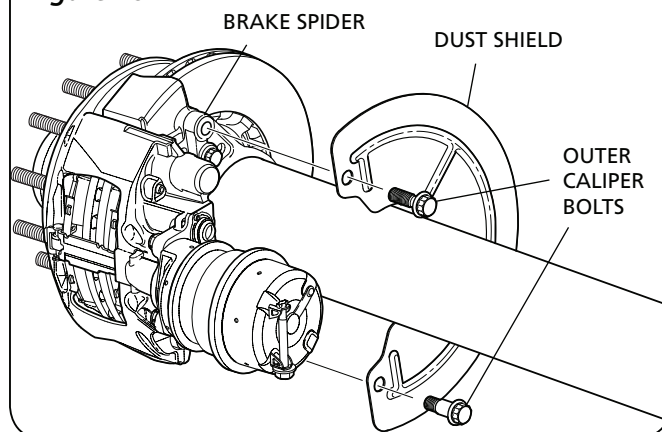
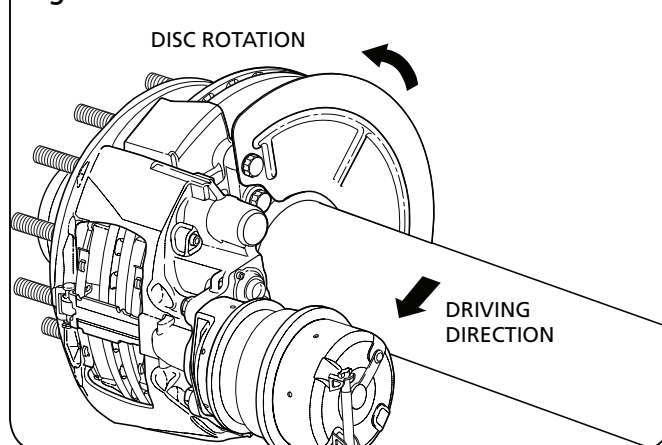


Figure 29



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 caliper guide pins and the tappet seals.

IMPORTANT: Never use high-pressure cleaners or cleaning fluids on the brake disc or Hub Unit.

Clean stub axle of any old grease and apply thin coat of 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

Check the hub nut for tightening torque as per maintenance schedule by following the prescribed procedure.

Tightening the hub nut

On LH side – LH thread On RH side – RH thread

Pre-tighten to 200 Nm whilst rotating wheel hub and disc. For final torque, continue tightening by 15° or one & a half (1-1/2) graduations. (**Figure 30**)

Alternatively the nut hub could be tightened to 900 Nm whilst rotating the hub and disc.

Hub nuts with LH thread are marked with a groove milled into the outside of the hexagon.

Hub Unit bearing axial end float 0 - 0.20 mm (see maintenance section for the procedure)

NOTE: Check the condition of rotor chamfer in case of uneven pad and rotor wear.

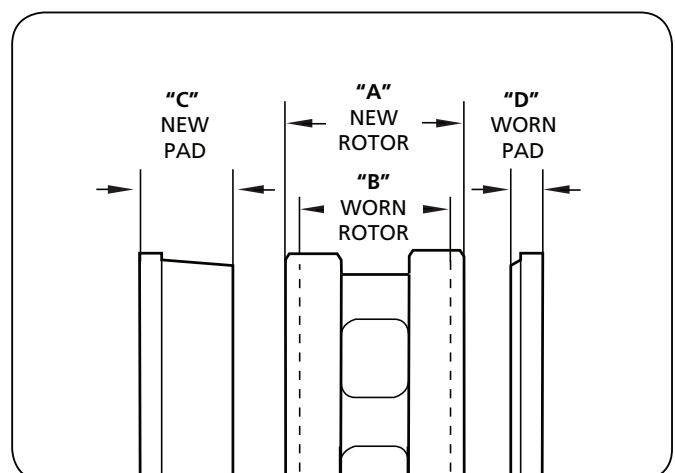
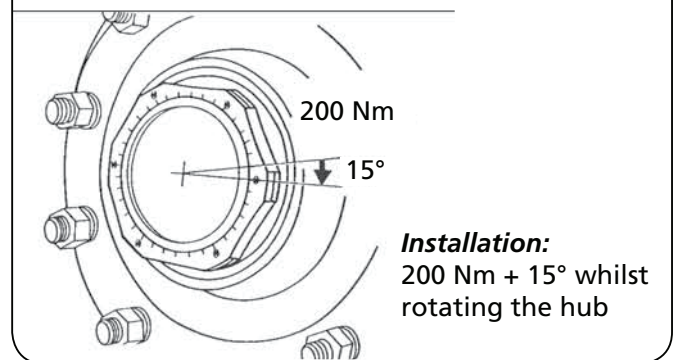
NOTE: Failure to observe these instructions could result in a road traffic accident. Worn brake linings or excessively worn brake discs result in a reduction in the braking efficiency or in a complete failure of the brake system.

BRAKE ROTOR			BRAKE PAD	
DIAMETER (mm)	"A" NEW (mm)	"B" MAX. WEAR LIMIT (mm)	"C" NEW (mm)	"D" MAX. WEAR LIMIT (mm)
370	45	37.0	30	11.0

IMPORTANT: Bolts must not be oiled.

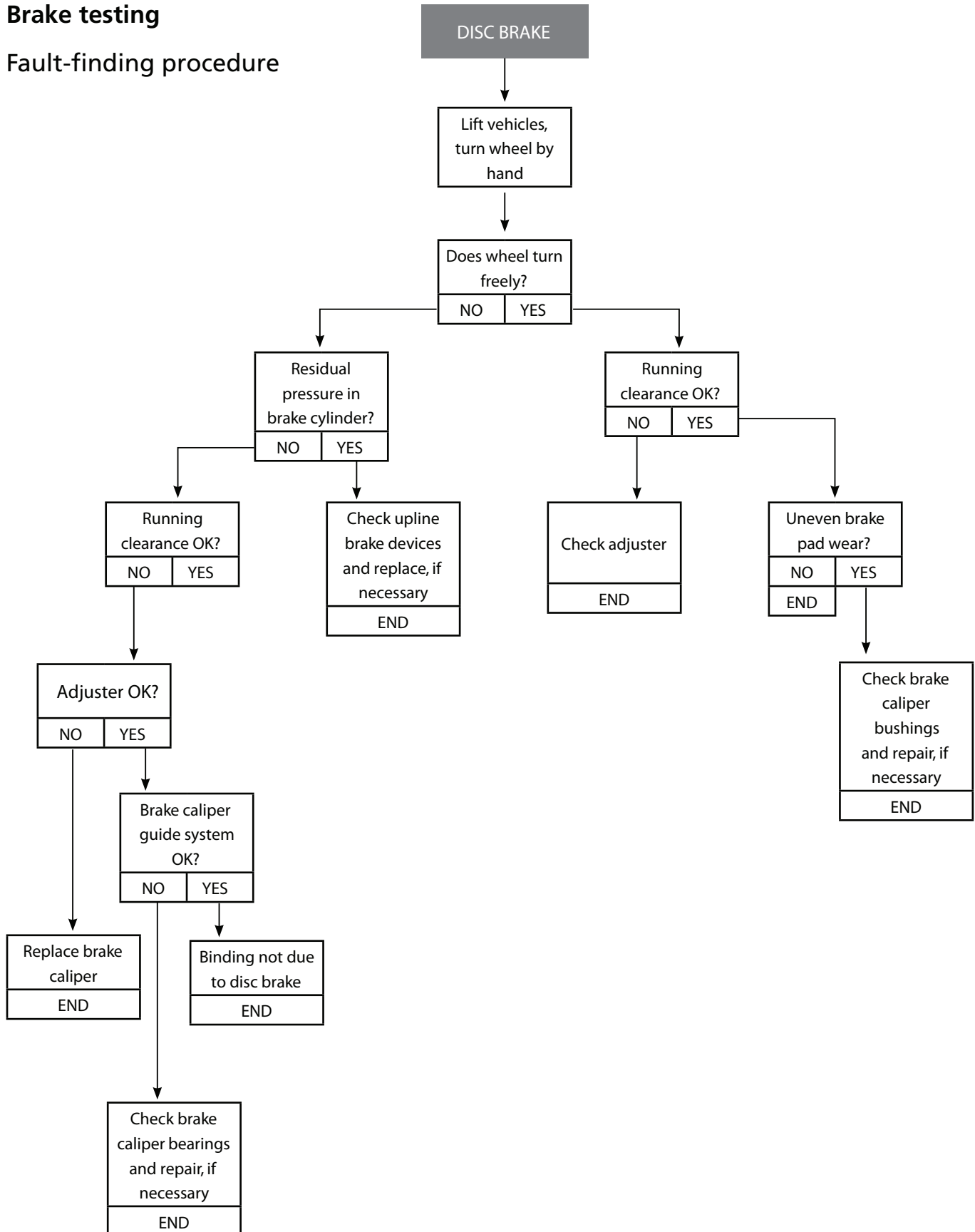
ASSEMBLY TOOLS	PART
Hub nut socket	1 012 0024 00
Hub puller	4 434 3822 00
Lever for hub cap	1 434 1041 00
Tool box universal	3 434 3328 00

Figure 30 (Checking Torque 900Nm)



Brake testing

Fault-finding procedure



NOTE: Difference between wear of inboard and outboard pad, and diagonal wear 4 mm maximum.

Self-Adjuster check

Remove adjusting screw cap. (**Figure 32**)

⚠ 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. (**Figure 33**)

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.

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 firmly sealed.

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.

If the following faults occur, caliper should be replaced or repaired:

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 caliper has to be replaced.

Figure 32

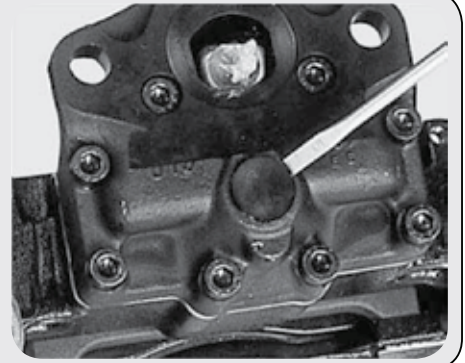
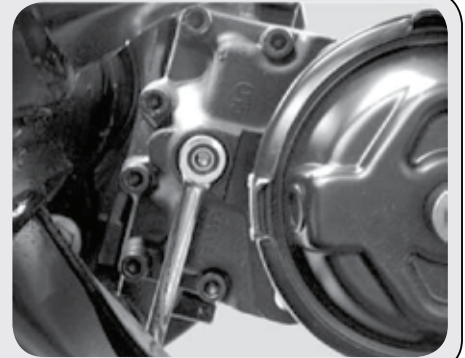


Figure 33



Repairing the brakes

Removal of the brake caliper.

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

1. Lift the axle using a jack.
2. Loosen the wheel nuts and remove the wheel (**Figure 34**).
3. Remove the adjusting screw cap (**Figure 32**).
4. Turn the adjuster in anti clockwise direction up to the stop until it clicks 2 - 3 times (**Figure 35**).
5. Unbolt the diaphragm cylinder, if necessary.
6. Remove the pad retaining clamp (**Figure 36**).
7. Remove the brake pads.
8. Unbolt the brake caliper.

Removal of the hub unit.

1. Lever the hub cap off the hub unit by inserting a lever into one of the recesses around the circumference of the hub cap (**Figure 37**).

Figure 34

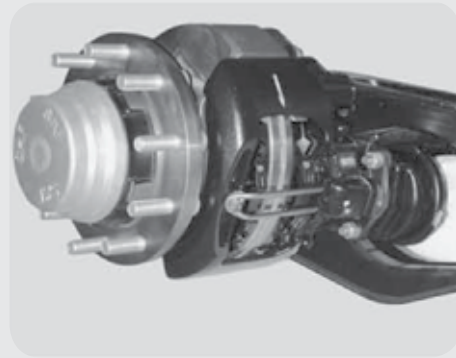


Figure 35



Figure 36

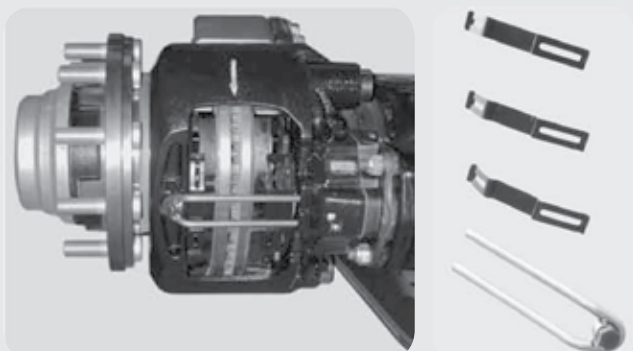
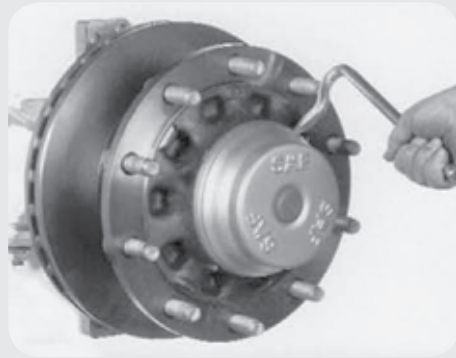


Figure 37



2. Press the ABS sensor completely out of the sensor-mounting block and place inside the axle tube. (**Figure 38**)

The sensor holder can remain on the axle nut.

3. Loosen the axle nut and unscrew from the stub axle. (**Figure 39**)

Axle nut socket of 140mm: SAF Part No. 1 012 0024 00 should be used with 1" square drive tool equipment.

NOTE: 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.

4. The complete hub unit with brake disc can be easily pulled off the stub axle (**Figure 40**).

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. It is recommended to oil the tool tread at the beginning.

NOTE: The important detail is to ensure the bearing does not tilt when being removed, so the hub remains parallel to the spindle at all times, whilst it is being drawn off. Pulling using 4 opposed or 8 of the wheel bolts can dramatically help with this.

The hub bearings have a long-life grease packing.

5. Check the brake caliper for free movement, and sliding action (**Figure 41**).
6. Back off the tappets on the adjuster until the boots are visible.
7. Perform a visual inspection of the boots and all seals.
8. Screw in the tappets again completely.

Please refer Appendix 1 for relubrication and bearing replacement procedures.

Figure 38



Figure 39

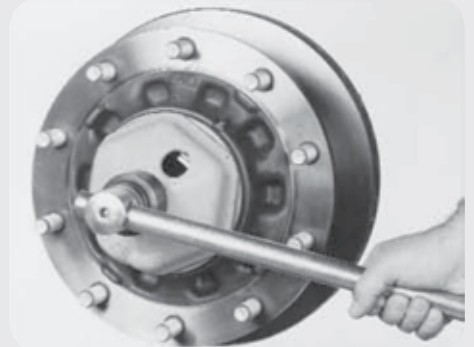


Figure 40

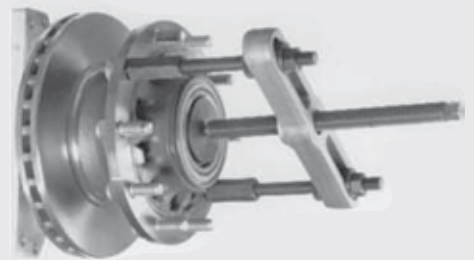
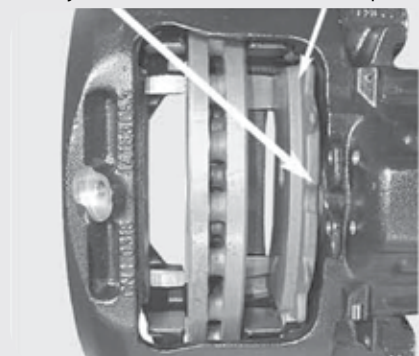


Figure 41

Adjustment screw Pressure plate



Brake disc

See table in chapter "maintenance Instructions".

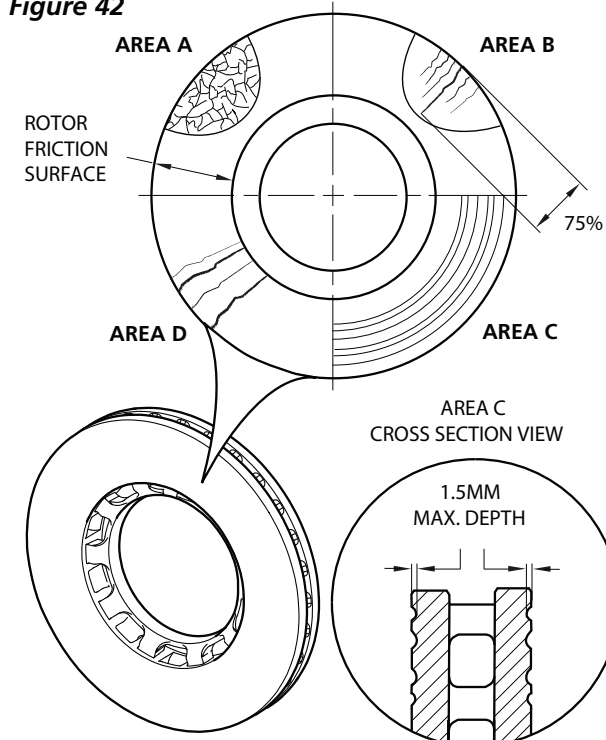
The brake disc may only be cleaned using a dry cleaning agent.

Inspecting the brake disc

1. Inspect the braking surface of the brake disc carefully for serviceability. (**Figure 42**)
 - a. Network-like cracks are permissible (**AREA A**).
 - b. Cracks up to max. 1.5 mm deep or wide, running towards the middle of the hub are permissible (**AREA B**).
 - c. Unevenness in the disc surface up to 1.5 mm is permissible (**AREA C**).
 - d. Cracks going right through the disc are not permissible (**AREA D**).
2. Check the brake disc thickness and machine, if necessary. For safety reasons, the limit thickness for machining the brake discs is 39 - 40 mm.

NOTE: Max. wear limit, see table in chapter "SK RZ 9019W Maintenance Instructions".

Figure 42



Replacing the disc brake

1. To remove the brake disc from the hub unit, drive all the wheel studs out of the hub unit using a hammer (**Figure 43**).
2. Before reassembling wheel hub and brake disc, remove any corrosion from the contact surfaces.
3. Insert the wheel studs at an angle from below and hammer into place (**Figure 44**). observe twist lock.
4. Draw the studs completely into the hub unit using a wheel nut and an impact wrench (**Figure 45**).

Figure 43



Figure 44



Figure 45



Installing the Hub Unit with brake disc

1. Completely coat the wheel bearing seats on the stub shaft and in the Hub Unit with SAF fitting paste (**Figure 46**) SAF Part No. 5 387 0021 01, or a nickel anti-seize.
2. Replace the rear O-ring on the stub shaft.
 - a. Inspect the O-ring on the axle nut and replace, if necessary.
3. Push the Hub Unit brake disc assembly onto the stub axle.
4. Screw on the axle nut.
5. Axle nut socket - 140mm – SAF Part No 1 012 0024 00.
Use 1" square drive socket.
6. 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.
7. Tighten the axle nut (**Figure 47**).
 - a. Pre-tighten the axle nut to 200 Nm manually.
Do not use an air impact wrench.
 - b. Rotate the hub at least 5 times.
 - c. The axle must then be tightened a further 15° torque angle while rotating.
 - d. Loosen the axle nut again and repeat procedure.
 - e. When final torque has been completed, clearly mark both the axle nut and the spindle so that there is a permanent reference point.
8. Completely coat the ABS sensor with copper paste and install in the sensor holder.
9. Inspect the O-ring on the Hub Unit for the snap fastening of the hubcap; replace, if necessary. Push on the hubcap and check that it is securely seated.
10. Remove the plug from the hubcap and push the ABS sensor until it is contacting the exciter ring (**Figure 49**). Insert the plug into the hubcap again.
11. Measure the voltage output on the ABS sensor cable using a voltmeter (approx. 100 mV) whilst rotating the hub.

Figure 46



Figure 47

Installation:
 200 Nm + 15°
 whilst rotating
 the hub

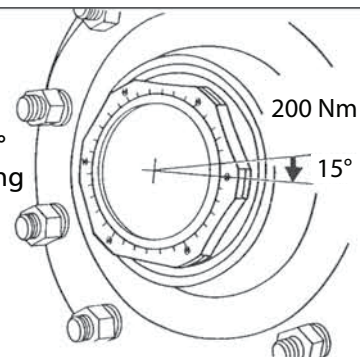


Figure 48

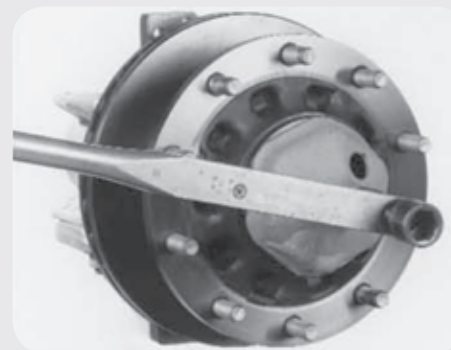
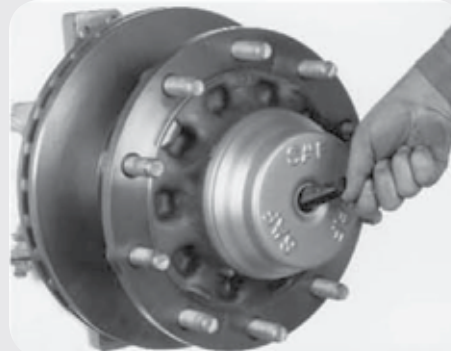


Figure 49



Move the brake caliper so far so that there is enough distance between the brake disc on the actuation side to insert the brake lining. (**Figure 50**)

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. (**Figure 51**)

Move the brake caliper 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. (**Figure 52**)

With the help of a 1 mm thick feeler gauge (arrow) inserted between the rim side of the lining and the brake caliper, 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. (**Figure 53**)

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

Figure 50

Adjustment screw Pressure plate

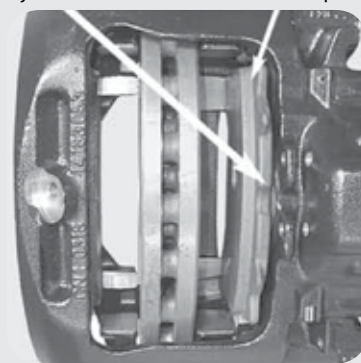


Figure 51

64.1

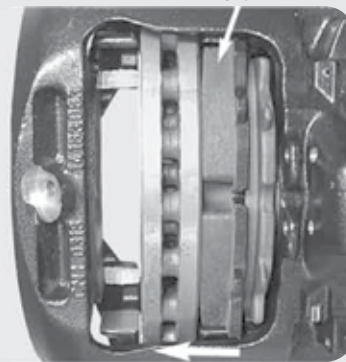


Figure 52

64.1

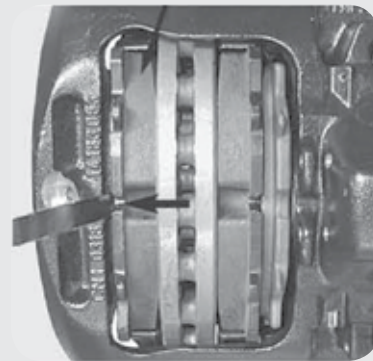
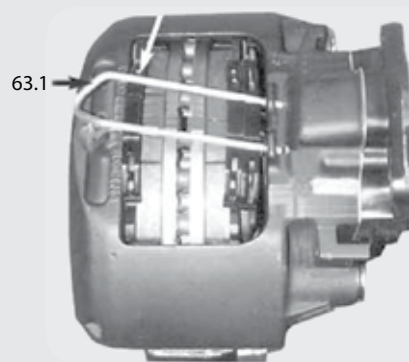


Figure 53

64.2 / 64.1

63.1



Affixing new hex. screw 63.2 with 30 ± 15 using a spanner onto the brake caliper. (**Figure 54**)

Push the new plug 65 into the opening of the brake caliper! Check the wheel hub for freedom of movement. (**Figure 55**)

NOTE: Check the brakes on a rolling road test station after completion of work.

Replacing of the tappet rubber boot seals

Ensure brakes are released & safe.

Dismantle brake linings and pressure plate. (**Figure 56**)

Move brake caliper by hand towards the cylinder. (**Figure 57**)

Pull out the protection cap 65 using a screwdriver from the brake caliper 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.

Figure 54

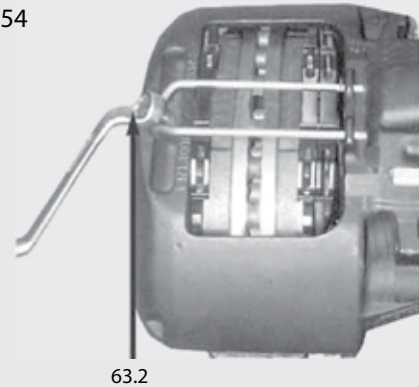


Figure 55

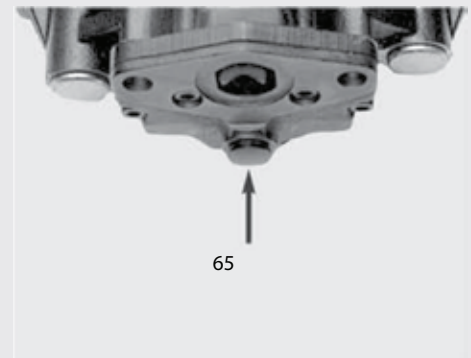


Figure 56

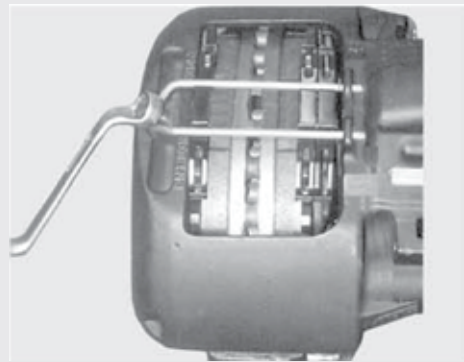
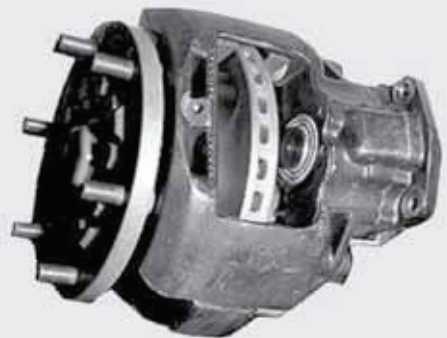


Figure 57



NOTE: The protection cap 66 can be replaced if dirt or water is seen to be present over the seal seat of the brake caliper, 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. (**Figure 58**)

After checking, grease the thread and partly screw the adjuster clockwise again. (**Figure 59**)

Clean the seating of the protection cap 66 in the brake caliper (arrow). Illustration without adjustment screw. (**Figure 60**)

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 caliper 59.

Illustration without adjustment screw. (**Figure 61**)

Figure 58

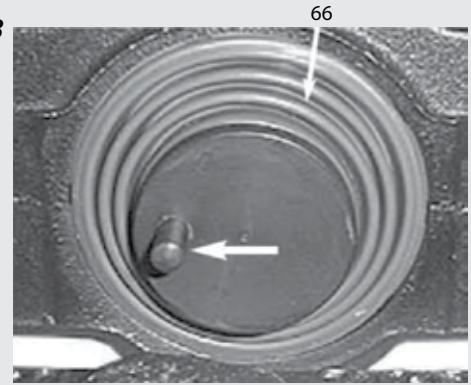


Figure 59



Figure 60

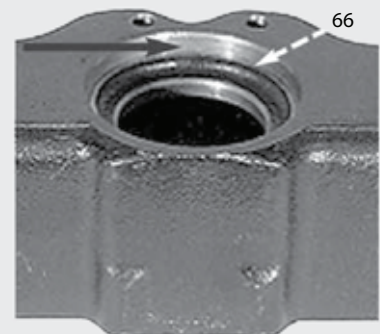
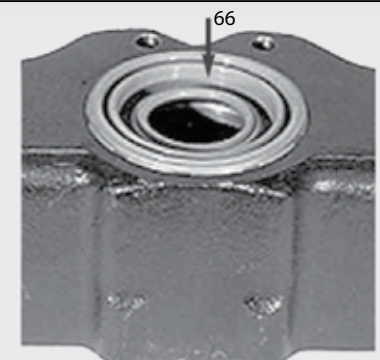


Figure 61



Insert the protection cap 66 into the adjustment screw seating. (**Figure 62**)

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 caliper bearing with "guide and seal kit"

Dismantle the brake caliper 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. (**Figure 63**)

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 caliper 59 from the brake mounting 61. (**Figure 64**)

NOTE: Danger of trapping your fingers through loose brake caliper!

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

Remove the guide pin 70.1/80.2 from the brake caliper 59, remove the protection cap 80 from the groove. (**Figure 65**)

Figure 62

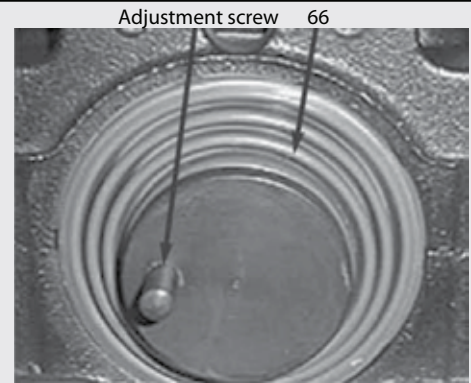


Figure 63

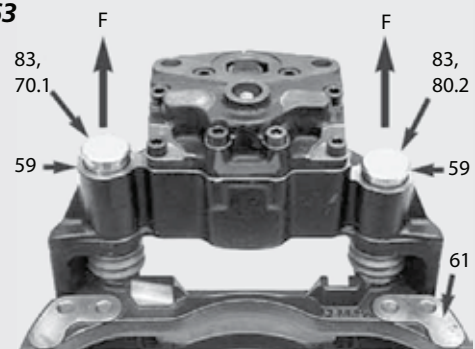


Figure 64

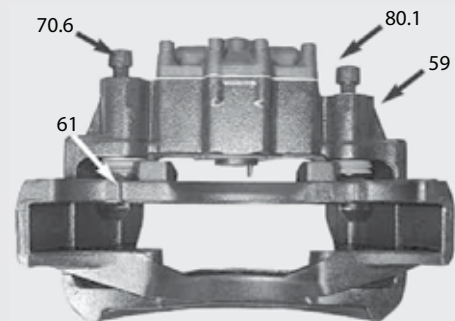
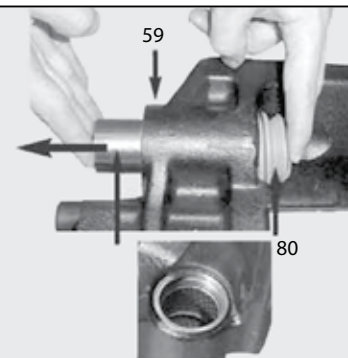


Figure 65



Lay the brake caliper 59 on a firm surface so that the cover opening of the brake caliper is uppermost in order to press out the bushes 70.3/80.3. (**Figure 66**)

Press out the bushes 70.3/80.3 from the brake caliper using a press and mandrel. (**Figure 67**)

Clean the holes in the brake caliper.

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

Firstly (A) (**Figure 68a**) the inner bush with mandrel (L1 = 52.2 ± 0.2 mm), and finally (B) (**Figure 68b**) the outer bush with a mandrel (L2 = 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. (**Figure 69**)

Press in bush (C) with mandrel (L3 = 38.7 ± 0.2 mm) until it meets the stop.

Grease sliding surfaces of the bush.

Figure 66

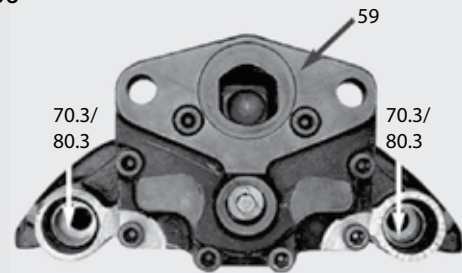


Figure 67

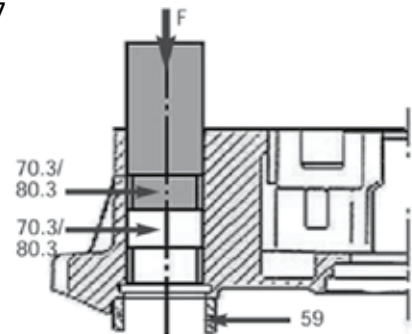


Figure 68a

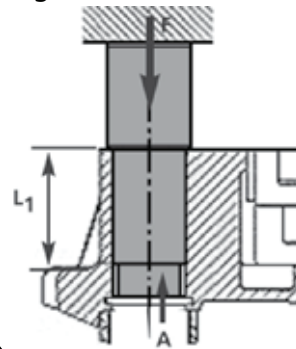


Figure 68b

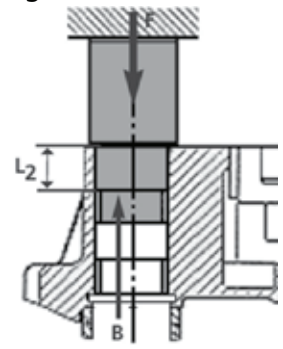
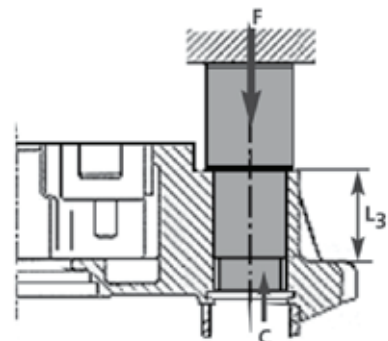


Figure 69



Insert the new protection cap 80 in the seat (arrow) of the brake caliper (59). (**Figure 70**)

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 caliper.

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 caliper 59 and push the protection cap 80 against the seating of the guide pins 70.1/80.2. (**Figure 71**)

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 caliper 59 onto the brake mounting 61 and insert the fitted guide pins 70.1/80.2 flush. (**Figure 72**)

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 caliper 59 and screw the brake caliper 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 caliper several times backwards and forwards over the guide pins 70.1/80.2. Ensure ease of movement.

(**Figure 73**) *

NOTE: Do not squash the guide pins against the brake mounting!

* The caliper slides should move easily and return under the vacuum of the seals without other assistance.

Figure 70

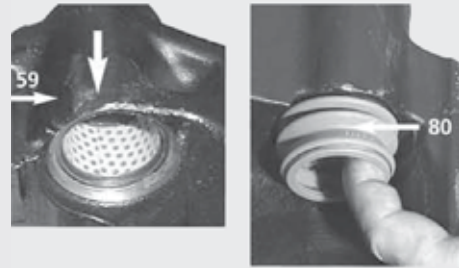


Figure 71

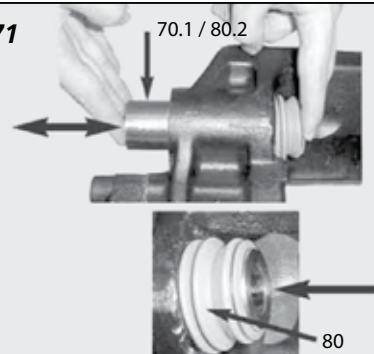


Figure 72

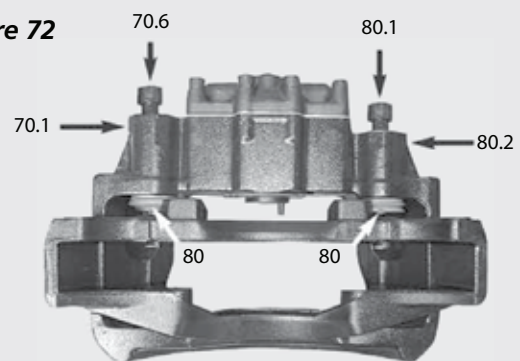
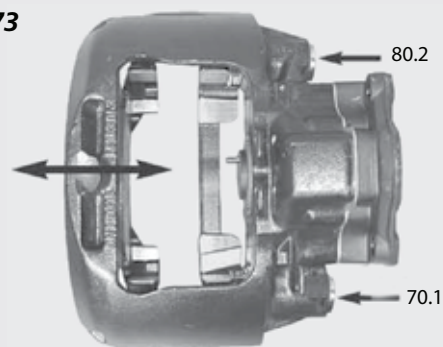


Figure 73



Grease the holes for the cover plate 83 in the brake caliper 59.
Insert the new cover plate 83 into the holes of the brake caliper 59 and press home using a suitable tool. (**Figure 74**)

NOTE: Avoid damaging the cover.

Fitting the brake caliper

Seat the brakes with brake mounting over the brake disc and fit to the axle. (**Figure 75**)

Tightening sequence of the screws:

RH side clockwise

LH side anti-clockwise

Each time begin the sequence with the shoulder bolt.

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 caliper and grease the bearing on the brake lever (**Figure 76**).

Set the brake cylinder onto the brake caliper and screw the nut slightly with a spanner - torque to 210 Nm.

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

NOTE: Ensure that even pressure is applied to both sides during fitting and the seal is fitted correctly.

See Appendix 2 for brake chamber information.

Figure 74

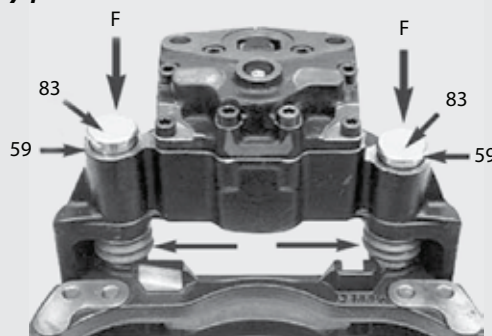


Figure 75

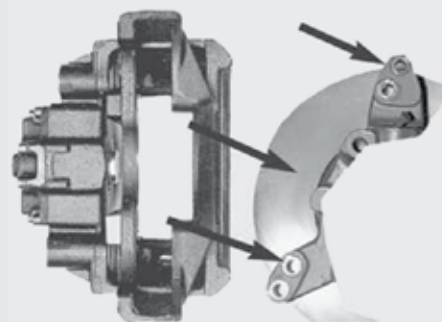
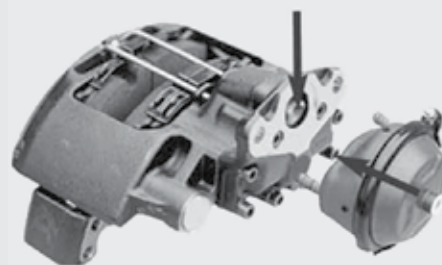
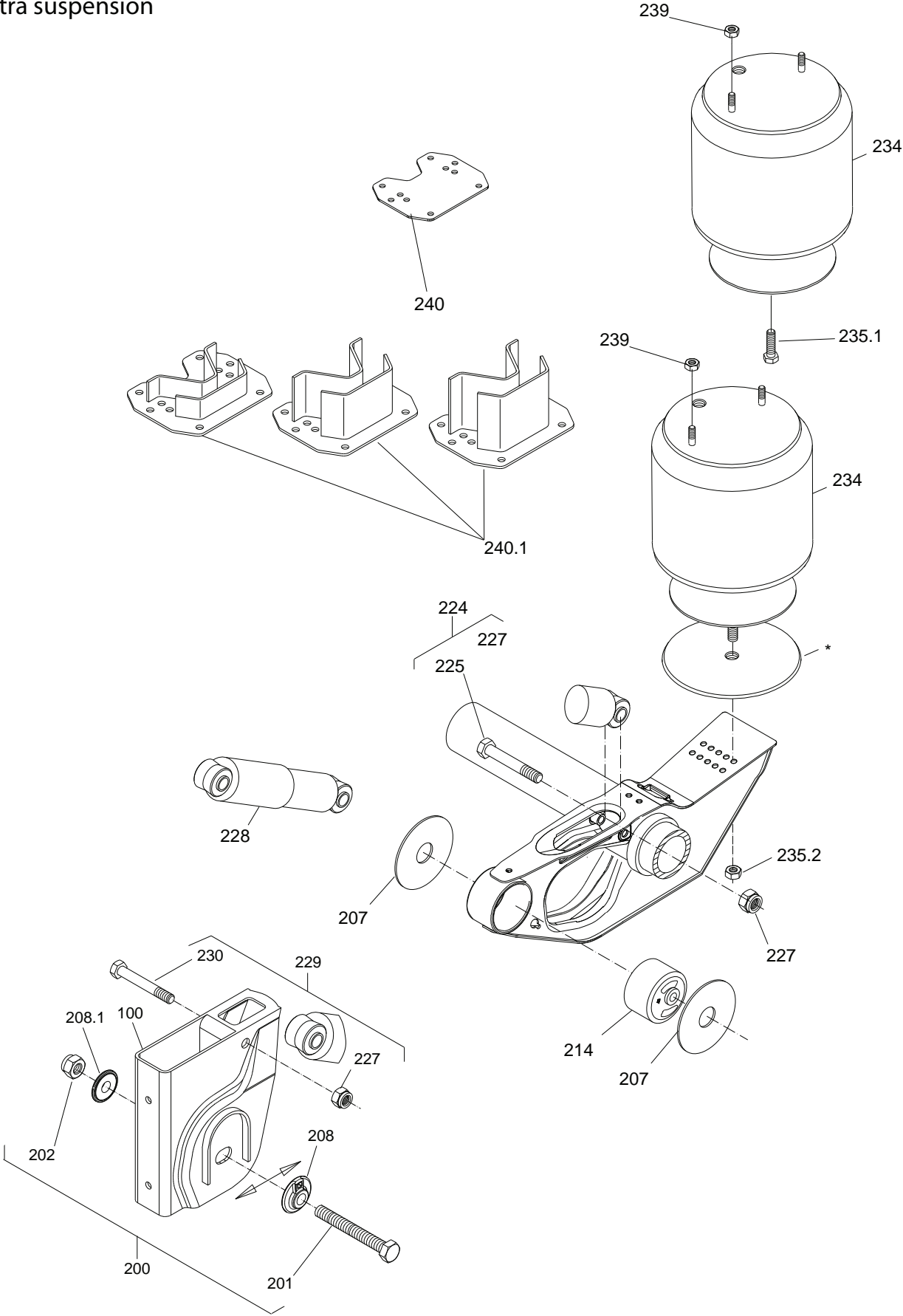


Figure 76



Intra suspension



ITEM	PART NO.	DESCRIPTION	QTY
100	2 183 0825 00	Intra hanger - steel - 200H	2
100	2 183 0826 00	Intra hanger - steel - 250H	2
100	2 183 0827 00	Intra hanger - steel - 300H	2
100	2 183 0828 00	Intra hanger - steel - 350H	2
100	2 183 0829 00	Intra hanger - alloy - 200H	2
100	2 183 0830 00	Intra hanger - alloy - 250H	2
100	2 183 0831 00	Intra hanger - alloy - 300H	2
100	2 183 0832 00	Intra hanger - alloy - 350H	2
100	2 291 0426 00	Intra cross member - self steer - 200H	1
100	2 291 0423 00	Intra cross member - self steer - 250H	1
100	2 291 0428 00	Intra cross member - self steer - 300H	1
200	3 341 1048 19	Pivot bolt kit (incl. 201 & 202)	2
201	4 343 1048 88	Pivot bolt M30x205 - suits steel hanger	2
201	4 343 1053 88	Pivot bolt M30x240 - suits alloy hanger	2
202	4 247 4022 80	Lock nut M30	2
207	4 331 5029 00	Wear pad - plastic	4
208	1 123 0001 01	Alignment washer - eccentric	2
208.1	1 101 2001 00	Washer	2
214	4 177 3028 00	Pivot Bush	2
224	3 341 2802 10	Shock bolt kit - bottom (incl. 225 & 227)	2
225	4 343 2802 10	Shock bolt - M20x155 - bottom	2
227	4 247 4044 10	Locknut M20 - flanged	4
228	2 376 0070 01	Shock absorber - standard	2
228	2 376 0071 01	Shock absorber - standard	2
228	2 376 0072 01	Shock absorber - standard	2
228	2 376 0079 00	Shock absorber - heavy duty	2
228	2 376 0080 00	Shock absorber - heavy duty	2
228	2 376 0081 00	Shock absorber - heavy duty	2
229	3 341 2803 10	Shock bolt kit - top - steel hanger (incl. 230 & 227)	2
229	3 044 1054 00	Shock bolt kit - top - alloy hanger	2
230	4 343 2803 10	Shock bolt - M20x125 - top - steel hanger	2
230	4 343 2804 10	Shock bolt - M20x205 - top - alloy hanger	2
N.A.	1 097 0008 00	Spacer washer - alloy hanger	4
N.A.	1 331 0136 00	Flat washer - alloy hanger	2
234	3 228 0033 00	Air bag - SAF 2619V - 300 mm dia (incl. 235.2 & 239)	2
234	3 228 1027 00	Air bag - SAF 2918V - 350 mm dia - short	2
234	3 228 0041 00	Air bag - SAF 2924V - 350 mm dia - long	2
235.1	4 343 1036 88	Hex bolt M16x40 (for SAF 0027 & 1041 bags)	2
235.2	4 247 4007 80	Lock nut M16 (for SAF 0033 bags)	2
N.A.	4 141 0006 00	Spring washer A12	2
239	4 247 4047 10	Lock nut M12	4
240	1 043 0261 01	Air bag plate - top - 5 mm	2
240.1	2 237 0081 01	Air bag pedestal - 50 mm	2
240.1	2 237 0080 01	Air bag pedestal - 100 mm	2
240.1	2 237 0082 01	Air bag pedestal - 150 mm	2
*	1 284 6052 00	Air bag plate 5 mm - bottom (for 60mm offset bags)	2

ZI9-19W INTEGRAL Torque Chart

PART	APPLICATION	TORQUE SPECIFICATIONS
SAF Specific Axle Spindle Nut M75 x 1.5	Compact Bearing System	<p>Left-hand thread located on the left-hand side of the axle Right-hand thread located on the right-hand side of the axle.</p> <p>The axle nut with a left-handed thread can be identified by a circular groove.</p> <ol style="list-style-type: none"> 1. Pre-torque with a size 85 mm socket to 150 Nm. 2. Rotate the head unit slowly by 5 revolutions whilst applying the final torque tighten the axle spindle nut by 1/12 turn (30°). 3. Check that the axle spindle nut has a final torque of 900 Nm. <p>Max. Permissible end play of the hub unit is shown in previous section of this manual.</p>
SAF Specific INTEGRAL Bolt M14 x 1.5 *NEW BOLTS MUST ALWAYS BE USED - PART NO. 03 434 3663 00	Rotor - Hub	<p>Torque all ten bolts in a criss-cross pattern.</p> <ol style="list-style-type: none"> 1. Pre-torque to 50 Nm. 2. For final torque tighten by an additional 120 degree turn.
SAF Specific Caliper Bolt M18 x 1.5	Caliper - Spider	<p>Torque bolts from inner bolts to outer bolts</p> <ol style="list-style-type: none"> 1. Pre-torque to 120 Nm. 2. Inspect the pre-torque of the bolts and if necessary re-tighten all bolts to 120 Nm. 3. Final torque from inner bolts to outer bolts to 450 +/- 30 Nm.
SAF Specific Brake Chamber Nut 5/8-11 UNC Nylock or M16 x 1.5"	Brake Chamber	<ol style="list-style-type: none"> 1. Pre-torque both chamber nuts to 80-100 Nm 2. For final torque tighten both chamber nuts to 180-210 Nm.

***NEW BOLTS MUST ALWAYS BE USED - PART NO. 03 434 3663 00**

SK RZ 9019 Torque Chart

PART	APPLICATION	TORQUE SPECIFICATIONS
Spindle nut		<p>Left-hand thread is located on the left-hand side of the direction of travel, can be identified by a circular grooved hub nut and spindle.</p> <p>Right-hand thread located on the right-hand side of the direction of travel, can be identified by an axle serial number on spindle.</p> <ol style="list-style-type: none"> 1. Pre-torque to 200 Nm while rotating wheel hub. 2. Rotate the head unit slowly at least 5 revolutions, whilst applying the final torque tighten the axle spindle nut by 15°. 4. Check that the axle spindle nut has a final torque of 900 Nm.
Diaphragm brake cylinder M16	Springbrake	210 Nm
Brake caliper mounting bolt M16	Brake Caliper	290 Nm
Wheel nuts M22		600 Nm

SK RZ 9019 W Torque Chart

PART	APPLICATION	TORQUE SPECIFICATIONS
Spring brake chamber 2 hex. nuts M16 x 1.5	Brake Chamber	210 Nm
Guide pin bolts	Brake Caliper	340 +/- 20 Nm
Brake caliper mounting on axle M16 x 1.5 x 55	Caliper - mounting	290 Nm
Brake pad retainer clamp	Brake pad	30 +/- 40 Nm

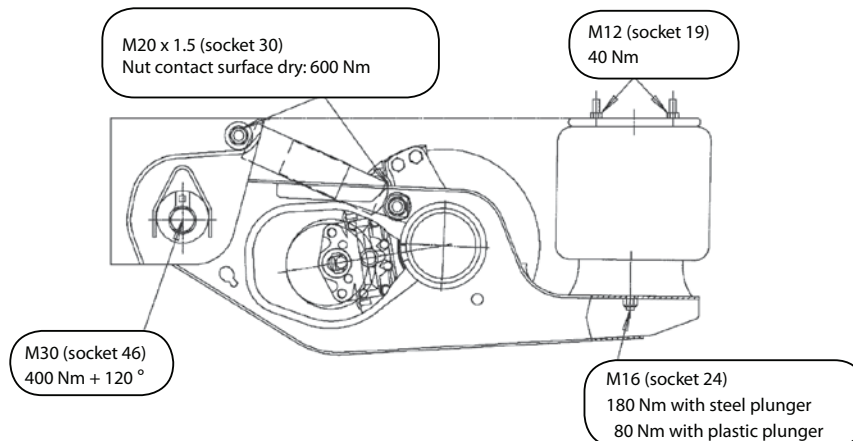
Intradisc Suspension Torque Chart

PART	APPLICATION	TORQUE SPECIFICATIONS
Pivot Bolt Assy M30		Pre-tighten to 400 Nm. Final tightening torque 120° (two flats of the nut) - AT RIDE HEIGHT ONLY The pivot bolt can be checked at a torque of 1200 Nm
Shock Absorber Nuts M20		AT RIDE HEIGHT ONLY Nut Contact Surface Dry 600 Nm, Check at 400Nm
Air spring top Nut M12		40 Nm
Air Spring Plunger Bolts M16		Plastic Plunger-Piston 80 Nm Steel plunger-Piston 180 Nm

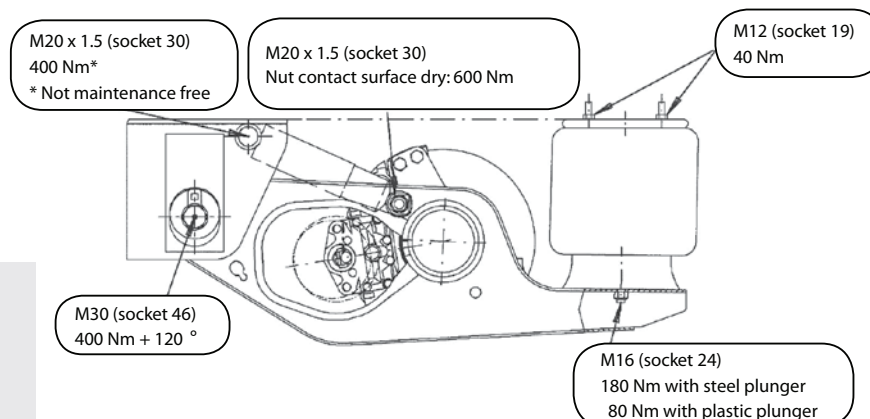
Do not oil or grease threads.
Use Pivot Bolt and Nut only once.
Use Shock absorber nuts only once.
Check torques after first 5000 kms.

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

SAF INTRA with steel hanger brackets, pivot bolt, shock absorbers and air bags



SAF INTRA with alloy hanger brackets, pivot bolt, shock absorbers and air bags

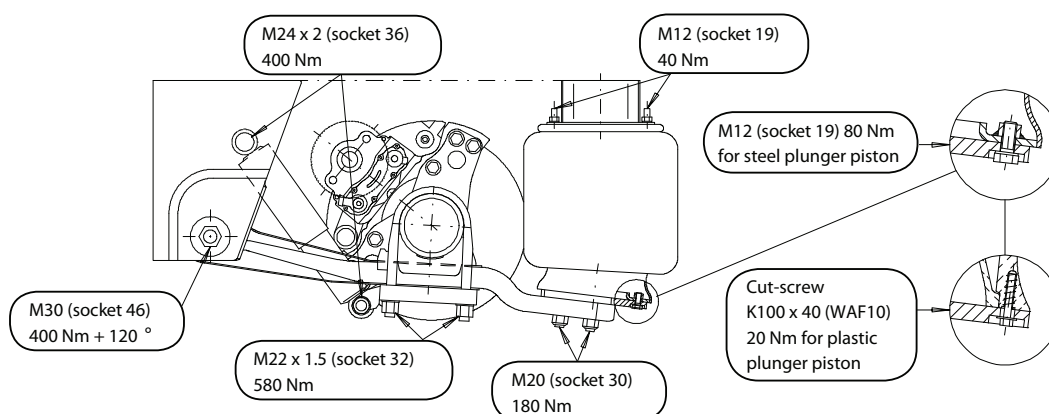


Modul Suspension Torque Chart

PART	APPLICATION	TORQUE SPECIFICATIONS
Pivot Bolt Assy M30		Pre-tighten to 400 Nm. Final tightening torque 120° (two flats of the nut) - AT RIDE HEIGHT ONLY The pivot bolt can be checked at a torque of 1200 Nm
Shock Absorber Nuts M24		400 Nm AT RIDE HEIGHT ONLY
U/Bolts for Trailing Arms M22 (Diagonally in three Stages)		650 Nm
Air Spring Mounting Plate M20		180 Nm
Air spring top Nut M12		40 Nm
Air Spring Plunger Bolts M16	Plastic Plunger-Piston	80 Nm
Air Spring Self Tapping Bolts	Plastic Plunger-Piston	20 Nm

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

SAF MODUL



Do not oil or grease threads.
Use Pivot Bolt and Nut only once.
Use Shock absorber nuts only once.

Ride height / shock absorber allocation

SERIES / STANDARD	NOMINAL RIDE HT (mm)	HANGER BRACKET (mm)	AIR BAG BRACKET (mm)	LIFT / LOWER (mm)	LENGTH OF SHOCK ABSORBER (mm)			TYPE OF SHOCK ABSORBER
					min	Ride ht	max.	
IU 25/2000 33/27	250	200	0	90 / 90	306	340	380	2 376 0084 00
IU 28/2005 33/27	280	200	50	90 / 90	316	351	390	2 376 0084 00
IU 30/2505 33/27	300	250	50	90 / 90	350	391	437	2 376 0085 00
IU 33/2510 33/27	330	250	100	90 / 90	363	404	447	2 376 0085 00
IU 35/3010 33/27	350	300	100	90 / 90	350	391	437	2 376 0085 00
IO 35/2000 33/27	355	200	0	90 / 90	343	381	421	2 376 0085 00
IO 37/2500 33/27	375	250	0	90 / 90	382	424	470	2 376 0085 00
IO 40/2505 33/27	405	250	50	90 / 90	395	437	482	2 376 0086 00
IO 42/3005 33/27	425	300	50	90 / 90	382	424	470	2 376 0085 00
IO 45/3010 33/27	455	300	100	90 / 90	395	437	482	2 376 0086 00
IO 47/3510 33/27	475	350	100	90 / 90	382	424	470	2 376 0085 00
IO 50/3515 33/27	505	350	150	90 / 90	395	437	482	2 376 0086 00
IU 29/2000 31/41	290	200	0	95 / 105	316	355	408	2 376 0084 00
IU 31/2500 31/41	310	250	0	95 / 105	349	395	455	2 376 0085 00
IU 34/2505 31/41	340	250	50	95 / 105	362	408	466	2 376 0085 00
IU 36/3005 31/41	360	300	50	95 / 105	349	395	455	2 376 0085 00
IU 39/3010 31/41	390	300	100	95 / 105	362	408	466	2 376 0085 00
IU 42/3015 31/41	420	300	150	95 / 105	375	422	476	2 376 0086 00
IO 44/3000 31/41	440	300	0	85 / 115	380	430	486	2 376 0086 00
IO 49/3505 31/41	490	350	50	85 / 115	380	430	486	2 376 0086 00

SHOCK ABSORBER TYPE REFERENCE TABLE			
SUPERSEDED	HD	CURRENT CD	
2 376 0070 01	2 376 0079 00	2 376 0084 00	
2 376 0071 01	2 376 0080 00	2 376 0085 00	
2 376 0072 01	2 376 0081 00	2 376 0086 00	

New Zealand market SAF Intradisc INTEGRAL standard specifications

MODEL	NOMINAL RIDE HT	RIDE HEIGHT RANGE	HANGER PIVOT HT	STANDARD SHOCK	AIR SPRING PED. HT	STANDARD AIR SPRING TYPE & DIA.	OPTIONAL OFF-HIGHWAY AIR SPRING TYPE & DIA (MOD.27)	WEIGHT (KG) (WITH 300MM AIR SPRING INCL. 14/16" BOOSTERS)	WEIGHT (KG) (WITH 350MM AIR SPRING INCL. 14/16" BOOSTERS)
IU 25/2000 XX	250 mm	230-270 mm	200 mm	2 376 0084 00	5 mm	S2619V (300 mm)	S2918V (350 mm)	399	410
IU 28/2005 XX	280 mm	260-300 mm	200 mm	2 376 0084 00	50 mm	S2619V (300 mm)	S2918V (350 mm)	401	412
IU 29/2500 41	290 mm	250-310 mm	350 mm	2 376 0084 00	5 mm	S2924V (350 mm)	NA	NA	404
IU 30/2505 XX	300 mm	280-320 mm	250 mm	2 376 0085 00	50 mm	S2619V (300 mm)	S2918V (350 mm)	403	414
IU 34/2505 41	340 mm	310-360 mm	250 mm	2 376 0085 00	50 mm	S2924V (350 mm)	NA	NA	406
IO 35/2000 XX	355 mm	335-375 mm	200 mm	2 376 0085 00	5 mm	S2619V (300 mm)	S2918V (350 mm)	408	419
IO 37/2500 XX	375 mm	355-395 mm	250 mm	2 376 0085 00	5 mm	S2619V (300 mm)	S2918V (350 mm)	411	422
IO 40/2505 XX	400 mm	380-420 mm	250 mm	2 376 0086 00	50 mm	S2619V (300 mm)	S2918V (350 mm)	412	423
IO 42/3005 XX	425 mm	405-455 mm	300 mm	2 376 0085 00	50 mm	S2619V (300 mm)	S2918V (350 mm)	417	428

SHOCK ABSORBER TYPE REFERENCE TABLE		
SUPERSEDED	HD	CURRENT CD
2 376 0070 01	2 376 0079 00	2 376 0084 00
2 376 0071 01	2 376 0080 00	2 376 0085 00
2 376 0072 01	2 376 0081 00	2 376 0086 00

Pivot Bolt Tightening Procedure

ATTENTION: Pivot bolt tightening always has to be performed at the specified ride height!
No paint residues between eccentric/thrust washer and hanger!
Bolt head always on the eccentric washer side. Turn the nut, not the bolt.

1. Pre-tighten to: 400 Nm (**Figure 77**).
Use torque wrench with socket size of 46 mm.
2. Mark the angle of 120° (two flats) for the final tightening (**Figure 78**).
3. Perform the final tightening of 120° (two flats).
Use impact wrench or extend lever to 2.5m. Hold hexagon bolt head to prevent it from turning during the final tightening. (**Figure 79**)
4. Clearly mark with counterpunch and line marker relative position of the bolt, nut and hanger after the final tightening for the future visual inspections (to be easily visible)! (**Figure 80**)

Do not oil or grease threads.
Use Pivot Bolt and Nut Only Once.

Figure 77



Figure 78



Figure 79



Figure 80



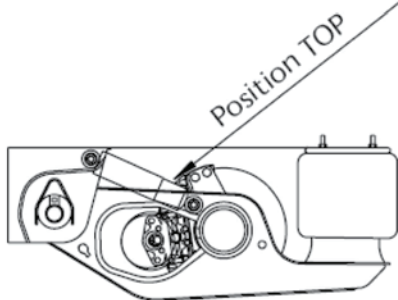
Steel hanger bracket / crossmember and suspension arm

Bolt kit 3 341 2803 10

PART NO.	DESCRIPTION
4 343 2803 10	Collared bolt M20x1.5x120 - Gr 10,9 dacromet coated
4 247 4044 10	Collared nut M20x1.5 - Gr 10

Tightening torque: **Contact surfaces dry 600 Nm**

ATTENTION: TOP mark facing upwards in working position.

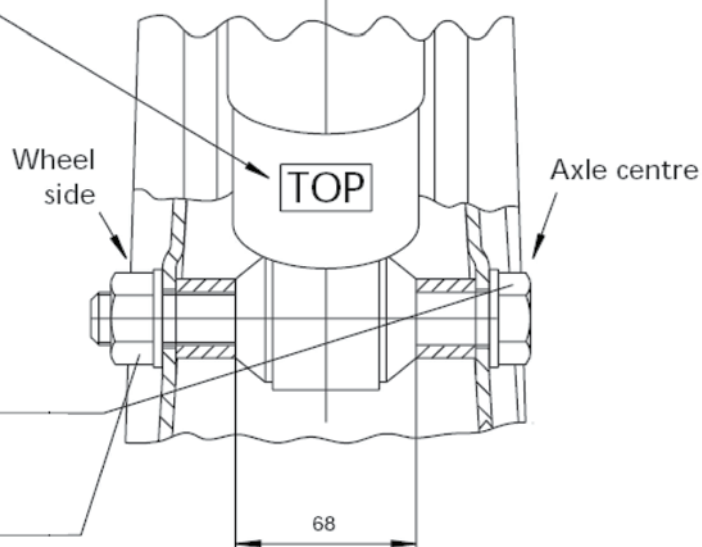
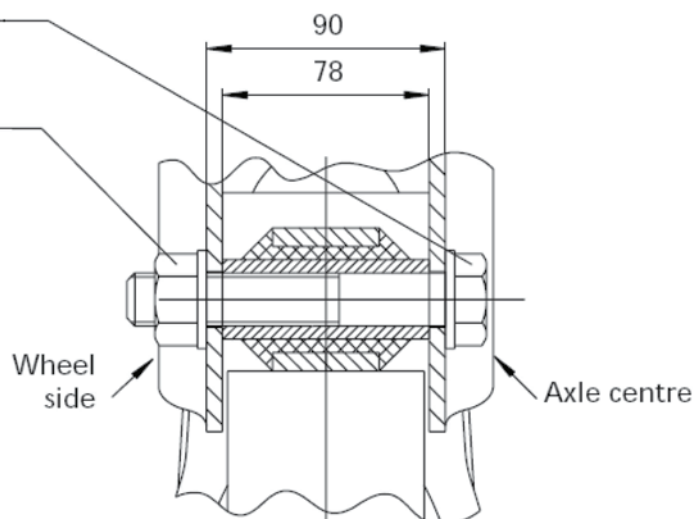


Bolt kit 3 341 2802 10

PART NO.	DESCRIPTION
4 343 2802 10	Collared bolt M20x1.5x150 - Gr 10,9 dacromet coated
4 247 4044 10	Collared nut M20x1.5 - Gr 10

Tightening torque: **Contact surfaces dry 600 Nm**

Steel hanger bracket / crossmember



Functional suspension arm

NOTE: All shock bolts to be tightened at the specified ride height!

Nuts to be used only once.

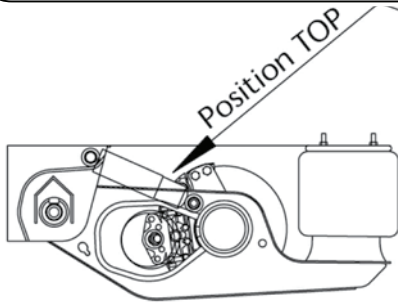
Aluminium hanger bracket and suspension arm

Mounting parts kit 3 044 1054 00

PART NO.	DESCRIPTION
4 343 2804 10	Collared bolt M20x1.5x200 - Gr 10,9 dacromet coated
1 097 0008 00	Spacer washer (2x)
1 331 0136 00	Washer
4 247 4044 10	Collared nut M20x1.5 - Gr 10

Tightening torque: **Contact surfaces dry 400 Nm**
 Caution! Mounting bolt not maintenance free!

ATTENTION: **TOP** mark facing upwards in working position.



Bolt kit 3 341 2802 10

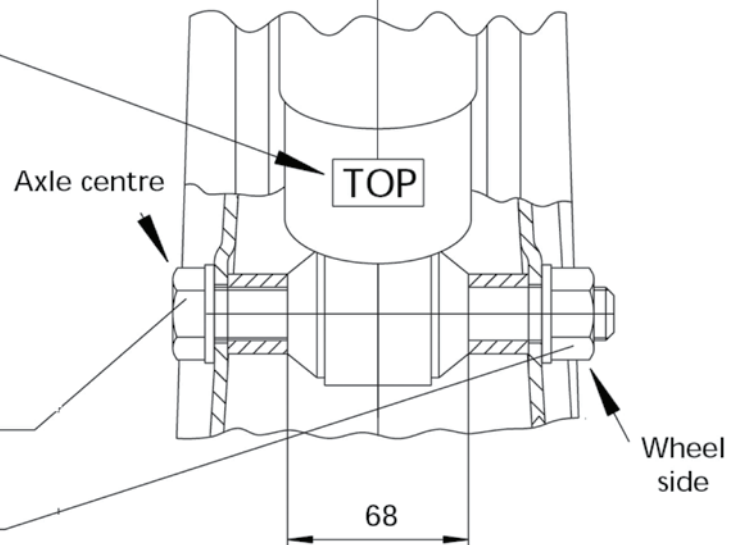
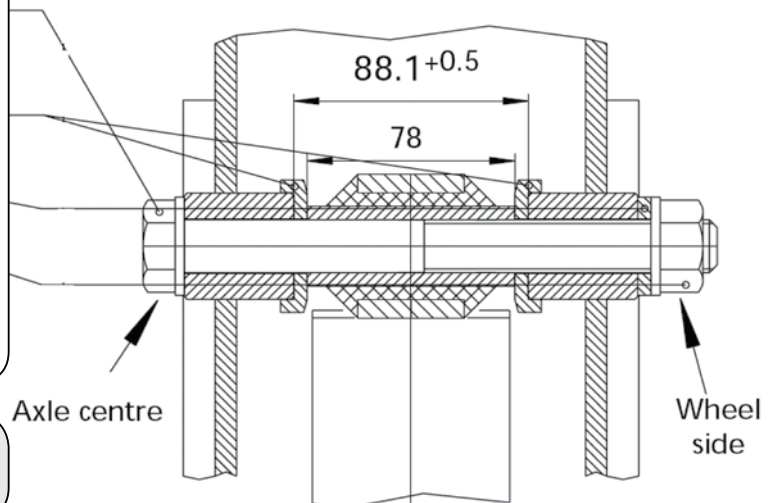
PART NO.	DESCRIPTION
4 343 2802 10	Collared bolt M20x1.5x150 - Gr 10,9 dacromet coated
4 247 4044 10	Collared nut M20x1.5 - Gr 10

Tightening torque: **Contact surfaces dry 600 Nm**

NOTE: All shock bolts to be tightened at the specified ride height!

Nuts to be used only once.

Aluminium hanger bracket



Functional suspension arm

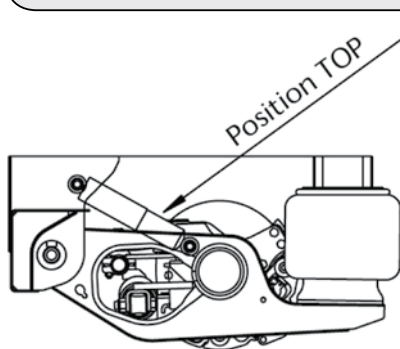
Crossmember and suspension arm / steered axle / V = 110

Bolt kit 3 341 2802 10

PART NO.	DESCRIPTION
4 343 2802 10	Collared bolt M20x1.5x120 - Gr 10,9 dacromet coated
4 247 4044 10	Collared nut M20x1.5 - Gr 10

Tightening torque: **Contact surfaces dry 600 Nm**

ATTENTION: TOP mark facing upwards in working position.



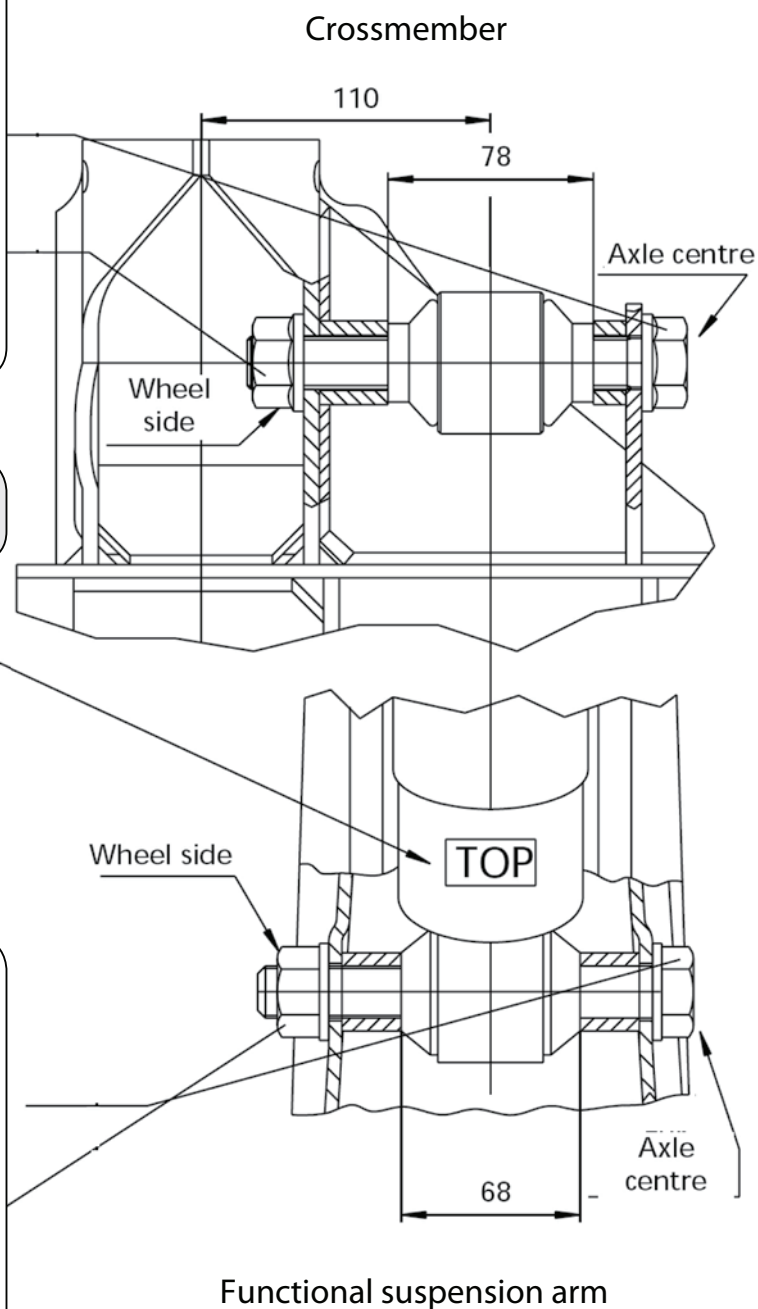
Bolt kit 3 341 2802 10

PART NO.	DESCRIPTION
4 343 2802 10	Collared bolt M20x1.5x150 - Gr 10,9 dacromet coated
4 247 4044 10	Collared nut M20x1.5 - Gr 10

Tightening torque: **Contact surfaces dry 600 Nm**

NOTE: All shock bolts to be tightened at the specified ride height!

Nuts to be used only once.



Axle alignment

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

Semi-trailers with self steering axle

Distance A, B, C (**Figure 81**) max. permissible deviation 1.0 mm,

Toe setting $\pm 12' = \pm 3.0$ mm/m Camber $\pm 12'$

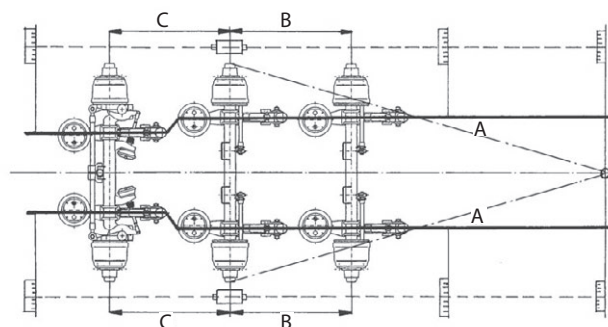
Values apply to unloaded vehicle.

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.

Figure 81



Trailer

Distance A, B, C (**Figure 82**) max. permissible deviation 1.0 mm,

Toe setting $\pm 12' = \pm 3.0$ mm/m Camber $\pm 12'$

Values apply to unloaded vehicle.

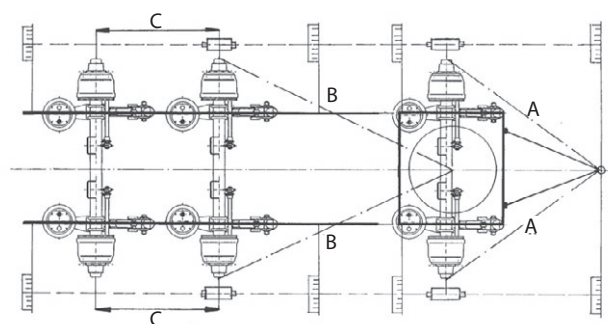
Air suspension must be in Ride Height for axle alignment check and re-adjustment works.

The max. permissible deviation values for axle alignment are according to the tyre manufacture specifications.

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

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

Figure 82



Semi-trailer tilt angle

Ride Heights (**Figure 83**)

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

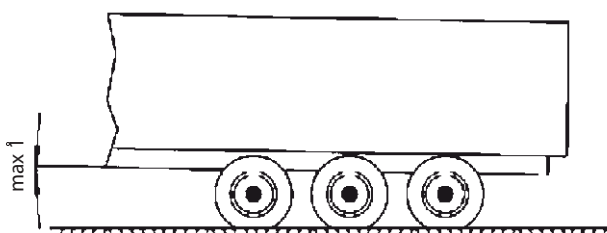
With single axles, allow for a minimum suspension travel of 60 mm.

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

Exception:

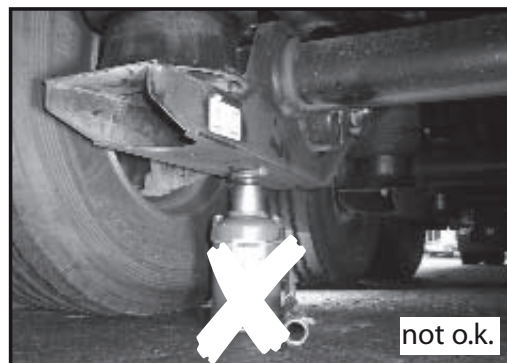
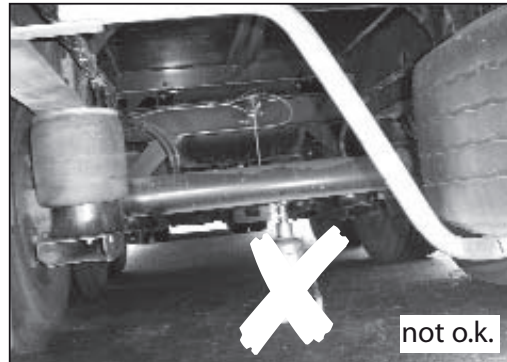
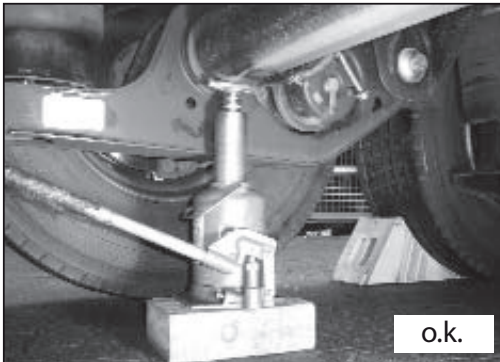
For multi-axle trailers with lift axles, the minimum suspension travel at the lift axle should not be less than 100 mm in order to ensure an adequate ground clearance.

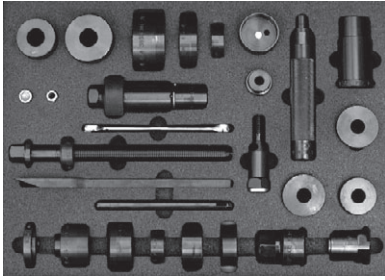
Figure 83



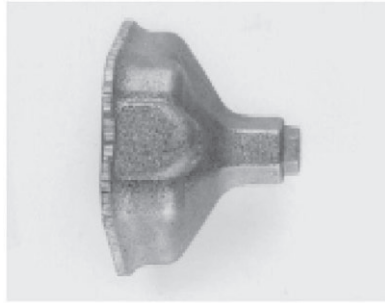
Tyre changing on fully loaded trailer with INTRA axle

Jack positioning points:





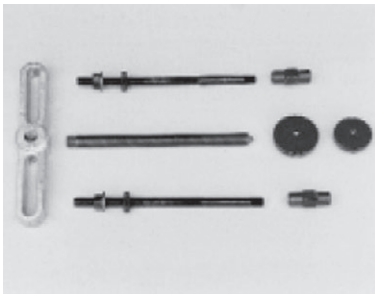
- 1. Universal disc brake tool kit**
SAF Part No. 3 434 3328 00



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



- 2a. Axle nut wrench W.A.F. 85mm**
SAF Part No. 4 434 3828 00



- 3. Universal hub puller**
SAF Part No. 4 434 3822 00



- 4. 3D bush tool**
SAF Part No. 3 434 3326 00 (Imported)
SAF Part No. 2 501 890 (Local)



- 5. Ring/open-end spanner with adaptor WAF 8 / 10 mm**
SAF Part No. 3 434 3327 00



- 6. Wheel cap removal lever**
SAF Part No. 1 434 1041 00

The following tightening torques are only valid if no other values are given in the axle maintenance chart.
 Torque wrench 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 1.5		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

10 Stud ISO M22 Stud - 600Nm

Please follow wheel manufacturers recommendations.

Appendix 1

Service of the Hub Unit.

SAF-Holland has repair kits available for the hub units on the ZI9-19W and SKRZ9019W axles as follows:

ZI9-19W

Re Lubrication kit	3 434 3025 00
Bearing Replacement Kit	3 434 3022 00

SKRZ9019W

Re Lubrication kit	3 434 3014 01
Bearing Replacement Kit	3 434 3012 00

Service Intervals

Bearing Replacement should be carried out when the axial clearance of the bearing passes the wear limit of 0.20mm.

Please see the instructions on the following pages; whilst the hub design is different the same basic procedure applies for both hub designs.

It is impossible to state a re-lubrication periods that can cover all situations and these need to be determined by the operator as they know their operating conditions better than anyone else. Below is a guide line that can be adjusted to suit, that follows the basic Guarantees of Competence offer by SAF-Holland.

Sealed Surface On-Highway operation	5 years or 1,000,000kms whichever comes first.
Un Sealed Highway or Off-Highway operation	3 years or 500,000kms whichever comes first.

For Multi Shift, Forestry, Construction Site or Extreme operation a suitably reduced interval should be introduced, this is normally given as a reduction by half of the above given periods, but this can be adjusted to the operators unique conditions.

Excessive grease leakage from the seal requires immediate action and re-lubrication to prevent bearing failure.

Note: It must be remembered that the life of the bearing lubricant is severely affected by heat. For example, If you have had an overheating brake for any reason, after the cause of the overheating is rectified it is strongly recommended that the bearing lubricant is replaced as soon possible to prevent an 'in service failure' at a later date.

As for the SKRZ9019 axle, a minimum of 230 grams of grease is required in each hub unit. It is recommended that this is increased in off highway or double shifting operations.

Extra lubricant can be purchased as follows:

5 387 0011 05	230 Grams
5 387 0011 01	Cartridge
5 387 0011 06	5kg Bulk Tubs

As for the ZI9-19 axle a minimum of 90 grams of grease is required in each hub unit. It is recommended that this is increased in off highway or double shifting operations.

Extra lubricant can be purchased as follows:

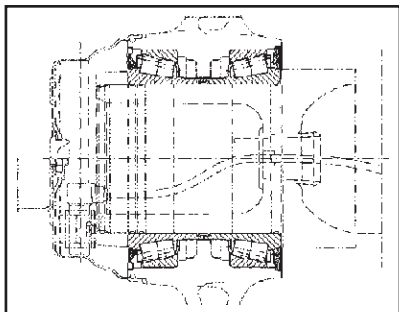
5 387 0023 09	90 Grams
---------------	----------

Anti-Fret Paste

5 387 0015 06	1kg Bulk Tin
5 387 0015 01	5 gram sachet
77164	Loctite Nickel Anti-Seize 771

Replacement instructions

SAF



Arrangement of wheel bearing assembly with seals on the SKRZ9019

Repairing the wheel bearings

Changing the wheel bearing grease

As the operations are identical for both procedures, the descriptions are contained in the same chapter.



Wheel bearing kit

The following 3 procedures are possible:

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

The wheel bearing has to be disassembled for the inspections; replace any parts which are worn or damaged.

The wheel bearings must be in a good and serviceable condition.

The outer races must still have a correct, secure seating in the wheel hub.

The wheel bearing must turn freely without noises.

During assembly of the wheel bearing set, ensure absolute cleanliness of all the parts as even the slightest dirt can significantly reduce the service life of the wheel bearings.

Note:

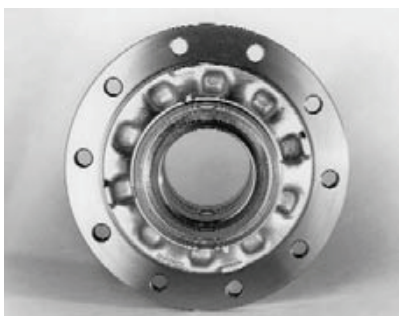
Replacement of only one bearing is not permitted.

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

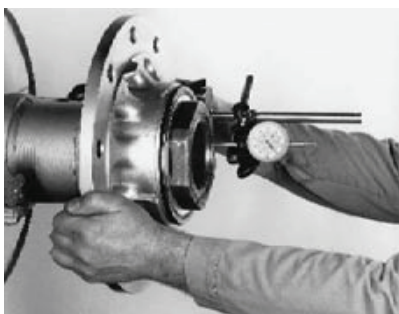
The wheel bearing axial clearance must not exceed 0.2 mm.

If the permissible limit for the wheel bearing clearance of 0.2 mm is exceeded, the wheel bearing set or optionally, the bearing hub must be replaced.

Checking of the axial clearance should be expediently carried out when changing the brake disc.

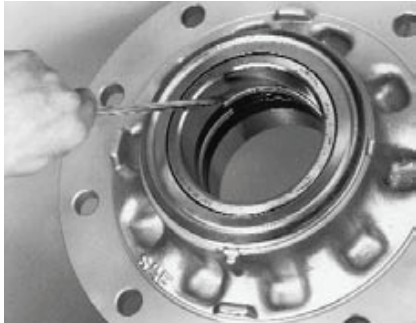


Original compact hub



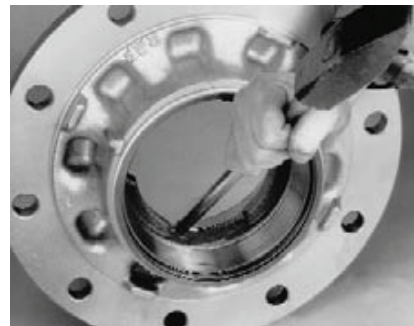
Replacement instructions

SAF



Removing the wheel bearing assembly

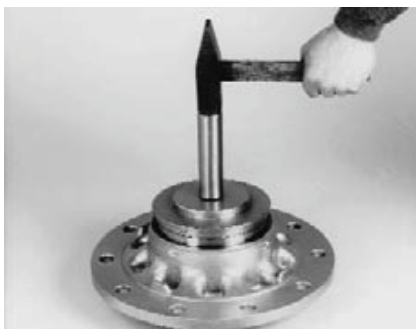
Lever out the retaining ring using a screwdriver or pick.



Place a drift against the joint of the two wheel bearings and drive the bearing inner races out of the wheel hub together with the seal rings.

Drive the bearing outer races out of the hub housing using a normal workshop drift.

Thoroughly clean the hub housing.



Installing the wheel bearing assembly

Drive both bearing outer races into the hub housing until they bottom.

Use installation tool, SAF Part No. 1 434 3321 00, for the SKRZ9019W as shown).

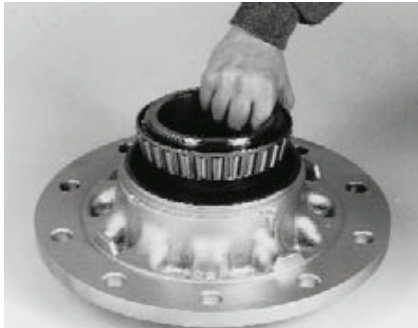
Pack the space between the bearing outer race and shoulder with long-life grease.

Coat the taper roller bearing with the remaining grease.

Distribute the grease supplied in the repair kit uniformly over both bearings and use up completely.

Replacement instructions

SAF



Place the bearing inner races into the hub.

Secure both bearing inner races with the retaining ring.

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



Fit the seal rings.

Ensure that the seals are correctly assembled and fitted. Pay special attention to the inner seal lip and the fitment of the seal runner. Also ensure the tension spring is correctly installed in the seal.



Press the seal rings into the hub on both sides using an installation tool, until they are flush with the edge of the hub.

If the hubs are subsequently painted, ensure that the contact surface for the wheel is not painted.

Warning:

Incorrect fitment of the seal or the bearing can result in a failure of the hub assembly, which if not avoided can lead to serious injury or loss of life.

NEWLY AVAILABLE ...

MOUNTING TOOL SAF COMPACT BEARING

MOUNTING TOOL BEARING RACE AND EXCITER RING



Mounting tool for assembly of:

- outer bearing races
- exciter rings

For axle type:

SK RB 9022KI (01), SK RB 9019KI
SK RB 9019WI, SK RB 9022WI
B(I)9-19K, B(I)9-19W, B(I)9-22K01,
B(I)9-22W (-6), BA9-22K01

Article N°:
1 434 3321 00

MOUNTING TOOL SEAL



Mounting tool for assembly of:

- Seals -outer-
- Seals -inner-

For axle type:

SK RB 9022KI (01), SK RB 9019KI
SK RB 9019WI, SK RB 9022WI
B(I)9-19K, B(I)9-19W, B(I)9-22K01,
B(I)9-22W (-6), BA9-22K01

Article N°:
1 434 3322 00



CAUTION:

For professional and proper assembly of SAF compact bearings both mounting tools are necessary.

IMPORTANT NOTICE:

Maintenance work has always to be carried out by trained personnel only!
Please do always follow SAF instructions for repair and maintenance!

Important Info 54 – Service

New Service tool: mounting tool for hub units on axles

To avoid damages on the axle spindles and to make the assembling easier you can use the mounting tool for hub units.

SAF's mounting tool for hub units makes it easier to place the hub unit onto the axle spindle. The universal mounting tool can be used both for axles with disc brakes and for axles with drum brakes. You can use it for assembly as well as disassembly. It is suitable for both axle spindles because of a right-hand thread and a left-hand thread.



Fig.1 Mounting tool with right/left-hand thread

You can order this mounting tool with the following order number:

4 434 1067 00 Bearing seat Ø 82 mm

4 434 1068 00 Bearing seat Ø 88 mm

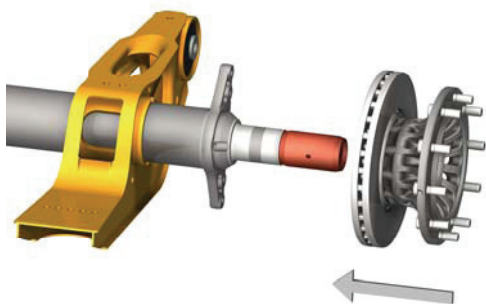


Fig.2 Mounting tool for axles with disc brake

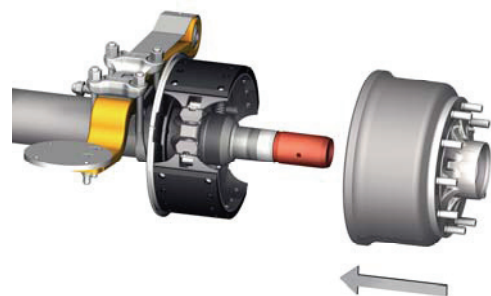


Fig.3 Mounting tool for axles with drum brake

Appendix 2

SAF Brake Cylinders for disc brakes

Installation and Service Guide

Contents

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Installation of the Single Diaphragm Cylinder	3
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**SAF Brake Cylinders for disc brakes
Installation and Service Guide****Safety Information**

- **IMPORTANT:**
During all work on the brake system, always block the wheels of the trailer in order to prevent the trailer rolling away.
- **CAUTION:**
The brake cylinder internal parts are under a spring preload of approx. 10,000 N. Mishandling or opening the brake cylinders can result in serious injuries or even death and is therefore strictly forbidden.
- **WARNING:**
Should the brake cylinders show signs of material damage, significant corrosion or other damage indicating a safety risk or incorrect function of the brake cylinders, the brake cylinders must be immediately replaced by qualified service personnel (brake specialist or motor mechanic). Take particular care when handling damaged brake cylinders. The opening of damaged brake cylinders is strictly forbidden.
- **CAUTION:**
If, during installation of the double diaphragm cylinders, the parking brake section is not released using the release tool bolt, the plunger of the brake cylinder may not fully engage in the lever arm of the disc brake. This can result in a limited function of the brake and serious damage and/or severe or even fatal injuries.
- **CAUTION:**
During operation, the release tool bolt must always be removed and stored in the bracket provided on the cylinder housing. The release tool bolt serves only for the manual caging of the parking brake with the trailer in pressure-free state (e.g. disconnected trailer without compressed air supply).
- **CAUTION:**
The drain vent holes of the brake cylinders must always be open. If the bottom-most drain vents are closed, this can result in damage to the brakes. SAF accepts no liability for damage caused by closed bottom-most drain vents.

SAF Brake Cylinders for disc brakes Installation and Service Guide

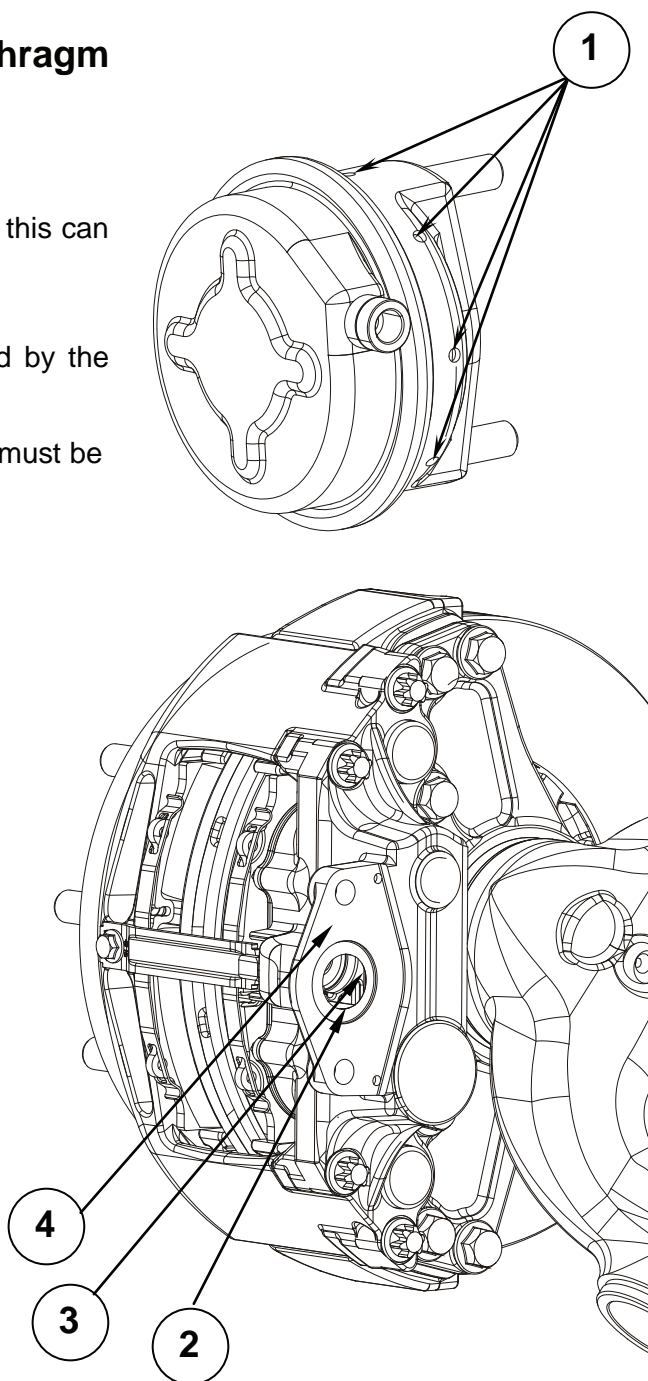


Installation of the SAF Brake Cylinders

The SAF brake cylinders are normally supplied ready for installation. Generally the drain vents are open. The SAF double diaphragm cylinders with parking brake section are supplied with mounted release tool bolt and released parking brake function.

Installation of the Single Diaphragm Cylinder

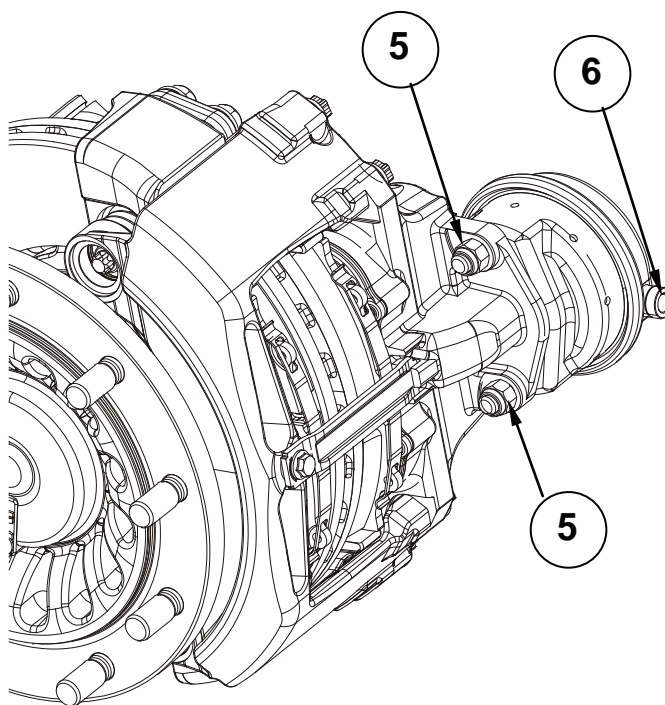
- **CAUTION:**
If the bottom-most drain vent hole is closed, this can result in damage to the brake.
- **CAUTION:**
SAF accepts no liability for damage caused by the bottom-most drain vent holes being closed.
- The sealing surface on the brake caliper (2) must be free from dirt and corrosion.
- Before installation of the single diaphragm cylinder, grease the spherical cap (3) in the brake lever. Be sure to observe and strictly comply with the brake manufacturer's instructions and recommendations here.
- Inspect the flange surface on the brake caliper (4) for flatness and cleanliness. Clean, if necessary.
- Also inspect the plungers, seals and flange surfaces of the brake cylinder for soiling and damage. Clean, if necessary.
- Move the diaphragm cylinder to its final position, ensuring that the plunger of the brake cylinder engages in the spherical cap of the brake lever.
- If the plunger is not in the correct position, it can be corrected as follows:
Pressurise the service brake section of the brake cylinder with compressed air five times and then relieve the pressure again. If the connecting rod has still not moved to the middle or if no compressed air is available, try to manoeuvre the connecting rod into the middle manually by careful shaking and pushing.



SAF Brake Cylinders for disc brakes Installation and Service Guide



- Screw on fastening nuts SAF 4 427 4043 80 symmetrically by hand until the brake cylinder is in full contact. Then torque the fastening nuts symmetrically to 120 Nm; then tighten the fastening nuts finally and symmetrically to 210⁻³⁰ Nm.
 - **CAUTION:**
Only new SAF fastening nuts M16x1.5 to DIN EN ISO 10513 may be used.
 - Torque the connecting elements of the compressed air lines on the air connections **(6)** of the brake cylinder to 40^{±5} Nm. Be sure to observe the instructions from the manufacturers of the connecting elements.
 - **CAUTION:**
When connecting the compressed air lines, be sure to observe the circuit diagrams and instructions of the trailer manufacturer.
- Air connections allocation:
Service brake part **(6)**
- **CAUTION:**
After installation, be sure to carry out a function check of the service brake system.

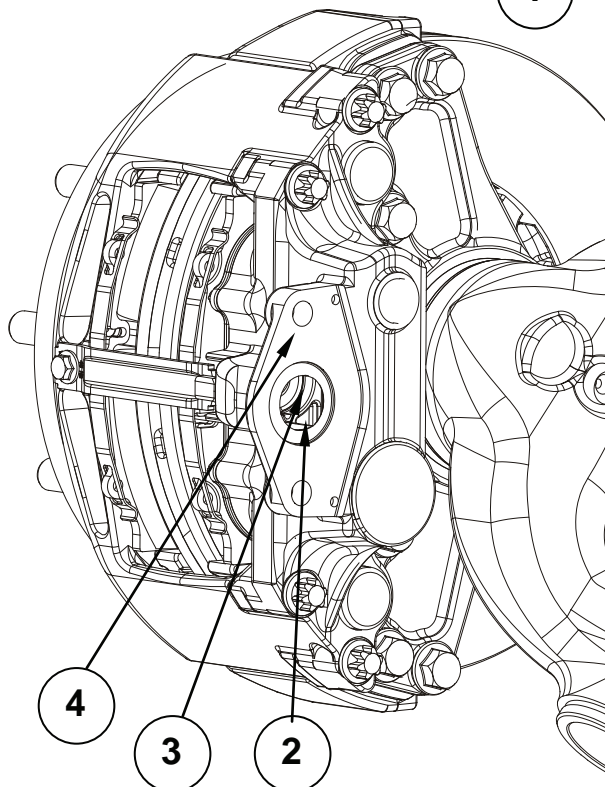
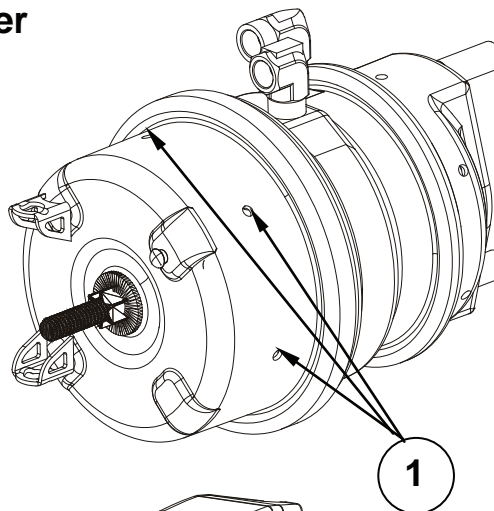


SAF Brake Cylinders for disc brakes Installation and Service Guide

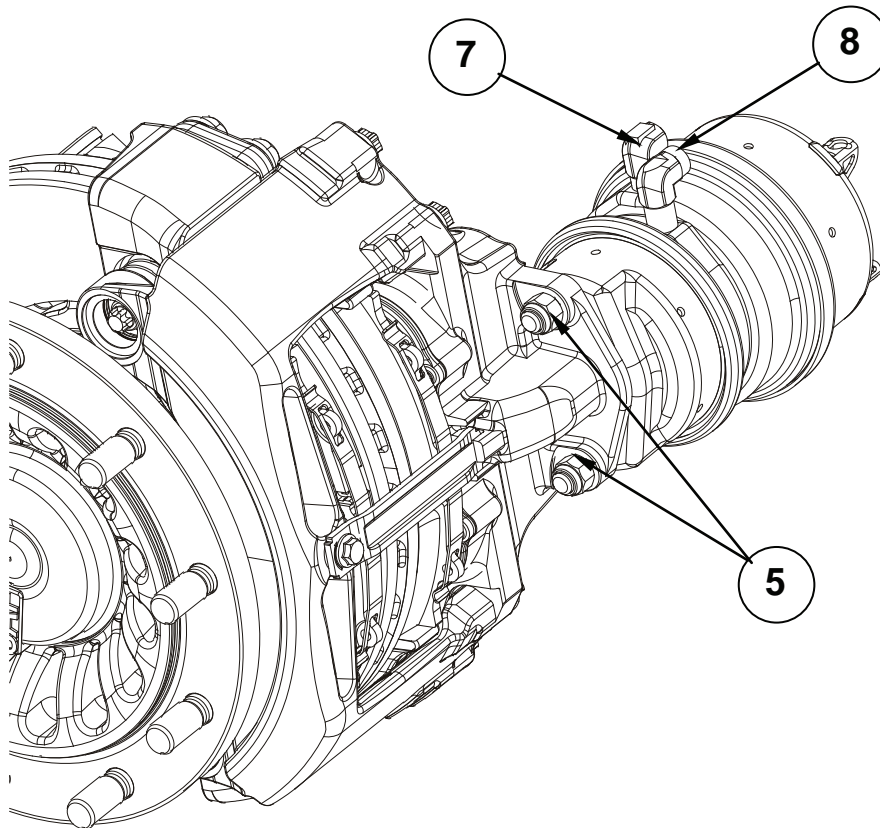


Installation of the Double Diaphragm Cylinder

- **CAUTION:**
If the bottom-most drain vent hole is closed, this can result in damage to the brake.
- **CAUTION:**
SAF accepts no liability for damage caused by the bottom-most drain vent holes being closed.
- The sealing surface on the brake caliper **(2)** must be free from dirt and corrosion.
- Before installation of the double diaphragm cylinder, grease the spherical cap **(3)** in the brake lever. Be sure to observe and strictly comply with the brake manufacturer's instructions and recommendations here.
- Inspect the flange surface on the brake caliper **(4)** for flatness and cleanliness. Clean, if necessary.
- Also inspect the plungers, seals and flange surfaces of the brake cylinder for soiling and damage. Clean, if necessary.
- Check that the parking brake function is disengaged (normal delivery condition) and that the release tool bolt is installed. If the parking brake function is not disengaged, please refer on the disengagement of the parking brake function.
- Move the double diaphragm cylinder to its final position, ensuring that the plunger of the brake cylinder engages in the spherical cap of the brake lever.
- If the plunger is not in the correct position, it can be corrected as follows: Pressurise the service brake section of the brake cylinder with compressed air five times and then relieve the pressure again. If the connecting rod has still not moved to the middle or if no compressed air is available, try to manoeuvre the connecting rod into the middle manually by careful shaking and pushing.
- Screw on fastening nuts SAF 4 427 4043 80 **(5)** symmetrically by hand until the brake cylinder is in full contact. Then torque the fastening nuts symmetrically to 100 Nm; then tighten the fastening nuts finally and symmetrically to 180⁺³⁰ Nm.



SAF Brake Cylinders for disc brakes Installation and Service Guide



- Torque the connecting elements of the compressed air lines on the air connections **(7+8)** of the brake cylinder to 40^{+5} Nm. Be sure to observe the instructions from the manufacturers of the connecting elements.
- **CAUTION:**
When connecting the compressed air lines, be sure to observe the circuit diagrams and instructions of the trailer manufacturer.

Air connections allocation:

Parking brake part **(7)**

Service brake part **(8)**

- **CAUTION:**
During operation, the release tool bolt must always be removed and stored in the bracket provided on the cylinder housing. The release tool bolt serves only for the manual caging of the parking brake with the trailer in pressure-free state (e.g. disconnected trailer without compressed air supply). See also section: Removal of the release tool bolt.
- **CAUTION:**
After installation, be sure to carry out a function check of the service and parking brake system.

**SAF Brake Cylinders for disc brakes
Installation and Service Guide**

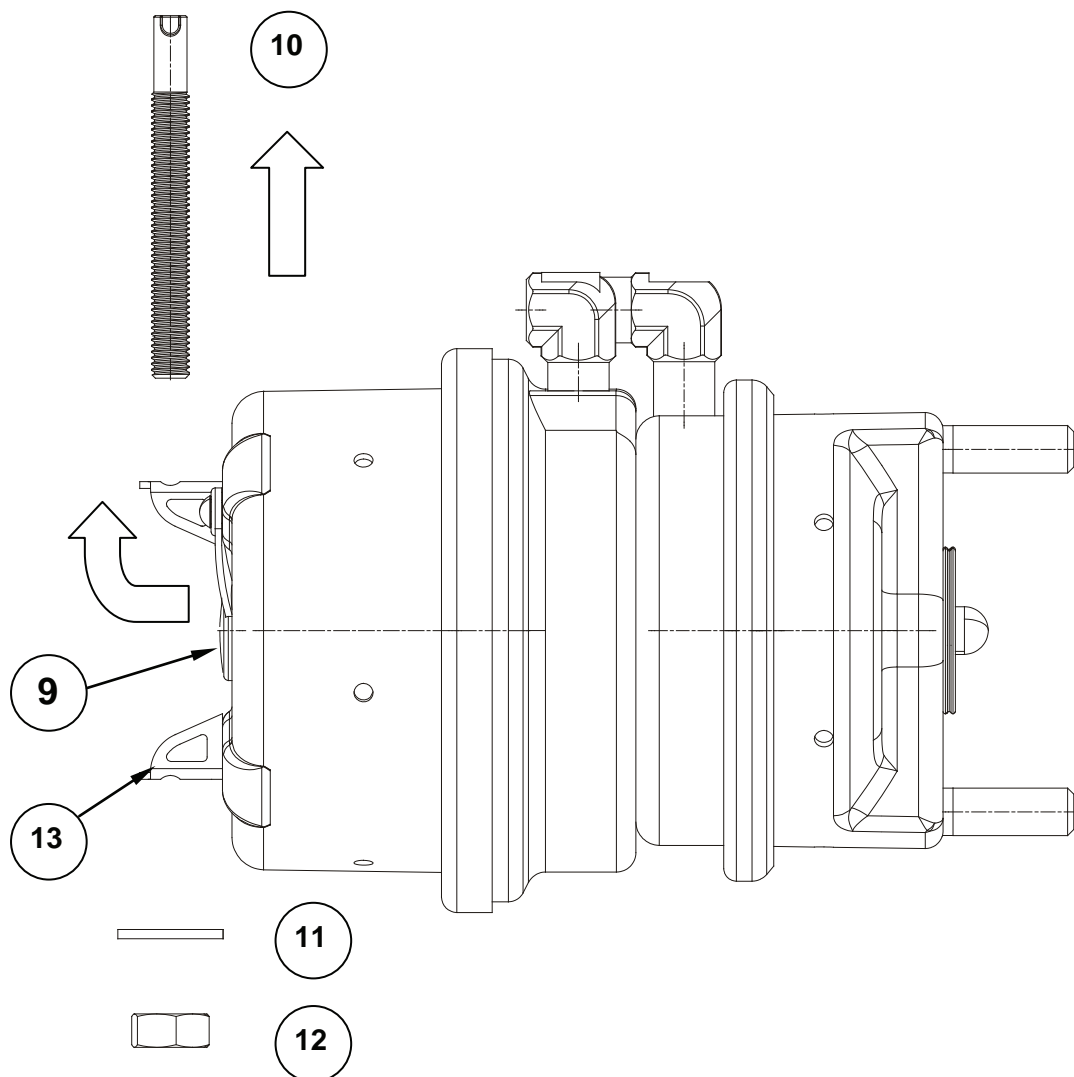


Mechanical Release (Caging) and Blocking of the Parking Brake with Double Diaphragm Brake Cylinders

The parking brake should preferably be released (caged) by using compressed air. If no compressed air is available, the parking brake can alternatively be caged solely using the release tool bolt supplied.

Caging the Parking Brake using Release Tool Bolt with Compressed Air

- Remove the dust plug (9) from the release tool bolt access hole in the middle of the cylinder housing.
- Remove the release tool bolt (10), washer (11) and nut (12) from its holder (13).

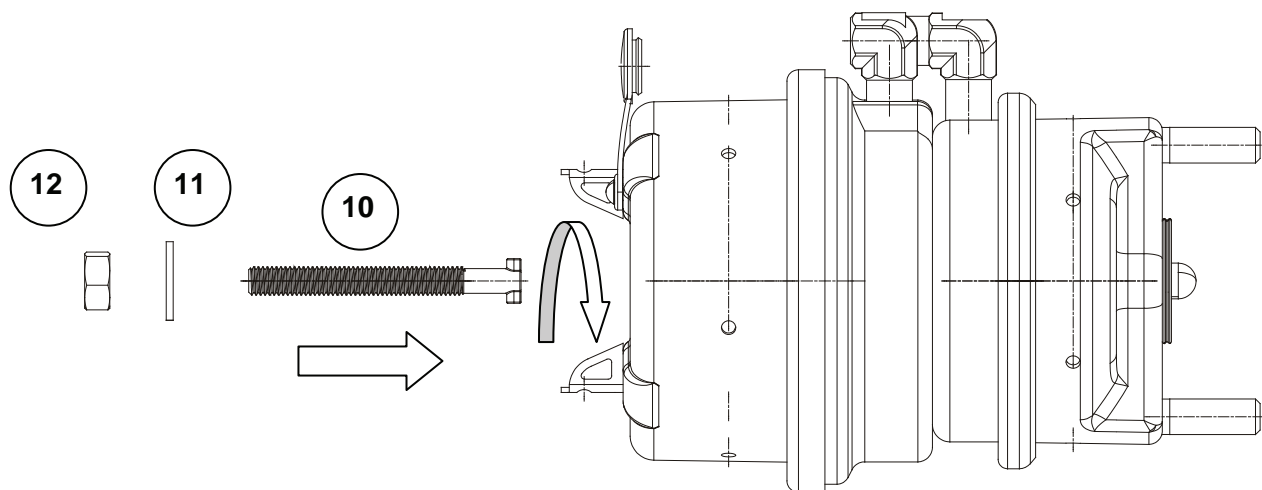


- Apply a vehicle or workshop air pressure of 8.3 bar (120 psi), but at least 6.2 bar (90 psi), to the parking brake side of the double diaphragm cylinder. Apply the brake three times and release. Maintain the air pressure obtained.

SAF Brake Cylinders for disc brakes Installation and Service Guide



- Insert the release tool bolt **(10)** through the access hole provided until engages with the mating piece (pressure plate) inside the brake cylinder.
- Ensure that the release tool bolt engages correctly in the recesses of the pressure plate by turning the bolt 1/4 turn clockwise and at the same time pulling outwards. If the bolt is correctly engaged in the pressure plate, it cannot be turned more than 1/4 turn and cannot be pulled out by more than 19 mm.



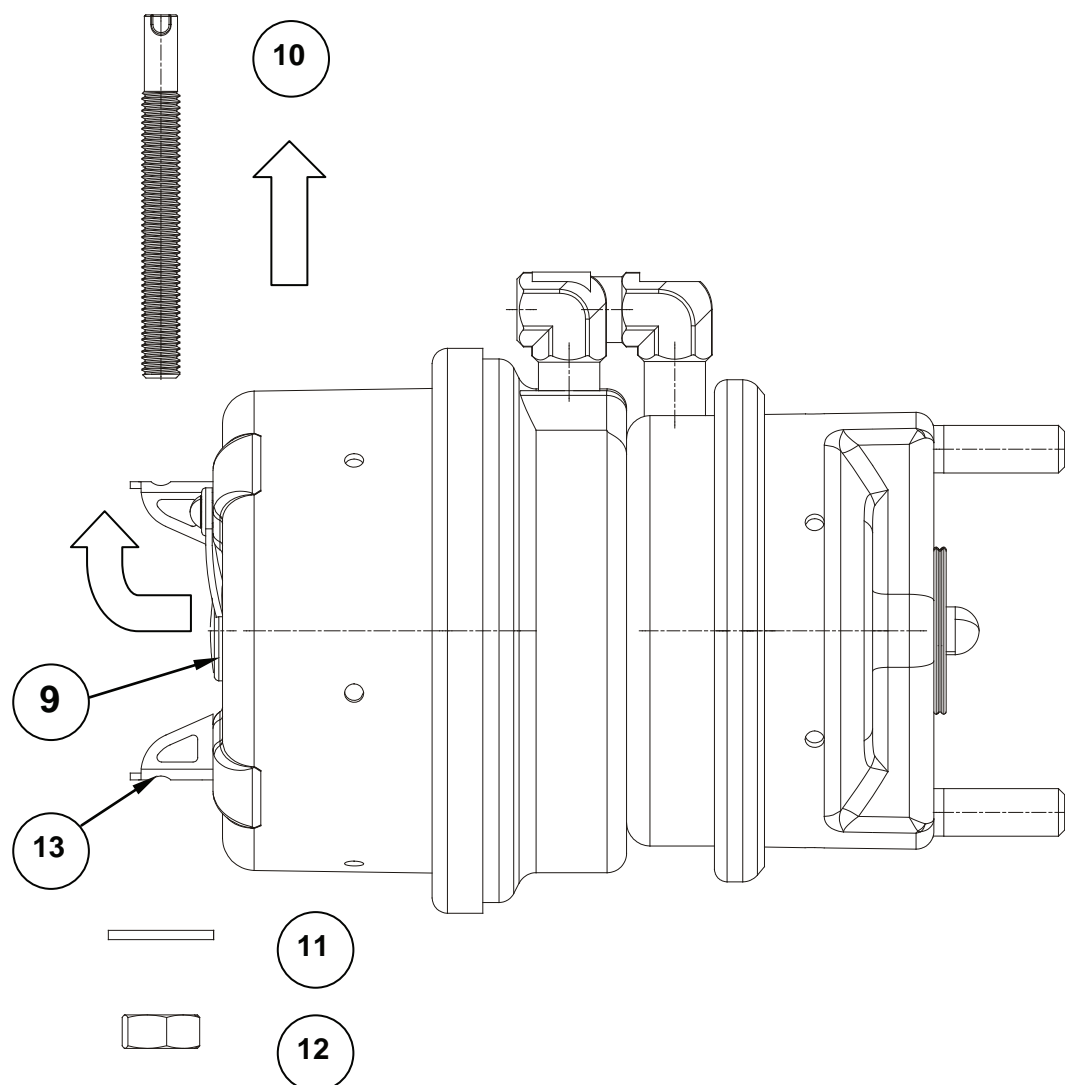
- Place the washer **(11)** of the release tool bolt onto the spindle and tighten the nut **(12)** finger-tight.
- **CAUTION:**
Do not torque the nut to more than 47 Nm. Do not use an impact wrench. Over-tightening the nut can cause damage to the pressure plate, washer and brake cylinder housing. This could lead to the sudden release of the main spring and possible springing out of further cylinder parts with the consequent result of serious material damage and/or severe or even fatal injuries.
- The parking brake is now caged. Relieve the air pressure.

SAF Brake Cylinders for disc brakes Installation and Service Guide



Mechanical Caging of the Parking Brake using Release Tool Bolt without Additional Compressed Air

- **CAUTION:**
This manual method should only be employed if the brake is not already caged delivery and no compressed air is available. The preferred method of caging is by using compressed air. Use this method only if the brake cylinders are not pressurised.
- Remove the dust plug (9) from the release tool bolt access hole (10) in the middle of the cylinder housing.

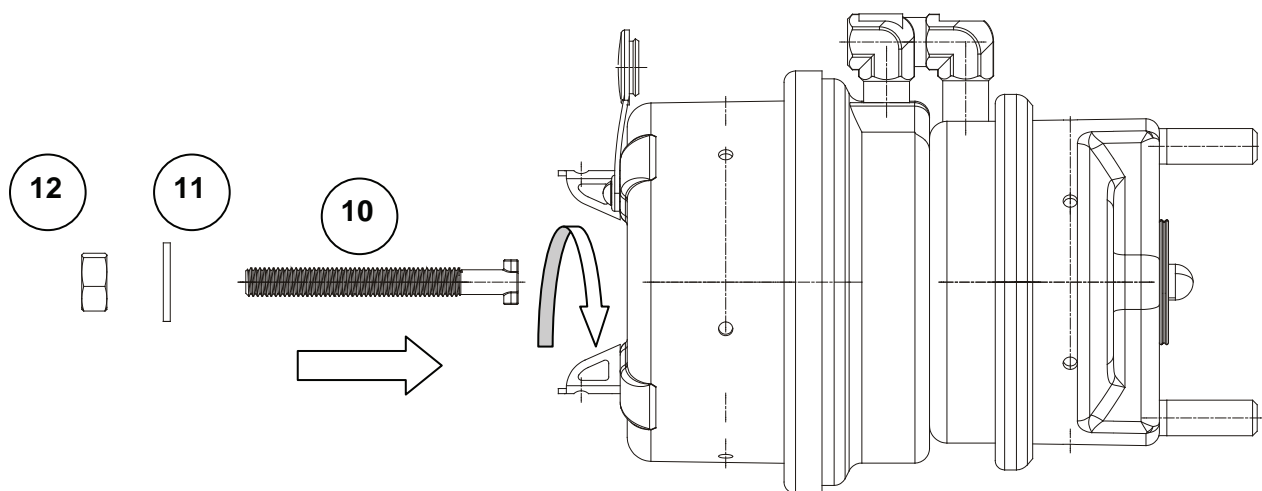


- Remove the release tool bolt, washer (11) and nut (12) from its holder (13).
- Ensure that the pressure plate is in the right position (distance to housing cover approx. 63 – 76 mm).
- Insert the release tool bolt (10) through the access hole provided until engages with the mating piece (pressure plate) inside the brake cylinder.

SAF Brake Cylinders for disc brakes Installation and Service Guide



- Ensure that the release tool bolt engages correctly in the recesses of the pressure plate by turning the bolt 1/4 turn clockwise and at the same time pulling outwards. If the bolt is correctly engaged in the pressure plate, it cannot be turned more than 1/4 turn and cannot be pulled out by more than 19 mm.



- Place the washer (11) of the release tool bolt onto the spindle and tighten the nut (12) finger-tight.
- **CAUTION:**
Do not torque the nut (12) to more than 47 Nm. Do not use an impact wrench. Over-tightening the nut can cause damage to the pressure plate, washer and brake cylinder housing. This could lead to the sudden release of the main spring and possible springing out of further cylinder parts with the consequent result of serious material damage and/or severe or even fatal injuries.
- During the tightening of the nut, the actuating plunger of the cylinder must be pulled back into the housing. Stop tightening the nut when the actuating plunger can no longer be pulled back into the housing and the maximum permissible torque of 47 Nm is reached.
- The parking brake is now caged.

SAF Brake Cylinders for disc brakes Installation and Service Guide



Removal of the Release Tool Bolt

- Cage the parking brake using compressed air.
- Remove the release tool bolt together with the washer and nut.
- Insert the release tool bolt, washer and nut into the holder provided on the cylinder head and torque the nut to 7-15 Nm an.
- Be sure to close the release tool bolt access hole with the dust plug again.
- **CAUTION:**
After removal of the release tool bolt, be sure to carry out a function check of the service and parking brake system.

Maintenance instructions

SAF

Special notes

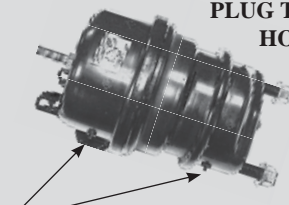
BRAKE BALANCE

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).

Ensure that brake chamber plugs are removed from the bottom most drain holes. Brake calipers are not covered by warranty for ingress of water or corrosion.

**INSTALLATION REQUIREMENTS
FOR WARRANTY VALIDATION AND
MAXIMUM CORROSION RESISTANCE,
PLUG TOP & SIDE
HOLES ONLY!**



**REMOVE PLUG FROM BOTTOM
MOST DRAIN VENT HOLES**

**Only brake cylinders approved by the brake
or axle manufacturer may be used.
Ensure the drainage holes are correctly located.**

Painting instructions

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



SAF 's history begins in 1881 in a village forge in Germany with the invention of a new plough. The family business soon starts building steel axles for agricultural vehicles, and under the name Otto Sauer Achsenfabrik (SAF) develops into one of the leading manufacturers of trailer axles and suspension systems in Europe.

A safety coupling between plough and horse team can be found at the beginning of Holland's history. The Safety Release Clevis Company was founded in South Dakota, USA , in 1910. After its move to Holland, Michigan, the company emerges as one of the largest supplier companies to the commercial vehicles industry under the name The Holland Hitch Company.

The merger of the two companies to form SAF-HOLLAND in 2006 creates one of the leading global suppliers of high-quality components and services for the commercial vehicle industry. Alongside axle and suspension systems for trailers and semi-trailers, the product range also includes kingpins and landing gear as well as fifth wheels for tractors, air suspensions, coupling products and numerous other components for buses and trucks.

Today SAF -HOLLAND is represented on all continents and distributes its products and services worldwide under the brand names SAF and HOLLAND. It can boast of an extensive distribution network with global service and dealer locations.

Transport Specialties Ltd.

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