

# General Operating and Service Manual

## SAF suspension systems and J-Series-axles with drum brakes



SAF SERVICE und ORIGINALTEILE  
SAF SERVICE and ORIGINAL PARTS

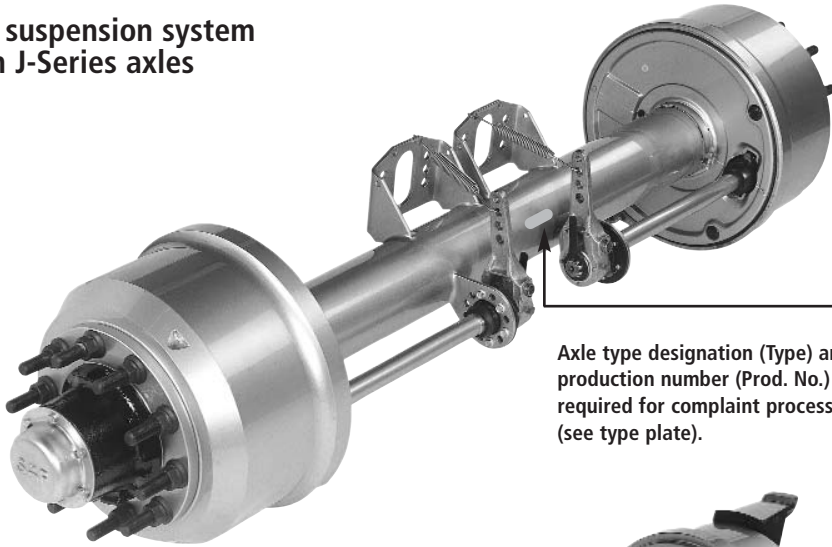
[www.saf-axles.com](http://www.saf-axles.com)

Edition 01/2006



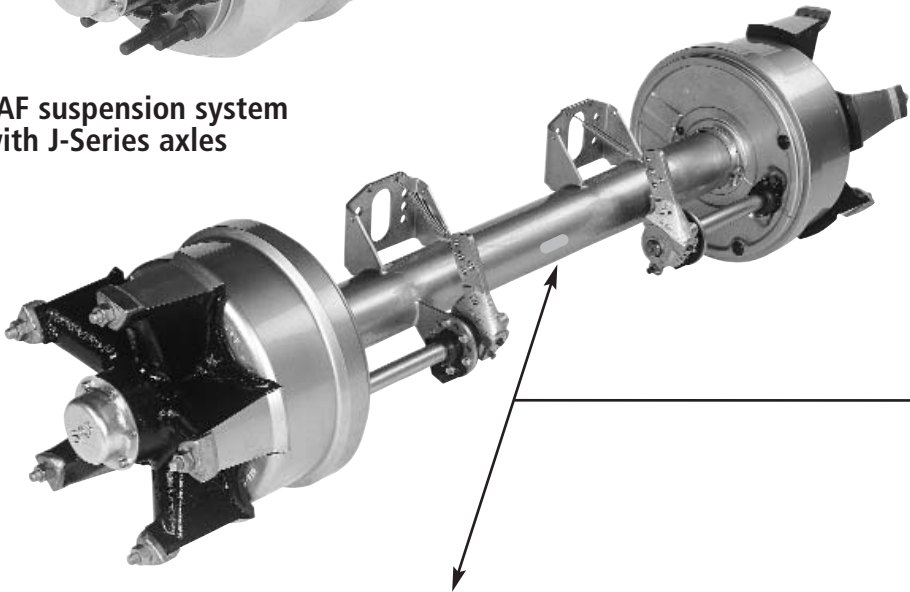
# SAF Vehicle and axle identification

## SAF suspension system with J-Series axles



Axle type designation (Type) and production number (Prod. No.) are required for complaint processing (see type plate).

## SAF suspension system with J-Series axles



<b>SAF</b> JINAN SAF AXLE CO., LTD			
TYPE	RZT12242/18C	C14712016010	
Prd.No.	0411121101		
Perm.Cap	10.000 kg	Max. Speed	105 Km/h
ADR.No	FB32245/HDTE	BrakeType	SNF420X180

Trailer manufacturer.....

Body type.....

Chassis No. ....

Date of delivery/date of registration .....

## Spare parts service for SAF axles and suspension systems

Exact type designations are required for spare parts orders.

Please enter the identification data of the suspension system in the type plate illustrated below so that the correct information is available when necessary.

<b>SAF</b> JINAN SAF AXLE CO., LTD			
TYPE	RZT12242/18C	C14712016010	
PrOd.NO.	0411121101		
Perm.Cap	10.000 kg	Max.Speed	105 Km/h
ADR.No	FB32245/HDTE	BrakeType	SNF420X180

	Prod.-No. (Serial-No.)	Type
Example:	0411121101	RZT 12242/18C
1st axle		
2nd axle		
3rd axle		
4th axle		
5th axle		

**Enter the axle data from the SAF type plate**



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## Service schedule

RZ 12242/18C, RZT 12242/18C, RZ 12242/20C, RZT 12242/20C.....	8
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**Please observe the following safety instructions in order to maintain the operational and road safety of your SAF axles and suspension systems:**

1. The wheel contact surfaces between the wheel disc and wheel hub and the wheel nut contact surface at the wheel disc must not be additionally painted. The contact surfaces must be clean, smooth and free from grease. Failure to observe this may result in the wheel coming loose. Any additional instructions of the wheel manufacturer must also be observed.
2. Only the wheel and tyre sizes approved by the trailer builder may be used. The tyres must always have the specified inflation pressure.
3. The brake systems of the tractor and the trailer/semi-trailer must be synchronised by means of a tractor/trailer brake synchronisation not later than 5,000 km after the initial start of operation of the trailer/semi-trailer in order to ensure a safe and uniform braking behaviour and uniform brake pad wear. Tractor/trailer brake synchronisations should be carried out by appropriately qualified and equipped brake workshops.  
The use of an additional braking system, such as a trailer anti-jackknife brake is forbidden by law on vehicles with type approval after January 1999.
4. Before starting a journey, ensure that the maximum permissible axle load is not exceeded and that the load is distributed equally and uniformly.
5. On trailers with air suspension, ensure that the air bags are completely filled with air before starting the journey. Incompletely filled air bags may result in damage to axles, suspension, frame and superstructure and impair road safety.
6. Ensure that the brakes are not overheated by continuous operation.  
With drum brakes, overheating can result in a hazardous deterioration in the braking efficiency.  
With disc brakes, overheating can result in damage to surrounding components – in particular the wheel bearings. This can result in a significant deterioration in road safety, e.g. failure of wheel bearings.
7. The parking brake must not be immediately applied when the brakes are hot, as the brake discs and brake drums may be damaged by different stress fields during cooling.
8. Use the supports provided when loading and unloading in order to avoid damage to the axle.
9. Observe the operating recommendation of the trailer builder for off-road operation of the installed axles and suspension systems.  
The SAF definition of OFF-ROAD means driving on non-asphalted / non-concreted routes, such as e.g. gravel roads, agricultural and forestry tracks, on construction sites and in gravel pits.  
Off-road operation of SAF axles and suspension systems not designed for the purpose may result in damage and hence to an impairment of road safety.
10. SAF axles and suspension systems require continuous care, service and maintenance in order to maintain operational and road safety and to be able to recognise natural wear and defects in good time.  
The daily inspection of the trailer for road safety before starting the journey is one of the driver's obligations. SAF recommends that at least the inspections and maintenance operations described on page 26 should be carried out.

We recommend the use of original SAF spare parts.

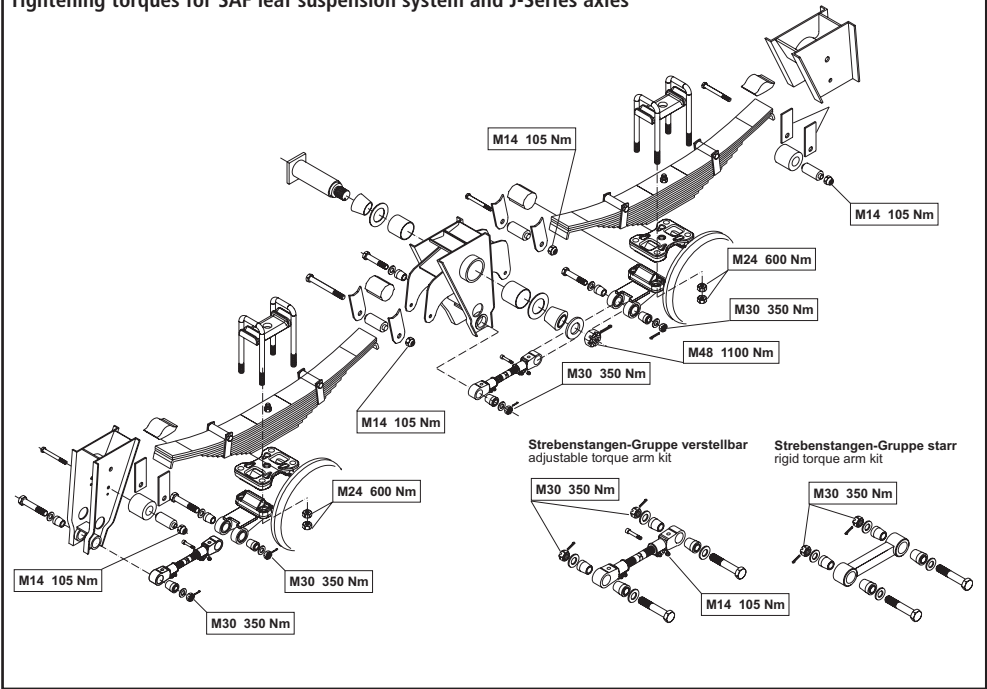
A close-knit service network of SAF partner companies is available for the technical support of the SAF axles and suspension systems and for the supply of original SAF spare parts (see rear cover or on the Internet under [www.saf-axles.com](http://www.saf-axles.com)).

Updates will be published as necessary on the Internet under [www.saf-axles.com](http://www.saf-axles.com).

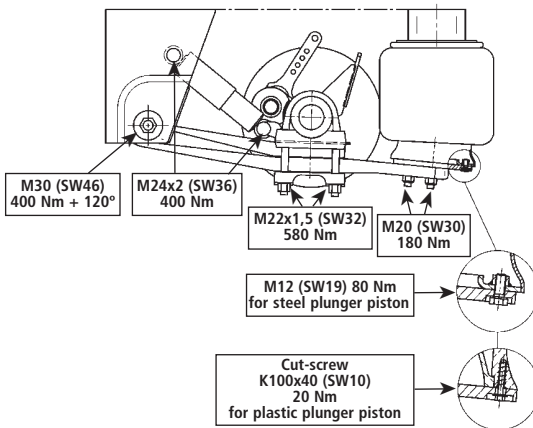
- **Caution:** After every wheel change, always retighten the wheel nuts to the prescribed torque after 50 km and again after 150 km.
- Check the brake lining thickness at regular intervals.
- Carry out general visual inspections of the brakes, tyres and all suspension components at regular intervals and check for proper attachment, wear, leaks, corrosion and damage.
- Carry out regular visual inspections of the wheel bearing unit for grease leaks and axial clearance. Wheel bearing grease change, see page 8.
- Regularly check the camshaft for smooth return and the slack adjuster for proper function.
- Lubricate the camshaft at regular intervals.
- Inspect the brake drum for wear\* and cracking at every brake lining change. Minimum wear limits\*, see page 8.
- Replace the brake shoe return springs at every brake lining change.
- Check the air suspension ride height at regular intervals in accordance with the trailer builder's specifications and adjust as described on page 13.
- On all units, check that the bolts of the U-brackets are tightened to the prescribed torques as described on page 7.
- Carry out a general safety check in accordance with the statutory provisions.
- We recommend the use of original SAF spare parts.

\* We recommend that a general safety check is carried out when the minimum wear limit is reached.

## Tightening torques for SAF leaf suspension system and J-Series axles



## Tightening torques for SAF air suspension system and J-Series axles



### Attention!

- Threads not to be oiled or greased!
- Pivot bolt on steel hanger brackets maintenance-free.

## Axle types

### RZ 12242/18C, RZT 12242/18C, RZ 12242/20C, RZT 12242/20C

#### Adjust wheel bearing clearance:

Tighten the WAF 85 axle nut to 150 Nm, turning the wheel hub at the same time.

Turn back the axle nut by 2 1/2 holes of the lock washer.

Push on the lock washer and secure the axle nut with the locking pin.

Tighten the lock nut to 400 Nm.

Check the running and rock of the wheel bearing.

The wheel must turn without resistance and no rock may be felt at the wheel rim. Correct the adjustment, if necessary.

Replace the O-ring and fit the wheel cap.

Replace the brake shoe return springs at every brake pad change.

#### Grease specifications

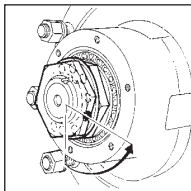
For wheel bearings:  
SAF Part No. 5 387 0011 05

For camshaft:  
SAF Part No. 5 387 0011 05

For axle stub end:  
SAF mounting paste  
SAF Part No. 5 387 0021 01

For ball in brake carrier:  
Copper paste  
SAF Part No. 5 387 0014 01

#### Tighten axle nuts



#### Note during brake repairs:

Lubricate the camshafts, rotating the camshaft through 360° several times.

Do not dismantle the wheel bearing unit.

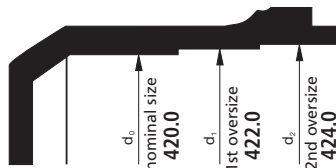
Use a vacuum cleaner to remove brake dust.

Use of a high-pressure cleaner or liquid cleanser is not permitted on the brake drum and brake hub.

Remove old grease from the stub axle and regrease.

**Max. permissible axial backlash of hub unit:**

**0 - 0.20 mm**



424.0 mm  
425.0 mm

#### BRAKE SNF 420

Max. admissible brake drum machining diameter:

Max. admissible brake drum wear diameter:

Use only brake lining qualities recommended and approved by SAF!

Machine new brake linings to diameter + 0.3 mm of the brake drum.

When riveting on, observe the lining form (see instructions in the pack).

Brake size	SAF Part No. Brake lining	Brake drum / brake lining Repair stages in mm			Brake lining	Rivet	Rivet DIN 7338
		Normal dimension	1st repair stage	2nd repair stage			
		$d_0$ -420.0	$d_1$ -422.0	$d_2$ -424.0			
x 180	3 057 9912 00	17.5			8	80	B8 x 15
	3 057 9912 10		19.0		8	80	B8 x 15
	3 057 9912 20			20.0	8	80	B8 x 15
x 200	3 057 9913 00	17.5			8	80	B8 x 15
	3 057 9913 10		19.0		8	80	B8 x 15
	3 057 9913 20			20.0	8	80	B8 x 15

#### Assembly tools

##### Axle types 12242

Axle nut wrench	4 434 3828 00
Puller for wheel hub	3 301 0010 00
Universal puller for wheel hub	4 434 3822 00
Fitting mandrel for wheel bearing and seal ring	3 434 3320 00
Fitting mandrel for cassette seal ring	3 434 1036 00
Brake shoe tensioner	3 349 1001 00

#### SAF Part No.



## Check the brake setting

### Adjustment of S-cam brakes with manual slack adjusters

The natural wear of the brake drum and brake lining necessitate frequent adjustment of the wheel brakes in order to maintain the maximum stroke of the brake cylinders. In order to achieve good braking, it is essential to minimise the clearance between the brake drum and brake lining. In order to check the clearance, the service brake is applied with full pressure and the stroke of the brake cylinder checked. If the stroke at the yoke end is more than 2/3 of the maximum cylinder stroke, the brake must be urgently adjusted. If the brakes are correctly adjusted, it should not be possible to move the piston rod more than 15 mm by hand.

No clearance between piston and diaphragm permitted in the rest position.

Adjustment is performed at the adjustment screw (WAF 19)

- 1 Turn the adjusting screw to the right until the
- 2 brake shoes are firmly up against the brake drum.
- 3 Turn the adjusting screw to the left until
- 4 the free travel of the slack adjuster (at 127 mm) is approx. 10 - 15 mm.
- 5 It must be possible to turn the wheel freely without braking (without scraping noises).

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

- A = Angle must not exceed 90° at 1/2 stroke.
- B = No contact permissible between slack adjuster and axle beam during emergency braking.
- L = Observe piston rod length as per the SAF specifications.

## Slack adjuster

Note when changing over from mechanical slack adjuster to automatic slack adjuster:

In order to avoid damage to the wheel brake, install only the automatic slack adjuster with the prescribed adjustment gate and corresponding mounting point strap approved by SAF for the respective axle type.

Changes to the effective brake lever lengths are not admissible.

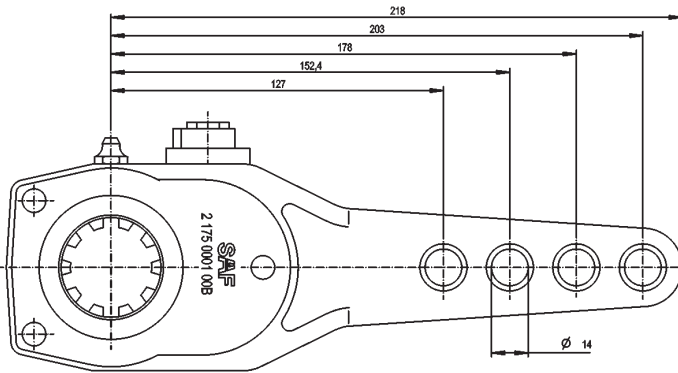
The field installation of automatic slack adjusters does not require type approval so that no inspection by the technical inspection authorities (TÜV) is necessary.

**Technical information on SAF spare part numbers and correspondence of slack adjusters and axle types can be obtained from the SAF service partners.**

From April 2004

TGL slack adjusters (14 mm hole diameter)

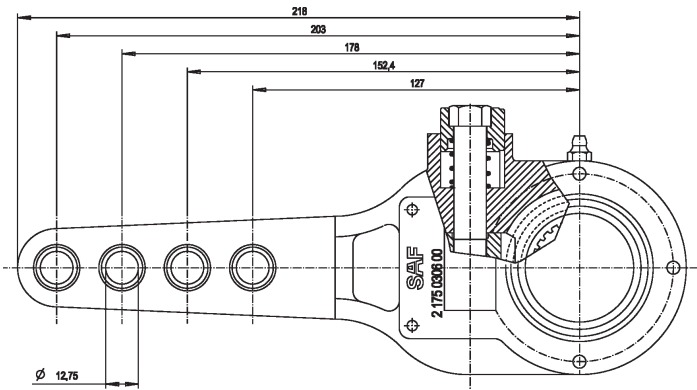
Manufacturer: Guangzhou Runhope Automotive Parts Co. Ltd.



From September 2005

QC slack adjusters (12,75 mm hole diameter)

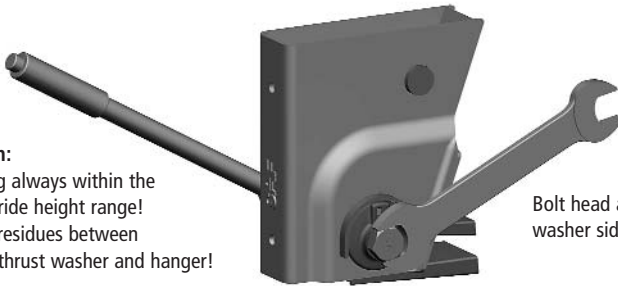
Manufacturer: Wan Xiang Qianchao Co. Ltd.



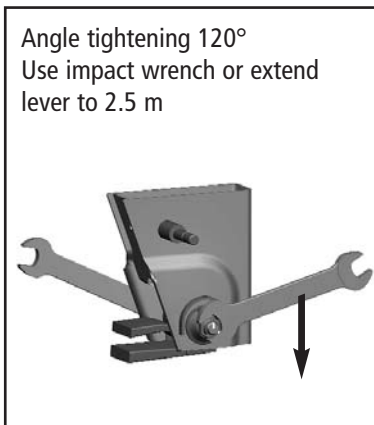
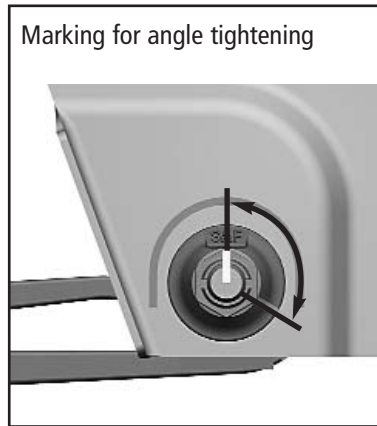
## Tightening instructions for adjustable pivot bolt

**Attention:**

Tightening always within the specified ride height range!  
No paint residues between eccentric/thrust washer and hanger!



Bolt head always on the eccentric washer side.



## Semi-trailer tilt angle

### Ride heights

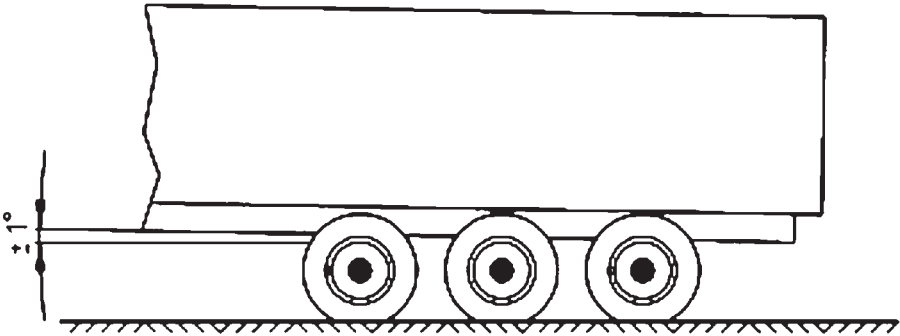
Adjust the ride height of the air suspension axles to the permissible range indicated in the corresponding SAF documents.

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.



## Adjustment of the air suspension system ride height

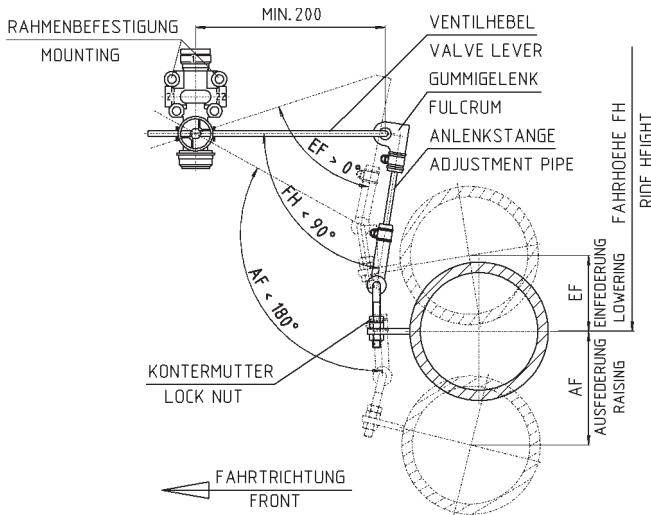
### Air suspension valve

As standard, SAF air suspension axles and system require only one air suspension valve.

The air suspension valve controls the air bag pressure in relation to the trailer load in order to maintain a constant ride height in every load condition.

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

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



### Installation

The valve lever should be at least 200 mm long and is horizontal when the trailer is in the driving position.

As a function check, move the lever down slightly. Air must now escape via the venting cap into the atmosphere. If air flows into the air bags when the lever is pushed down, the valve lever has to be turned through 180°. For this the valve lever has to be disconnected. The ride height is set by adjusting the adjustment pipe in the fulcrums and by turning the lock nuts.

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

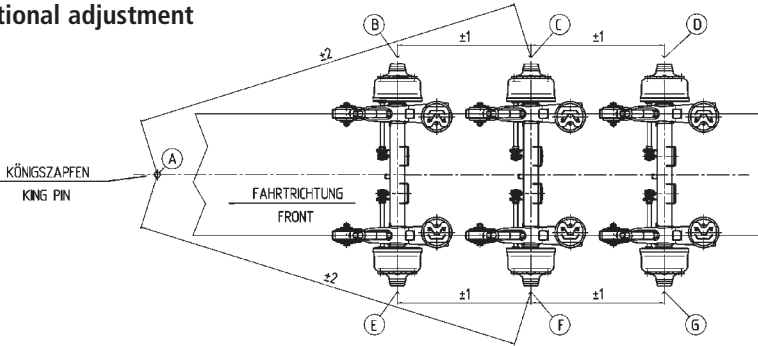
### Note

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

# SAF Axle alignment

In order to compensate for production tolerances, an axle alignment and, if necessary, a correction should be carried out. The maximum permissible deviations (tolerances) of the alignment values are specified by the tyre manufacturer. The maximum possible wheelbase correction per axle is  $\pm 6$  mm.

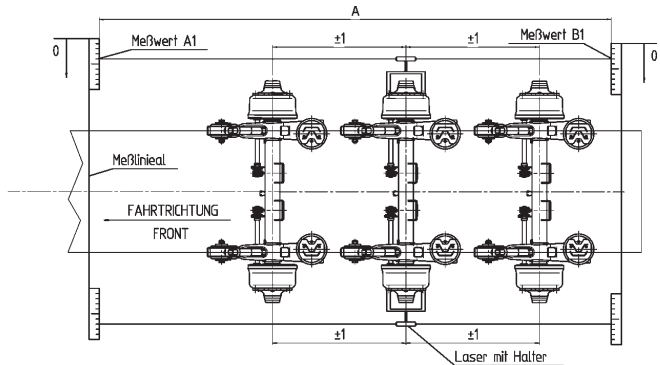
## Conventional adjustment



Determine the lengths of the diagonals A - C and A - F for the middle axle (reference axle) by comparison measurements, observing the tolerances. Check the wheelbases B - C and E - F for the front axle and C - D and F - G for the rear axle and correct, if necessary, observing the tolerances.

## Optical adjustment

Observe the operating and setting instructions of the measuring system manufacturer.



### Calculation of the toe-in and toe-out values:

$$\frac{A1 - B1 \text{ (mm)}}{A \text{ (m)}} = S$$

S = positive value = Toe-in  
S = negative value = Toe-out

## Notes

- In order to avoid tyre wear, we recommend that an axle alignment is performed at regular intervals.
- We recommend the use of an optical measuring system for carrying out the axle alignment.
- For alignment, only the centres of the middle of the wheel cap or the middle of the axle stub end are of interest as reference points.
- Possible causes of deviations in the axle alignment are:
  - Loose U-bolts
  - Wear of the spring guide bearing
  - Deformation of the axle assembly components due to improper use

Lined area for notes with horizontal lines.



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