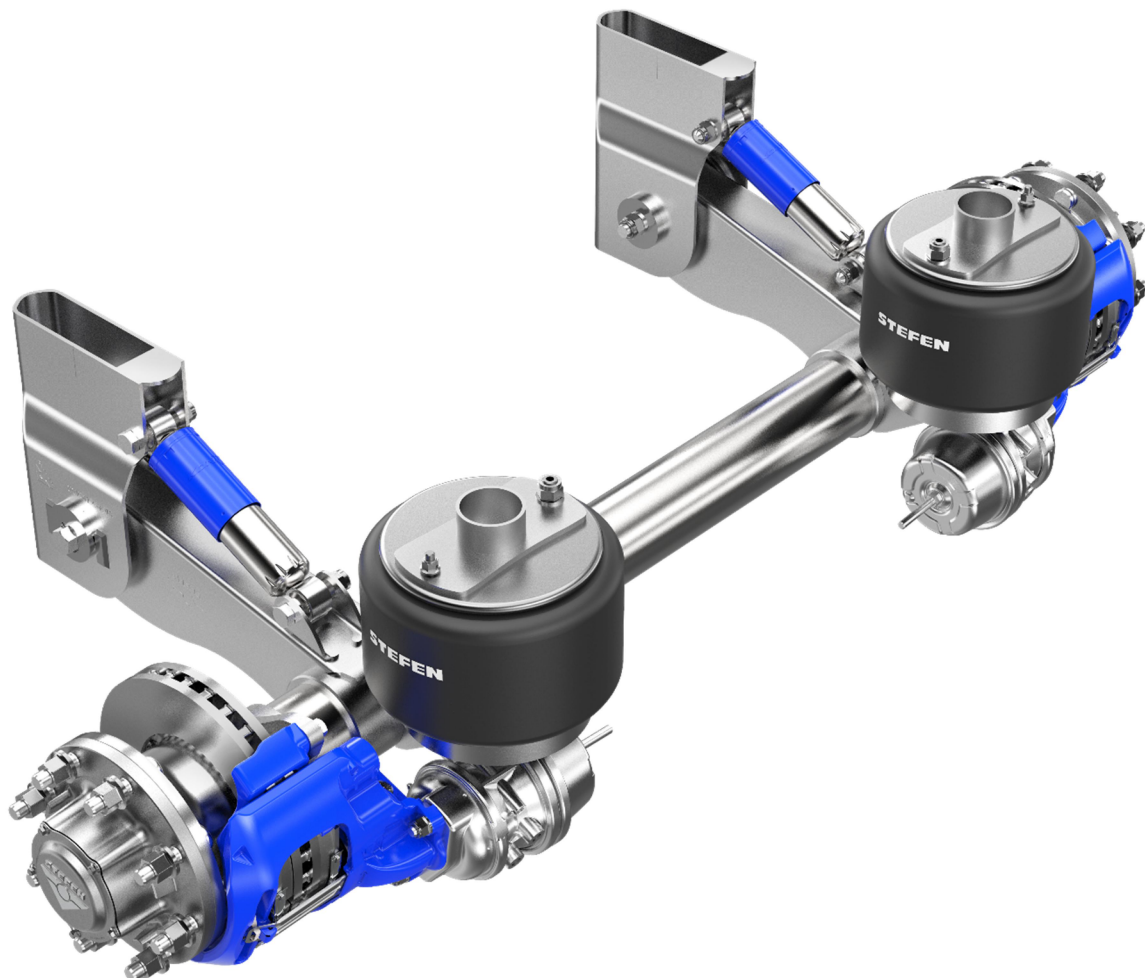


## **SL9 SUSPENSION**

Service manual & parts lists





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## Introduction

### Description

The SL9 suspension is an integrated air suspension system designed for trailers and semitrailers. It is based on a semi-trailing arm suspension arrangement where the trailing arms are mounted perpendicularly onto the axle and in parallel to one another. The front of the trailing arm consists of a pivot bushing, hanger bracket and alignment bosses, while the rear short arm supports the air spring.

The trailing arms are attached to the axle via a patented process that can only be performed by ASSALI STEFEN. The trailing arms contain a multi-functional pivot bush at the eye ends, specially designed to accommodate vertical inputs, yet remaining stiff for the fore and aft inputs. The trailing arms are mounted to hanger brackets, which are then welded to the chassis.

The main characteristics are a high roll stiffness and light weight.

The ride height is a very important measurement for the overall vehicle height. The ride height of the suspension unit is determined from the centerline of the axle to the under-side of the vehicle chassis (Fig 1).

**Note:** Ensure that the ride height is set correctly. An incorrect ride height may result in damages to the suspension components and affect the performance of the trailer. Refer to the Trailer Manufacturer's recommendations for ride height settings on the fifth wheel of the tractor.

### Features

- High roll stiffness
- Lightness: 24 kg lighter than CS9 suspension, and 4 kg lighter than SL9 Version 1 on Top Mount
- Max. 9.3 ton loading capacity
- Airspring single stud lower mounting
- Inline shock absorber on the Top Mount versions
- Reinforced bushing
- Nominal ride height of 325 - 500mm with 205mm of total travel (85 mm bump and 130 mm rebound nominal)



## Operating Principle

While driving on striking bumps, potholes and so on, superb ride characteristics are obtained due to the airsprings providing a very low vertical suspension stiffness at the wheel. This ensures very little shock which is transmitted to the chassis/payload, thus minimizing structural damage or problems with the goods.

During cornering maneuvers, the axle tube acts as an anti-roll bar and links each trailing arm. The majority of the compliance in roll comes from the multi-functional pivot bush.

Careful design of the shock absorber characteristics and positioning ensures a high degree of damping required to gain the best possible performance from an air suspension.

Modern dynamic analysis methods and testing were used to determine such characteristics and positions.

The short length allows to have a shorter wheel base between the axles.

## Suspension Parameters & Parts Lists

### KEY WORDS

#### A. RIDE HEIGHT

This is the distance from the center of the axle to the underside of the chassis.

#### B. FRAME BRACKET HEIGHT

This is the distance from the centre of the pivot bolt to the top of the frame bracket.

#### C. PIVOT TO AXLE CENTRE LINE

This is the distance from the pivot center in the frame bracket to the center of the axle tube\*

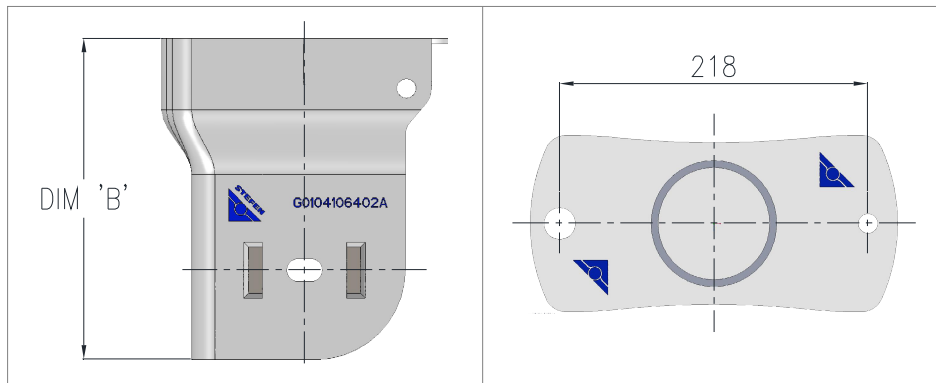
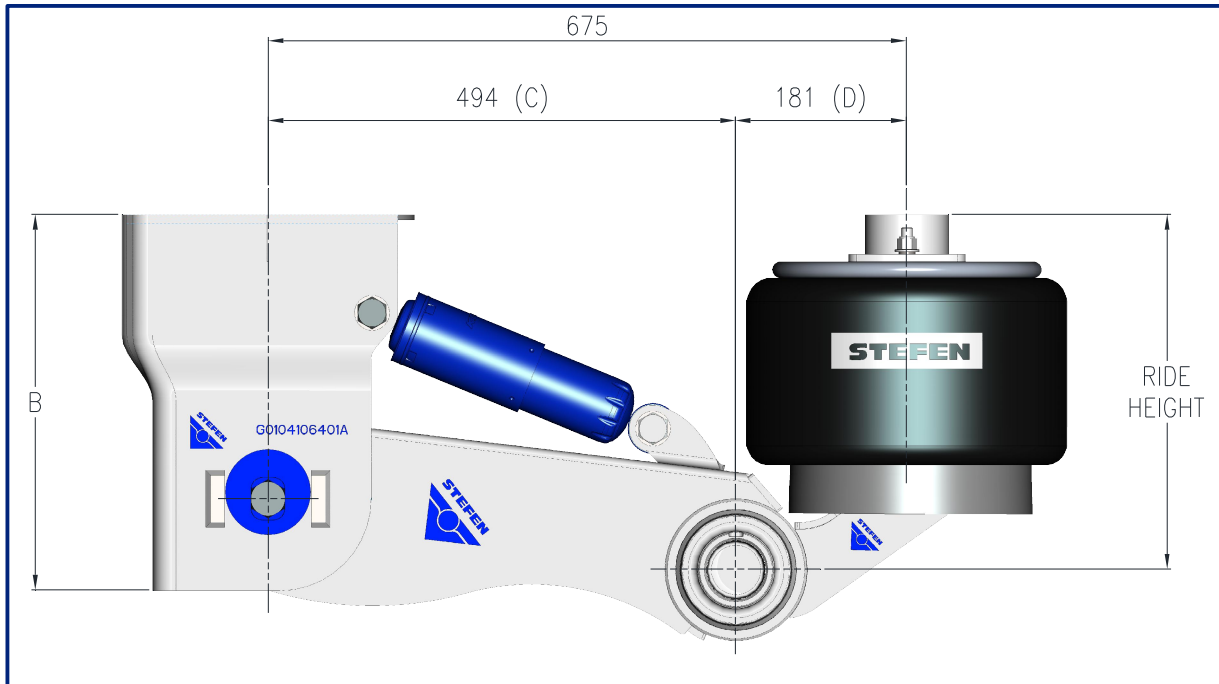
#### D. AXLE CENTRE TO AIRSPRING CENTRE LINE

This is the distance from the axle tube center to the center of the airspring pedestal\*

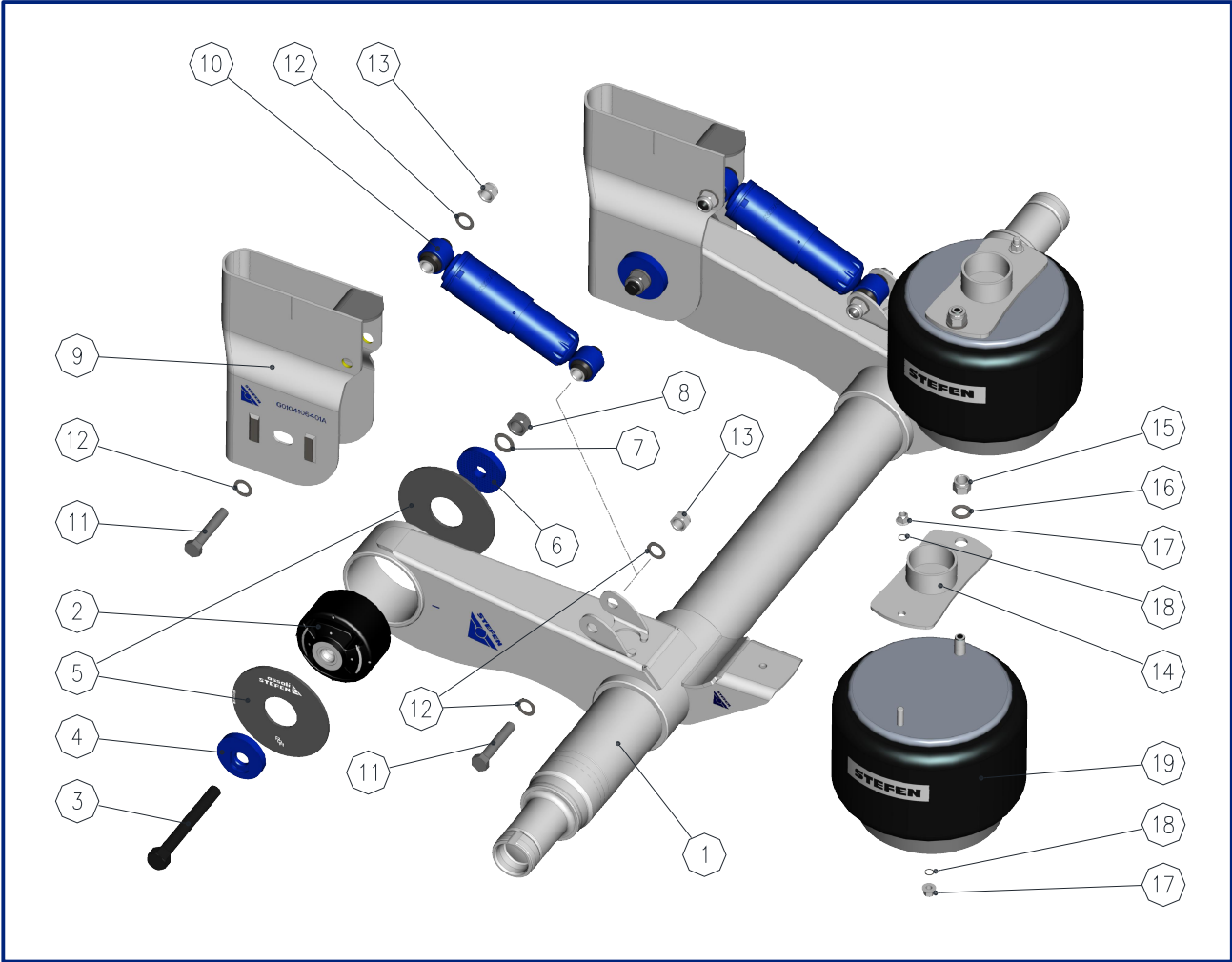
\* Both dimensions 'C' and 'D' must be measured when the axle is in ride height position and dimension 'RIDE HEIGHT' is set.



## SL9-TSA Version (Top Short Arm)

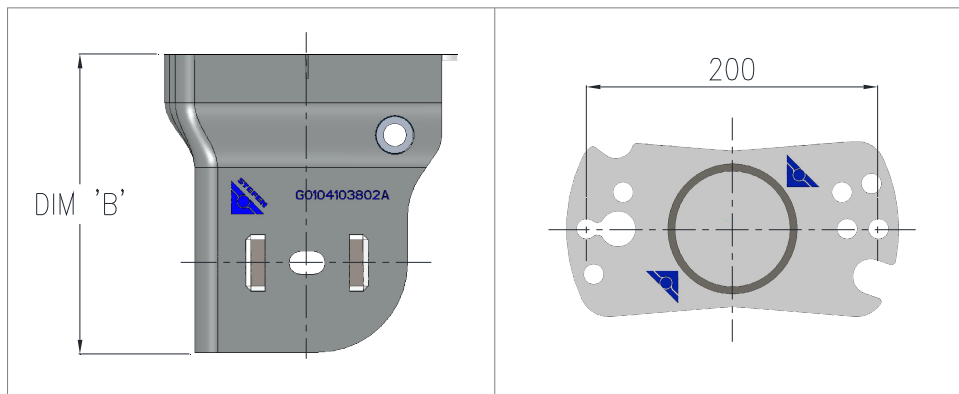
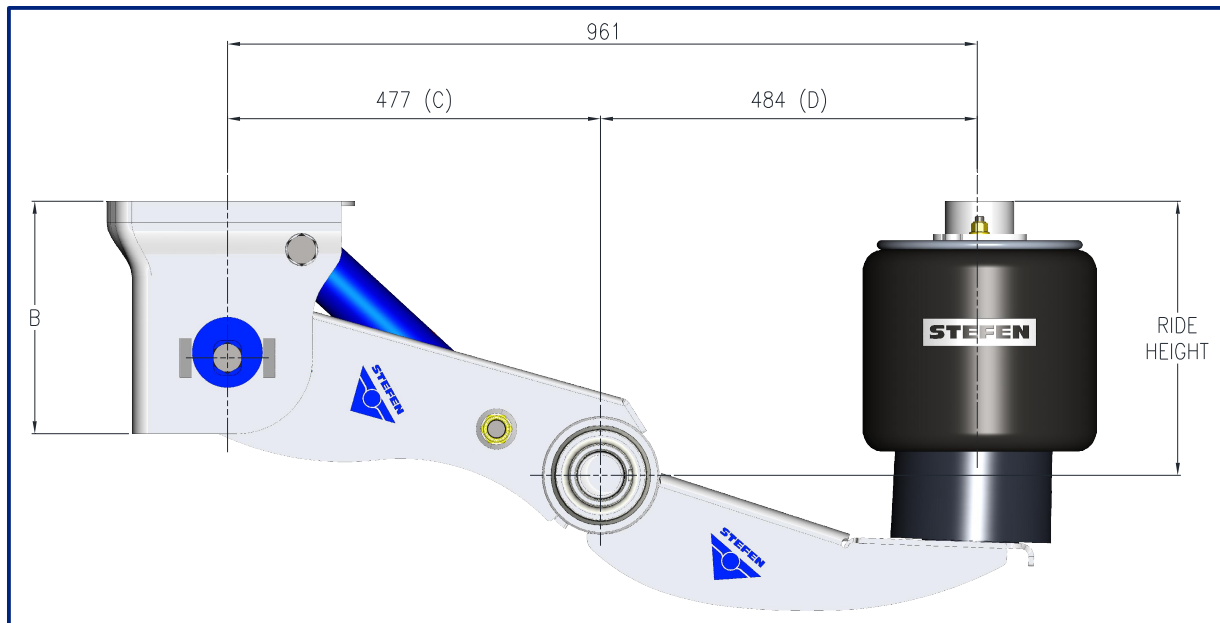


HANGER BRACKET (RIGHT SIDE)	HANGER BRACKET (LEFT SIDE)	RIDE HEIGHT	BRACKET HEIGHT (DIM B)	PEDESTAL	PEDESTAL HEIGHT
C31023A	C31022A	325/350	347	C34017A	0
C31047A	C31092A	375/400	397	C34019A	50
C31093A	C31040A	425/450	447	C34021A	100
C31048A	C31041A	475/500	497	C34023A	150

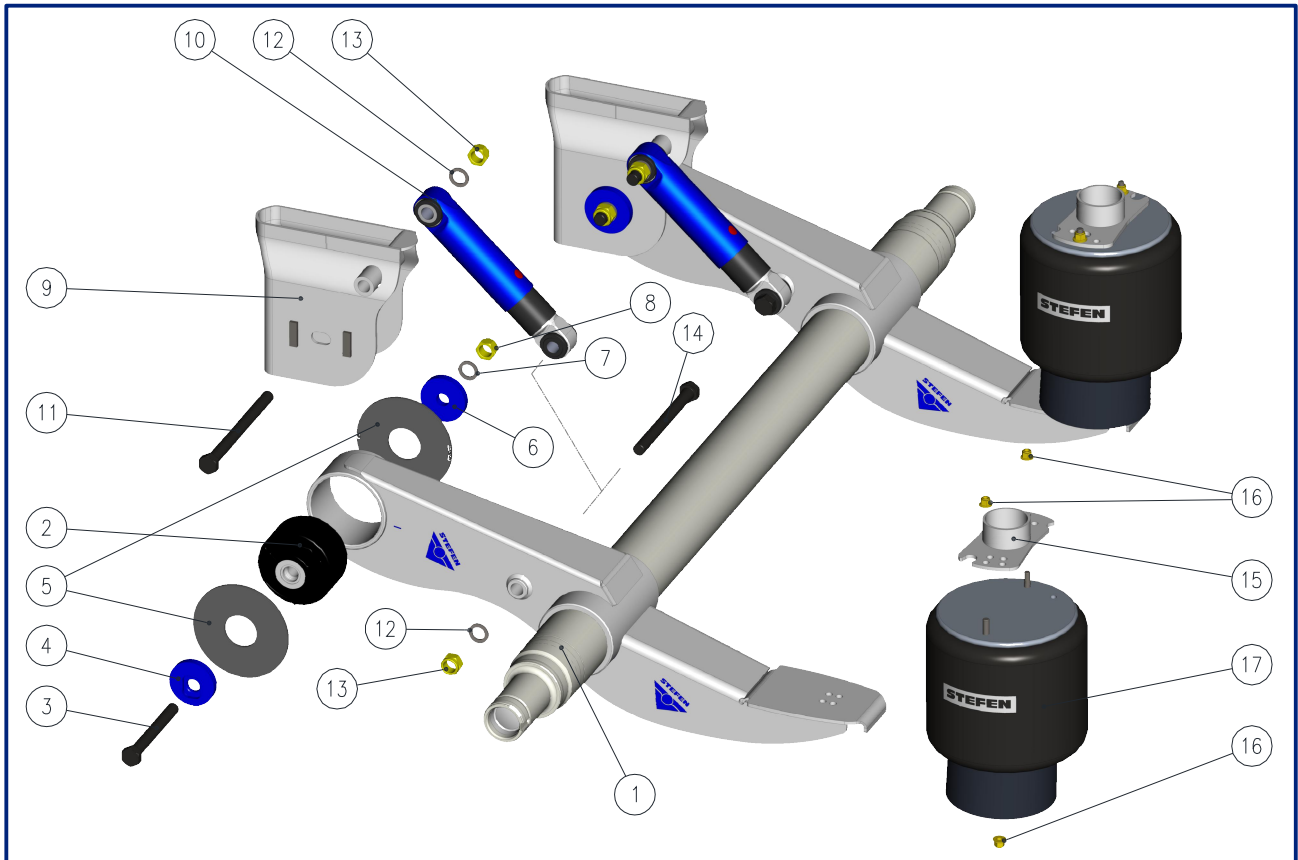


ITEM	CODE	DESCRIPTION	QTY	ITEM	CODE	DESCRIPTION	QTY
1	N/A	AXLE ASSEMBLY	1	11	C91084A	SHOCK ABSORBER BOLT - M20	4
2	C44011A	PIVOT BUSHING	2	12	C94053A	WASHER - M20	4
3	C91080A	PIVOT BOLT	2	13	C92041A	HEX NUT - M20 - CL. 8,8	4
4	C95023A	ECCENTRIC ALIGNMENT BOSS	2	14	SEE TABLE	AIR SPRING PEDESTAL	2
5	C94034A	WEAR WASHER	4	15	C92007A	AIR SPRING HEX NUT - M20	2
6	C95022A	CONCENTRIC ALIGNMENT BOSS	2	16	C94017A	AIR SPRING WASHER Ø20	2
7	C94043A	WASHER - M24	2	17	C92009A	AIR SPRING HEX NUT - M12	2
8	C92042A	HEX NUT - M24 - CL. 10,9	2	18	C94047A	AIR SPRING WASHER Ø12	2
9	SEE TABLE	HANGER BRACKET	2	19	C33023A	AIR SPRING	2
10	C32008A	SHOCK ABSORBER	2				

## SL9-TRC (Top Rear Chamber)

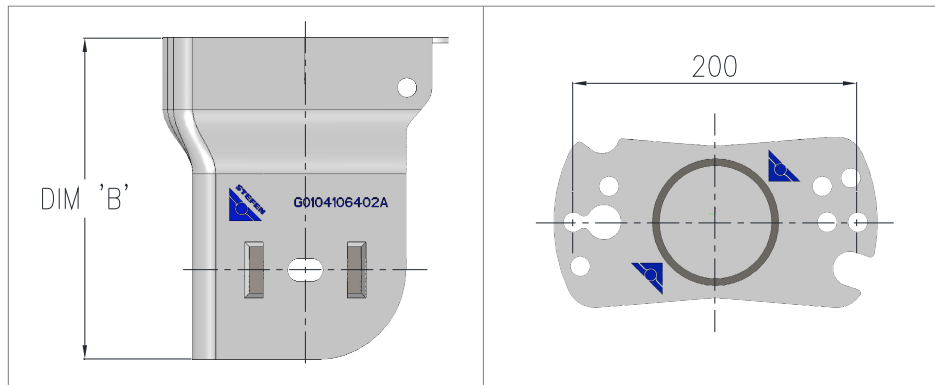
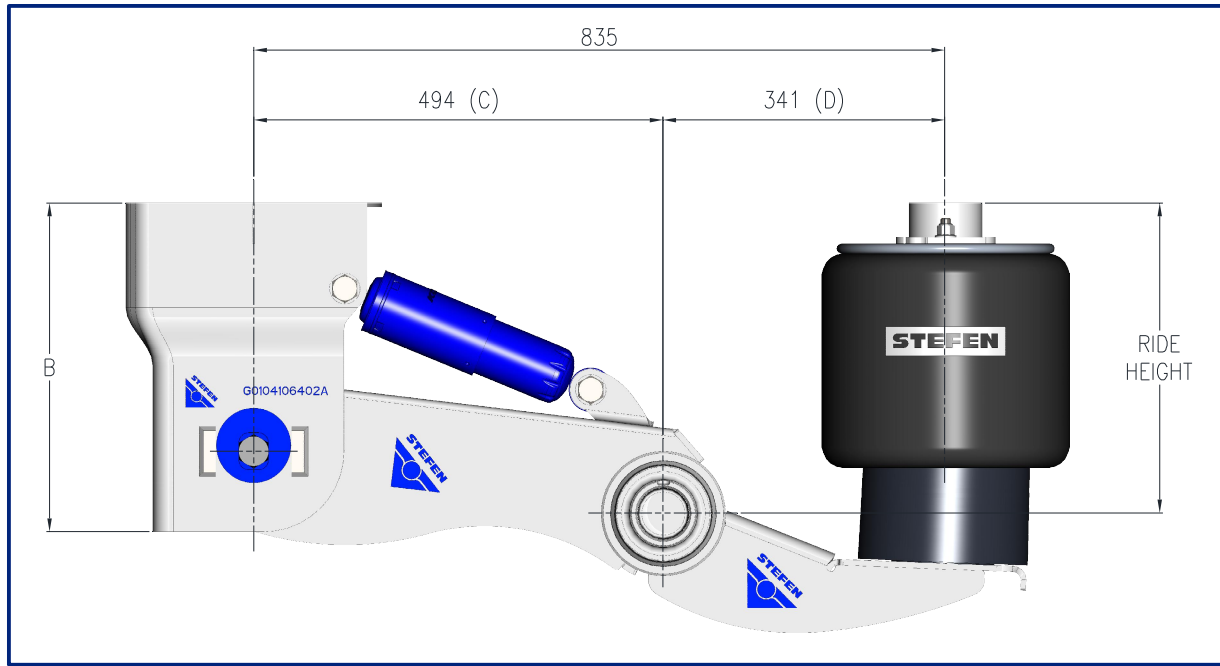


HANGER BRACKET (RIGHT SIDE)	HANGER BRACKET (LEFT SIDE)	RIDE HEIGHT	BRACKET HEIGHT (DIM B)	PEDESTAL	PEDESTAL HEIGHT
C31150A	C31100A	325	272	C34025A	8
C31151A	C31101A	350	297	C34026A	25
C31152A	C31102A	375	322	C34027A	50
C31153A	C31103A	400	347	C34028A	75
C31154A	C31104A	425	372	C34029A	100
C31155A	C31105A	450	397	C34030A	125
C31156A	C31106A	475	422	C34031A	150
C31157A	C31107A	500	447	C34032A	175

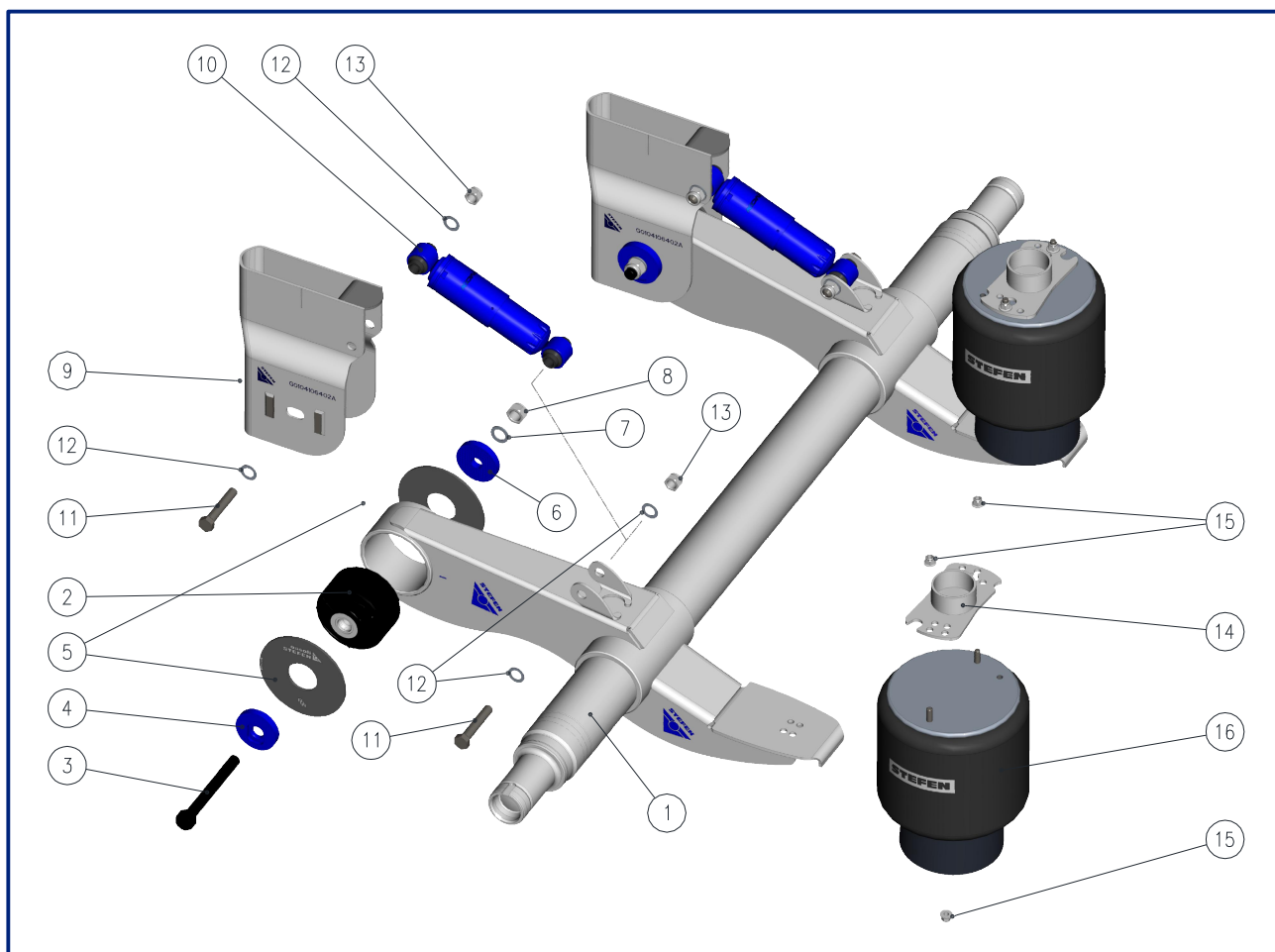


ITEM	CODE	DESCRIPTION	QTY	ITEM	CODE	DESCRIPTION	QTY
1	N/A	AXLE ASSEMBLY	1	10	C32007A	SHOCK ABSORBER	2
2	C44011A	PIVOT BUSHING	2	11	C91071A	SHOCK ABSORBER BOLT-UPPER	2
3	C91080A	PIVOT BOLT	2	12	C94043A	WASHER - M24	4
4	C95023A	ECCENTRIC ALIGNMENT BOSS	2	13	C92036A	HEX NUT - M24 - CL. 8,8	4
5	C94034A	WEAR WASHER	4	14	C91089A	SHOCK ABSORBER BOLT-LOWER	2
6	C95022A	CONCENTRIC ALIGNMENT BOSS	2	15	SEE TABLE	AIR SPRING PEDESTAL	2
7	C94043A	WASHER - M24	2	16	C92009A	HEX NUT - M12	6
8	C92042A	HEX NUT - M24 - CL. 10,9	2	17	C33027A	AIR SPRING	2
9	SEE TABLE	HANGER BRACKET	2				

## SL9-TFC Version (Top Front Chamber)

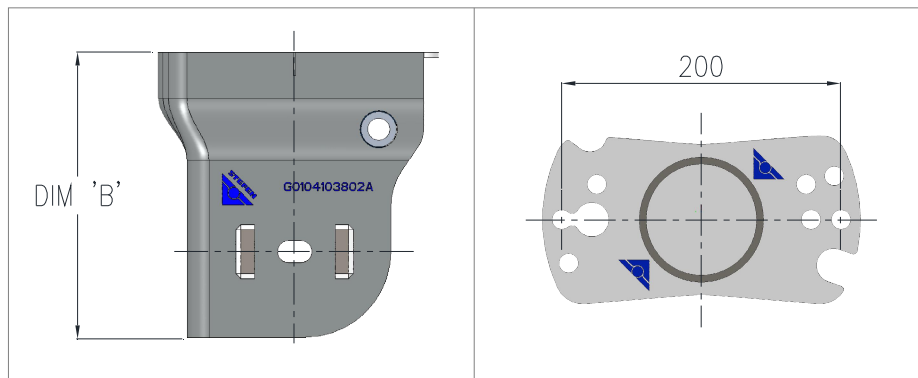
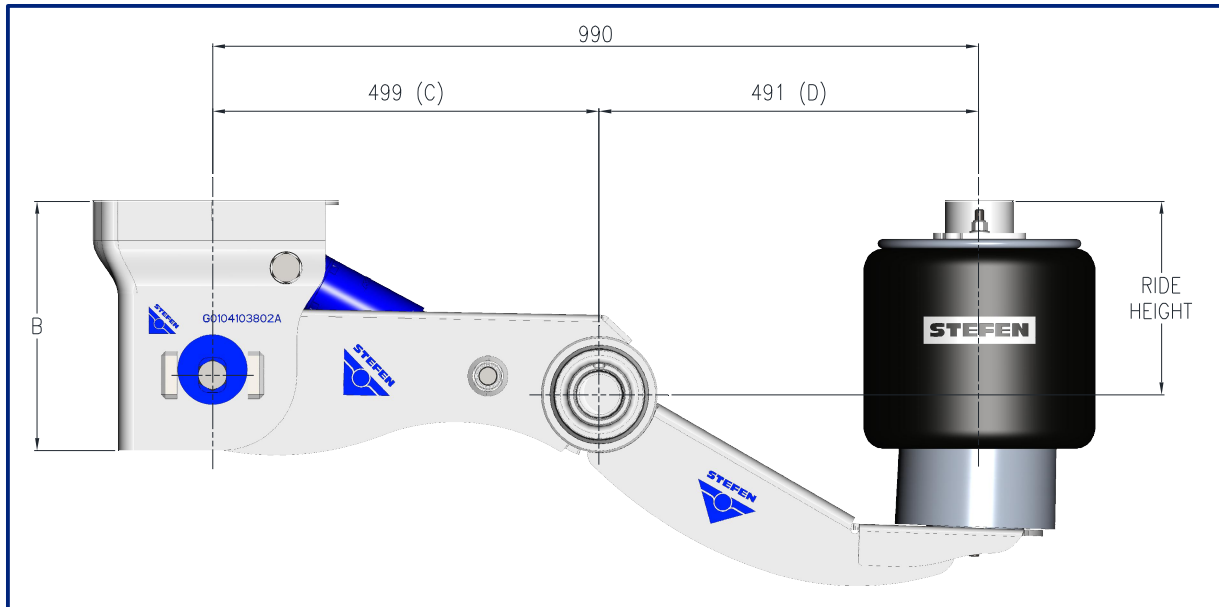


HANGER BRACKET (RIGHT SIDE)	HANGER BRACKET (LEFT SIDE)	RIDE HEIGHT	BRACKET HEIGHT (DIM B)	PEDESTAL	PEDESTAL HEIGHT
C31023A	C31022A	325/350	347	C34025A	0
C31047A	C31092A	375/400	397	C34027A	50
C31093A	C31040A	425/450	447	C34029A	100
C31048A	C31041A	475/500	497	C34031A	150

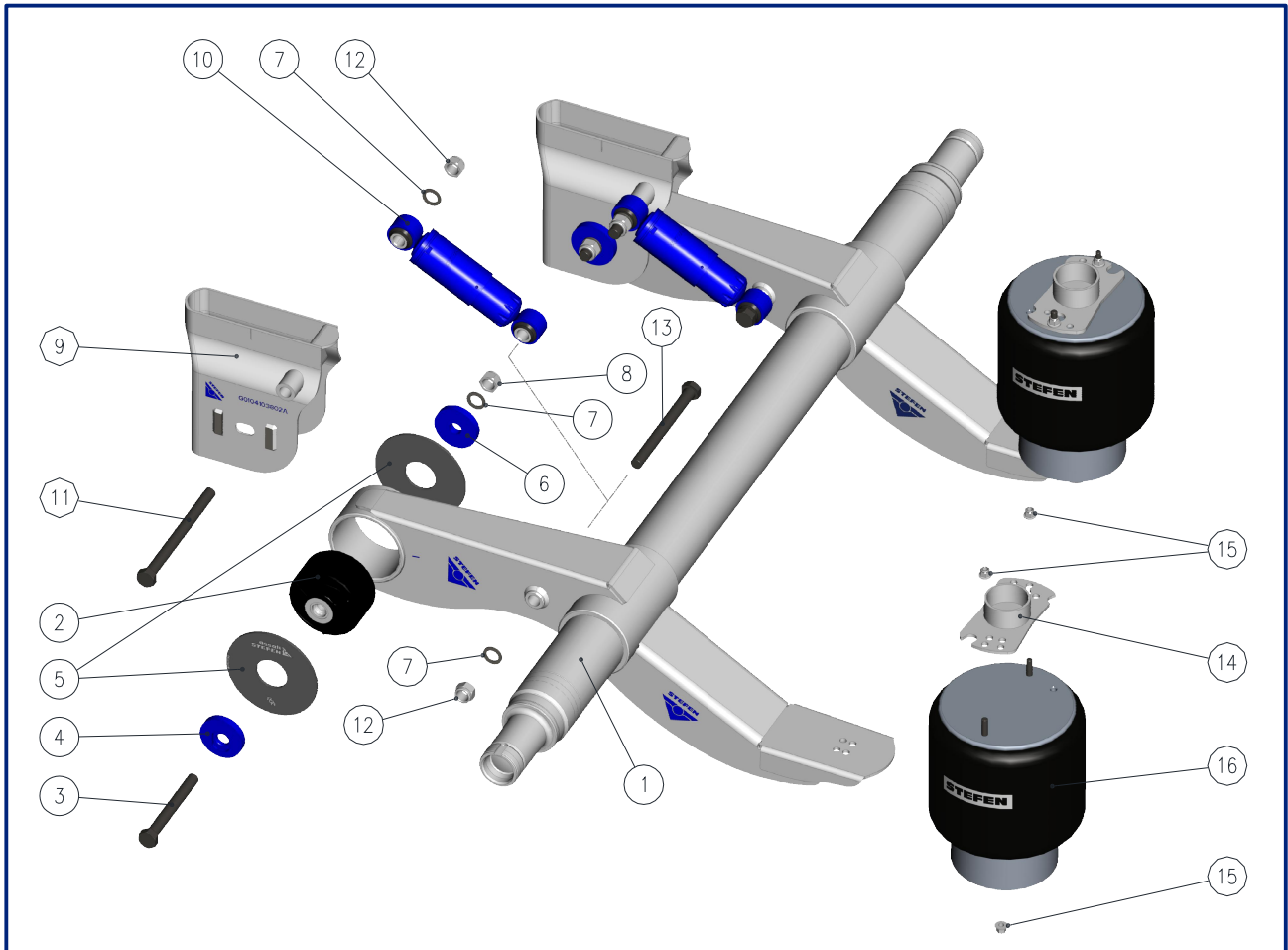


ITEM	CODE	DESCRIPTION	QTY	ITEM	CODE	DESCRIPTION	QTY
1	N/A	AXLE ASSEMBLY	1	9	SEE TABLE	HANGER BRACKET	2
2	C44011A	PIVOT BUSHING	2	10	C32008A	SHOCK ABSORBER	2
3	C91080A	PIVOT BOLT	2	11	C91084A	SHOCK ABSORBER BOLT - M20	4
4	C95023A	ECCENTRIC ALIGNMENT BOSS	2	12	C94053A	WASHER - M20	4
5	C94034A	WEAR WASHER	4	13	C92041A	HEX NUT - M20 - CL. 8,8	4
6	C95022A	CONCENTRIC ALIGNMENT BOSS	2	14	SEE TABLE	AIR SPRING PEDESTAL	2
7	C94043A	WASHER - M24	2	15	C92009A	AIR SPRING HEX NUT - M12	6
8	C92042A	HEX NUT - M24 - CL. 10,9	2	16	C33027A	AIR SPRING	2

## SL9-LRC Version (Low Rear Chamber)



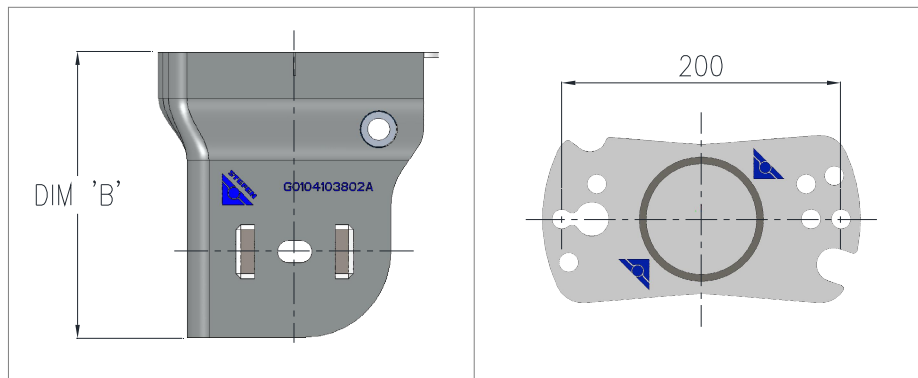
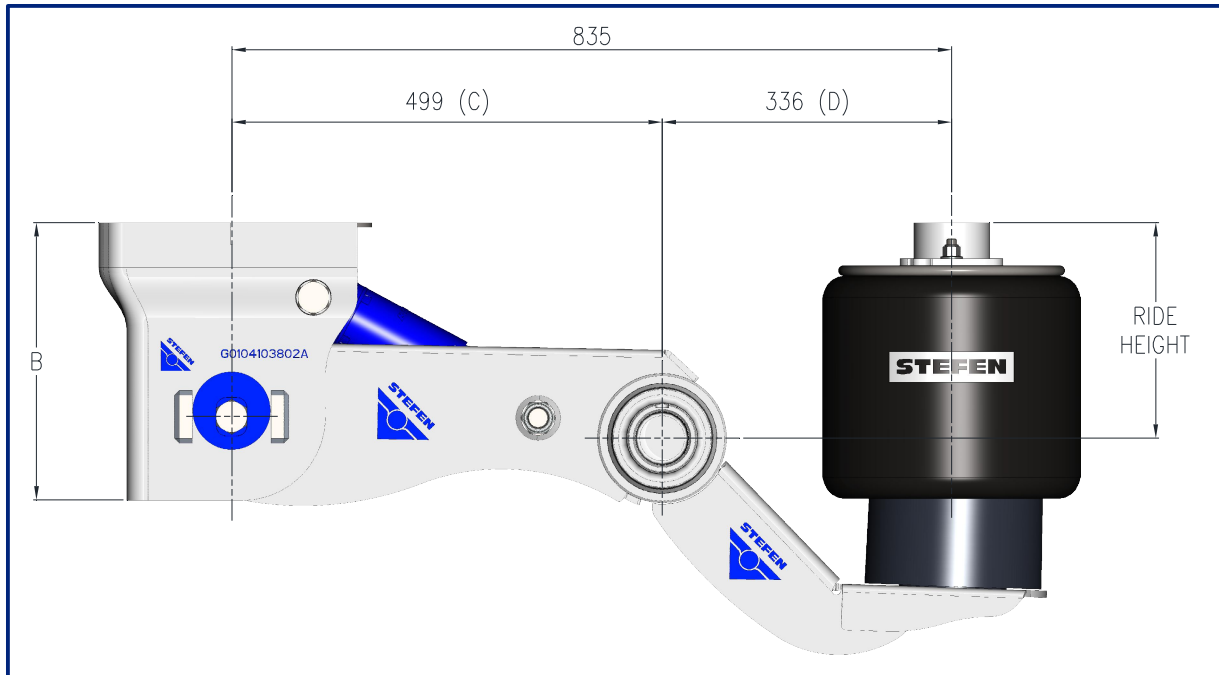
HANGER BRACKET (RIGHT SIDE)	HANGER BRACKET (LEFT SIDE)	RIDE HEIGHT	BRACKET HEIGHT (DIM B)	PEDESTAL	PEDESTAL HEIGHT
C31150A	C31100A	200	272	C34025A	8
C31151A	C31101A	225	297	C34026A	25
C31152A	C31102A	250	322	C34027A	50
C31153A	C31103A	275	347	C34028A	75
C31154A	C31104A	300	372	C34029A	100
C31155A	C31105A	325	397	C34030A	125
C31156A	C31106A	350	422	C34031A	150
C31157A	C31107A	375	447	C34032A	175



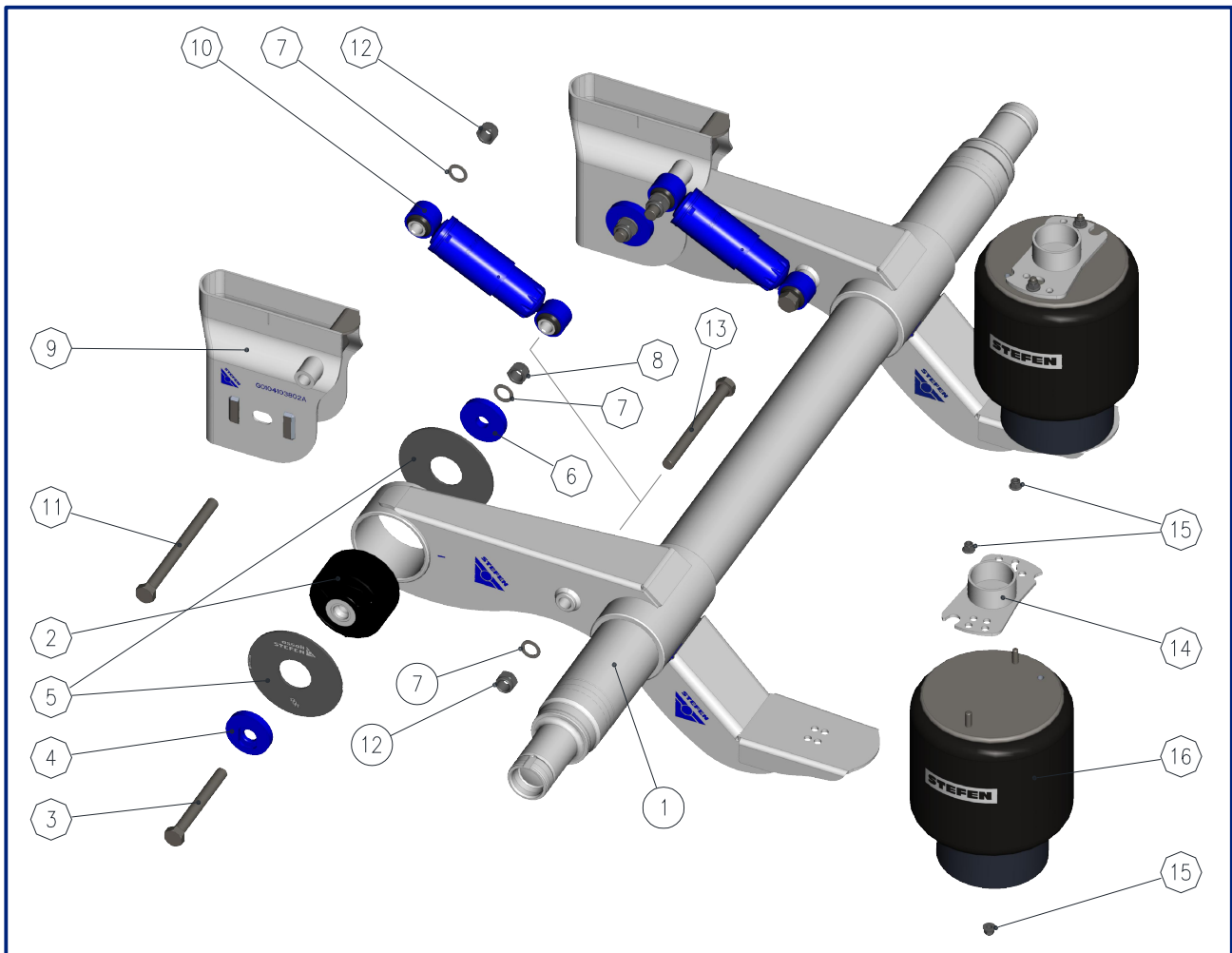
ITEM	CODE	DESCRIPTION	QTY	ITEM	CODE	DESCRIPTION	QTY
1	N/A	AXLE ASSEMBLY	1	9	SEE TABLE	HANGER BRACKET	2
2	C44011A	PIVOT BUSHING	2	10	C32006A	SHOCK ABSORBER	2
3	C91080A	PIVOT BOLT	2	11	C91071A	SHOCK ABSORBER BOLT M24 - UPPER	2
4	C95023A	ECCENTRIC ALIGNMENT BOSS	2	12	C92036A	HEX NUT - M24 - CL. 8,8	4
5	C94034A	WEAR WASHER	4	13	C91005A	SHOCK ABSORBER BOLT M24 - LOWER	2
6	C95022A	CONCENTRIC ALIGNMENT BOSS	2	14	SEE TABLE	AIR SPRING PEDESTAL	2
7	C94043A	WASHER - M24	6	15	C92009A	AIR SPRING HEX NUT - M12	6
8	C92042A	HEX NUT - M24 - CL. 10,9	2	16	C33027A	AIR SPRING	2



## SL9-LFC Version (Low Front Chamber)



HANGER BRACKET (RIGHT SIDE)	HANGER BRACKET (LEFT SIDE)	RIDE HEIGHT	BRACKET HEIGHT (DIM B)	PEDESTAL	PEDESTAL HEIGHT
C31150A	C31100A	200	272	C34025A	8
C31151A	C31101A	225	297	C34026A	25
C31152A	C31102A	250	322	C34027A	50
C31153A	C31103A	275	347	C34028A	75
C31154A	C31104A	300	372	C34029A	100
C31155A	C31105A	325	397	C34030A	125
C31156A	C31106A	350	422	C34031A	150
C31157A	C31107A	375	447	C34032A	175



ITEM	CODE	DESCRIPTION	QTY	ITEM	CODE	DESCRIPTION	QTY
1	N/A	AXLE ASSEMBLY	1	9	SEE TABLE	HANGER BRACKET	2
2	C44011A	PIVOT BUSHING	2	10	C32006A	SHOCK ABSORBER	2
3	C91080A	PIVOT BOLT	2	11	C91071A	SHOCK ABSORBER BOLT M24 - UPPER	2
4	C95023A	ECCENTRIC ALIGNMENT BOSS	2	12	C92036A	HEX NUT - M24 - CL. 8,8	4
5	C94034A	WEAR WASHER	4	13	C91005A	SHOCK ABSORBER BOLT M24 - LOWER	2
6	C95022A	CONCENTRIC ALIGNMENT BOSS	2	14	SEE TABLE	AIR SPRING PEDESTAL	2
7	C94043A	WASHER - M24	6	15	C92009A	AIR SPRING HEX NUT - M12	6
8	C92042A	HEX NUT - M24 - CL. 10,9	2	16	C33027A	AIR SPRING	2



## Inspection and maintenance



### WARNING

If any welding is performed around the suspension and axle running gear, suitable precautions should be made to protect the running gear from weld spatter. Failure to do so may result in premature failure of running gear components.

Ensure that welding earth clamps or connectors are not connected to any part of the suspension and axle running gear.



### CAUTION

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

## Before Entering Service

Check that the suspension and brake systems operate correctly.

Check the suspension air system for leaks by charging the system with air and by testing all joints and fittings using soapy water.

Ensure that the suspension ride height is correctly set (refer to the Ride Height Adjustment details).

If an axle lift system is fitted, make sure it operates correctly and observe the extra lift cylinders attached to the leveling valve arms to ensure they work correctly.

Carry out a visual inspection of all suspension and brake system pipe work to ensure no possibility of fouling or rubbing against each other or other components.

Check that the brake system operates correctly.

Check the operation of all optional equipment fitted. If any doubt or problems arise, please refer to the appropriate service manual or seek qualified advice.

## Inspection

Inspect air suspension components, height control valve and axle at regular intervals during normal operation and each time the trailer is serviced.

Before each trip, visually inspect the suspension system and listen for leaks.

Perform the following inspections after the first 1000 km of operation and at normal service intervals or annually thereafter as a minimum.

1. Check fastener torque values, tighten loose fasteners and replace damaged or missing fasteners.
2. Inspect all upper and lower air spring and shock absorber nuts and bolts for looseness and movement. Tighten any loose nuts and bolts to the correct torque value as specified in the table of the torques section. Thereafter, inspect the suspension components each time the trailer is serviced or as specified above.
3. Inspect all height control valve nuts, bolts and linkage for looseness and movement. Tighten any loose nuts and bolts to the correct torque value as specified in the table of the torques section. Thereafter, inspect the suspension components each time the trailer is serviced or as specified above.
4. Inspect Pivot bolts for looseness and movement. Align/Track the axle before tightening any loose nuts and bolts to the correct torque value as specified in the table of the torques section. Thereafter, inspect the suspension components each time the trailer is serviced or as specified above.



### WARNING

Check fastener torque values, tighten loose fasteners and replace damaged fasteners.

Loose, damaged or missing fasteners can cause loss of vehicle control, serious personal injury and damage to components.

1. Inspect for broken or missing fasteners. Repair or replace as needed. Refer to the table of the torque section for correct torque specifications.
2. Inspect welds for cracks at the axle, hanger bracket and suspension trailing arm.
3. Inspect bushings for free play, use a crow bar to check for looseness or free play. Replace bushings if there are any signs of excessive vertical movement.

**WARNING**

Take care not to damage any of the suspension components.

1. Inspect the rubber bellows of the air spring for any cut or abrasion. Replace the air spring immediately if it is cut or damaged in any way.
2. Check for obstructions or interference to the air spring surface that can lead to damage to the air spring. Relocate and secure items, such as air hoses, that can contact the air spring.
3. Check for leaks in the air lines, at the air spring bead plate, piston and mounting studs. Replace air lines, fittings or air springs that leak. Refer to Section 3 for replacement details.
4. Inspect shock absorbers for worn bushings, oil leaks and dents. Check that the mounting holes have not become enlarged.
5. Inspect the structure of the suspension including:
  - Hanger Brackets
  - Trailing arm
  - Shock absorber mountings
  - Axle welds
  - Brake interference (cam or chamber)
  - Hanger bracket bracing (where fitted)
  - Alignment Bosses
  - Fasteners

**CAUTION**

Verify that people are clear of the trailer before you inflate or deflate the air springs. The air suspension has various pinch points that can cause serious personal injury.

**WARNING**

Do not add lubrication or cleaning solvents to the air system. These additives can contaminate the air system and damage fittings. Damage to components will result.

Inspect the height control valve for air leaks and cracked lever arm housing. If air leaks or cracks are detected, replace the height control valve.

## Determining the correct ride height

Measure ride height from the top of the axle to the bottom of the chassis rail. See diagram (Fig 1,2 and 3) and chart (Fig 4) for setting dimensions on TOP Mount Versions. For LOW Mount Version see diagram (Fig 5 & Fig 6) and chart (Fig 7). The Special Version SL9-TRC please see diagram (Fig 8) and chart (Fig 9).

### SL9-TSA Version (Top Short Arm)

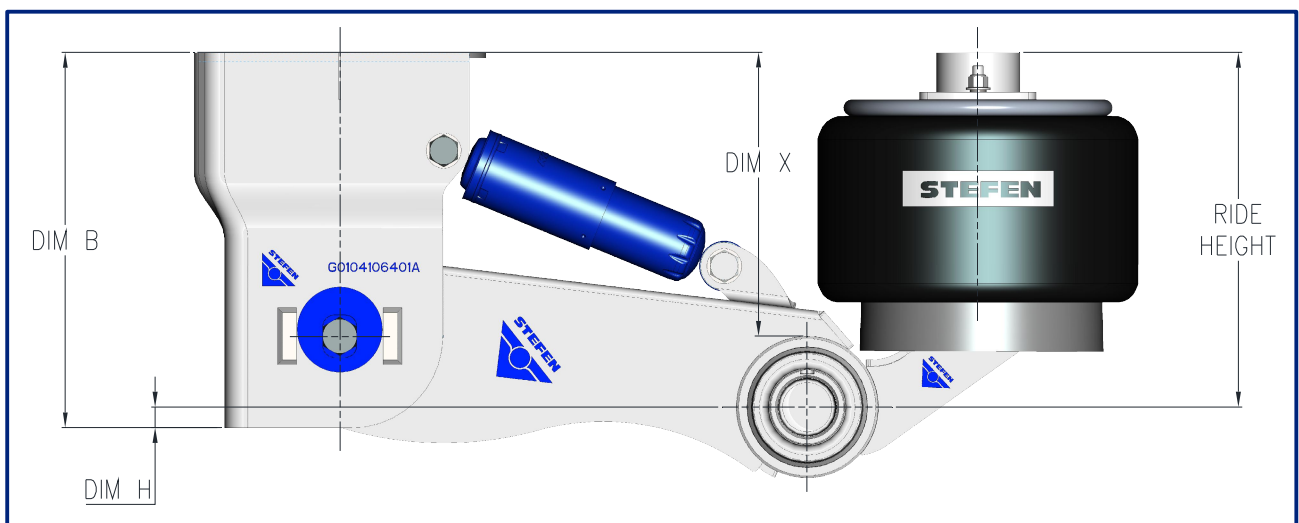


Fig 1

### SL9-TRC Version (Top Rear Chamber)

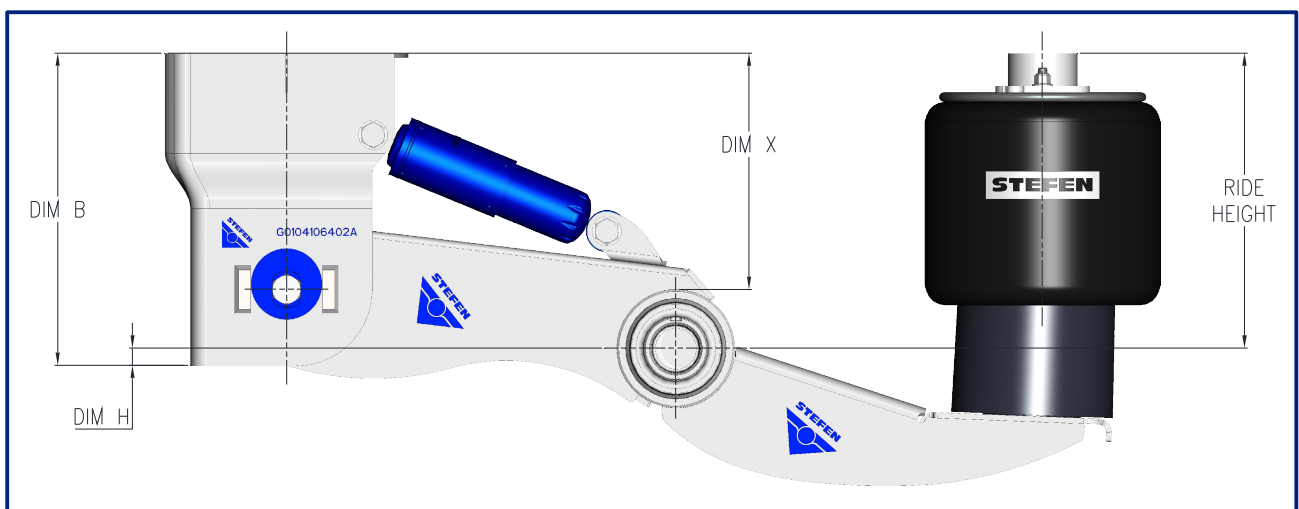


Fig 2

SL9-TFC Version (Top Front Chamber)

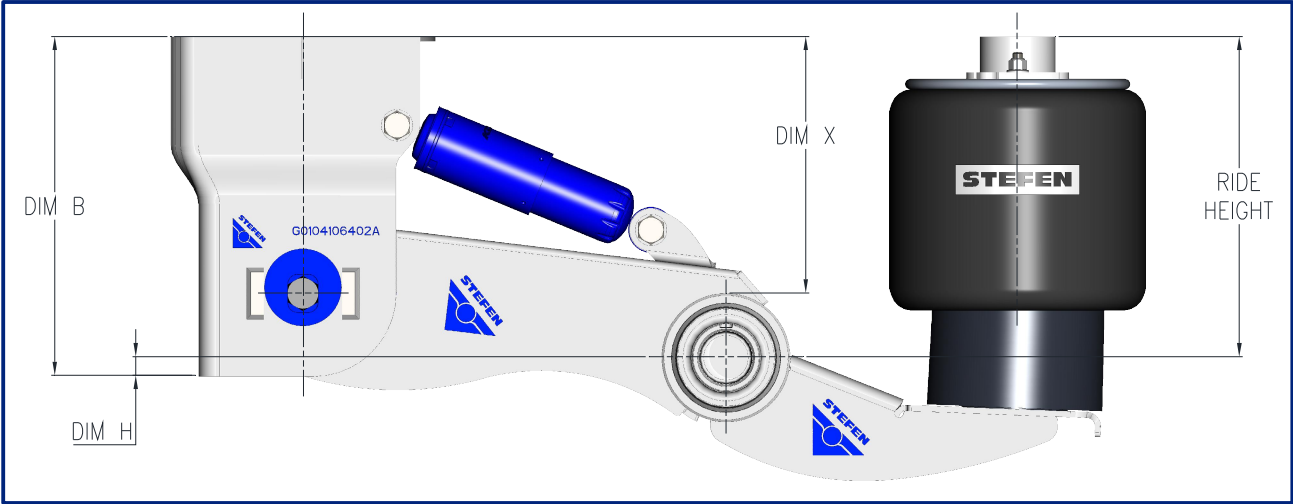


Fig 3

Dim "B"	Ride Height	Dim "H"	Dim "X"
347	325 / 350	-22 / +3	Dimension "X" is achieved by deducting 64mm from the actual right height
397	375 / 400	-22 / +3	
447	425 / 450	-22 / +3	
497	475 / 500	-22 / +3	

Fig 4

SL9-LRC Version (Low Rear Chamber)

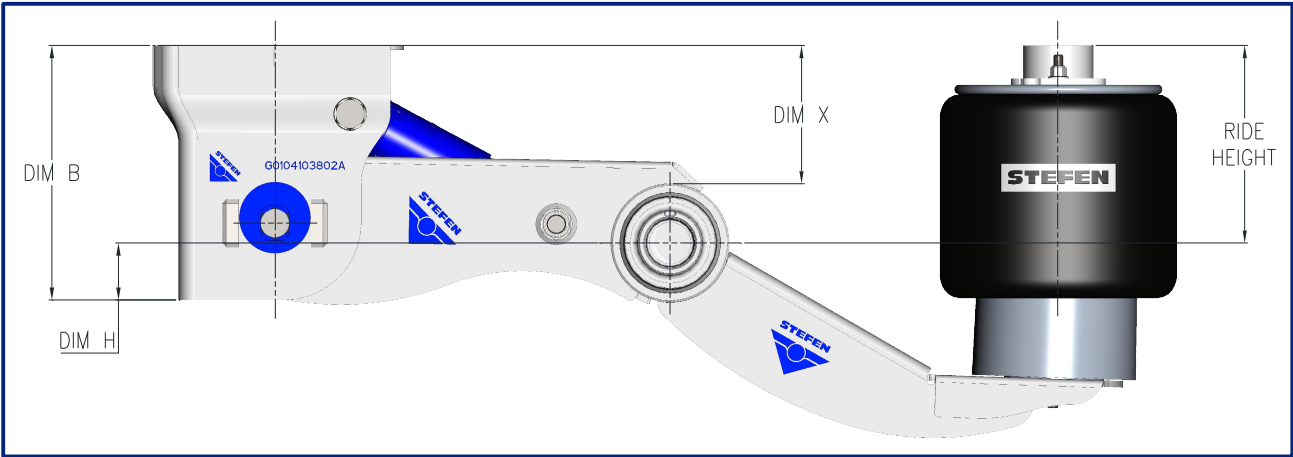


Fig 5

SL9-LFC Version (Low Front Chamber)

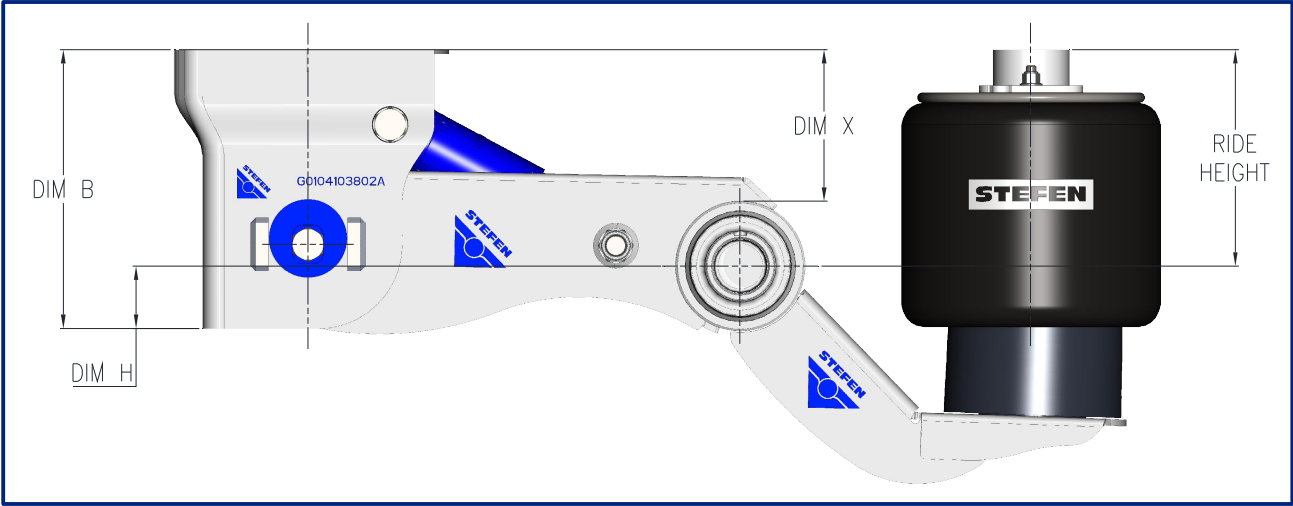


Fig 6

Dim "B"	Ride Height	Dim "H"	Dim "X"
272	200	-72mm	Dimension "X" is achieved by deducting 64mm from the actual right height
297	225		
322	250		
347	275		
372	300		
397	325		
422	350		
447	375		

Fig 7



SL9-TRC Special Version (Top Rear Chamber)

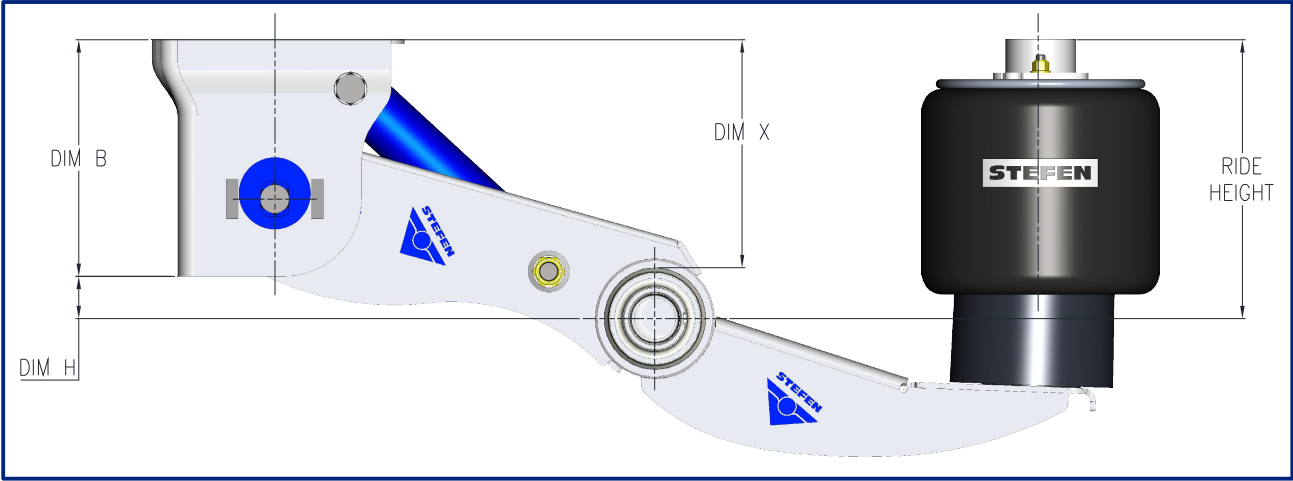


Fig 8

Dim "B"	Ride Height	Dim "H"	Dim "X"
272	325	+53mm	Dimension "X" is achieved by deducting 64mm from the actual right height
297	350		
322	375		
347	400		
372	425		
397	450		
422	475		
447	500		

Fig 9

## Suspension Overhaul

### Pivot Bush



Ensure the pips on the replacement Pivot Bush are in line with the correct alignment boss and the steel plates 'A' are aligned front and rear, as shown in Fig 10.

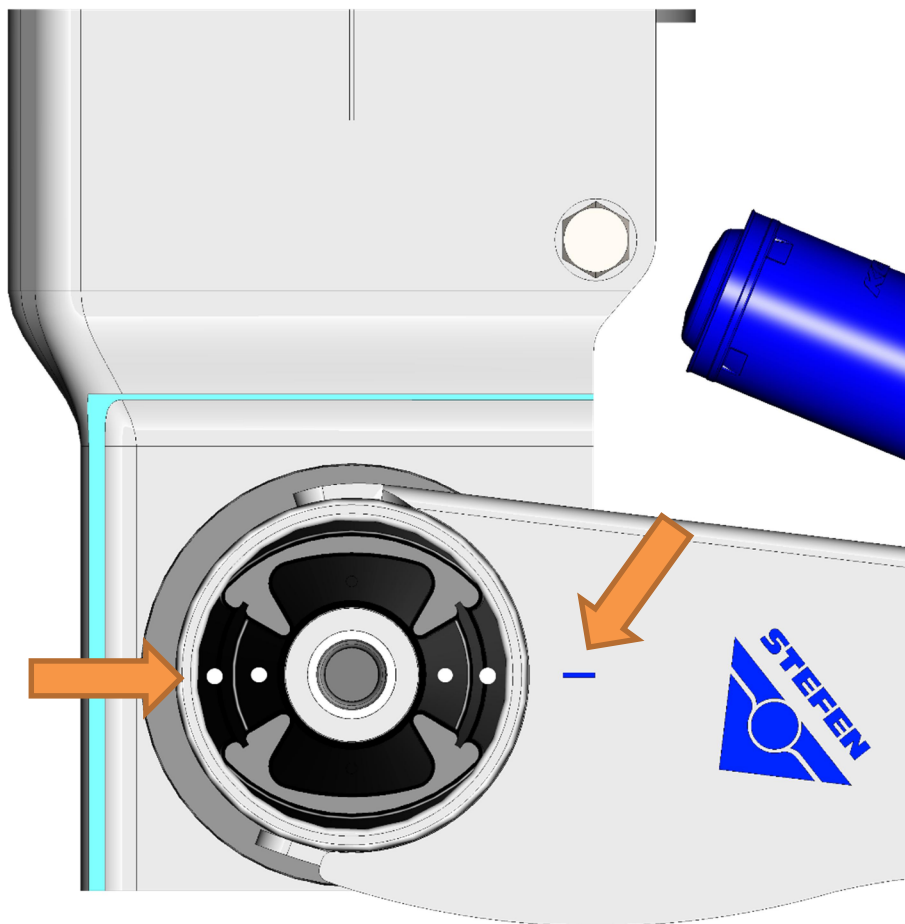


Fig 10

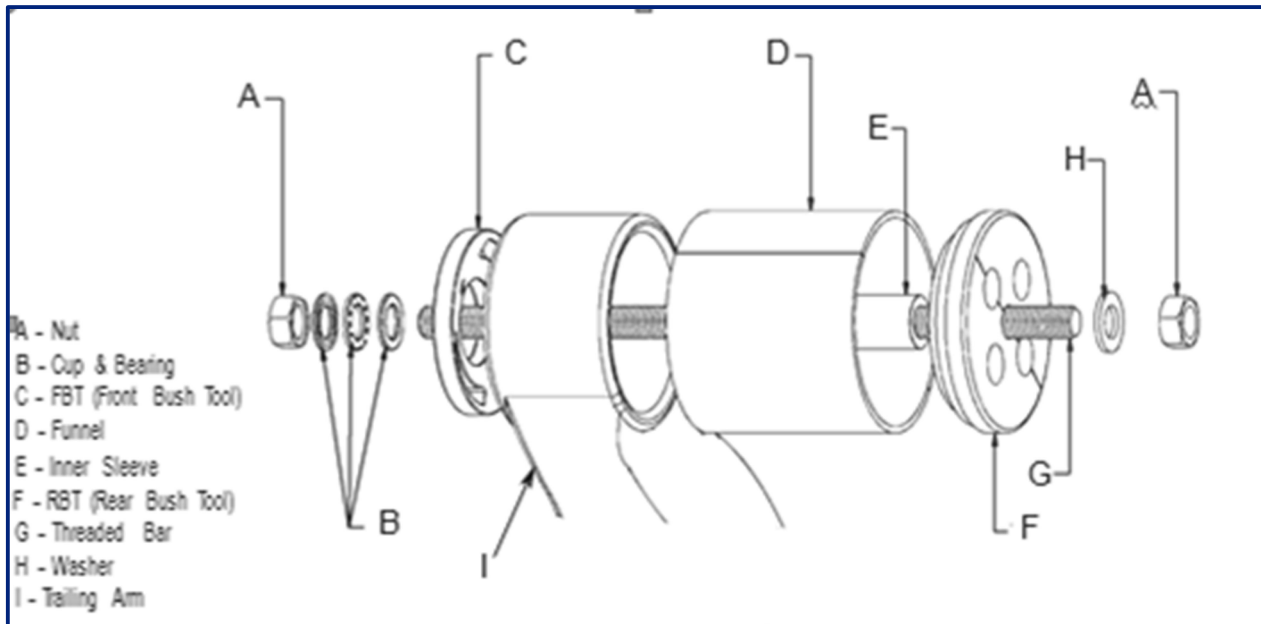


Fig 11



#### WARNING

Check pivot bushings for looseness and wear. Replace worn or damaged pivot bushings. Worn bushings can loosen and cause the trailer to wander during operation. Serious injury and damage to components can result.

Verify that people are clear of the trailer before you inflate or deflate the air springs. The air suspension has various pinch points that can cause serious personal injury.

Park the un-laden vehicle on a flat surface and block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks, which can slip or fall over. Serious personal injury can result.

NOTE: This following procedure requires the assistance of another person.

Before removal and fitment of pivot bushes, an original ASSALI STEFEN pivot bush replacement kit is required. A pivot bush removal and insertion tool (Part No. G0106008800A) will be required (Fig 11).

NOTE: Check the position and orientation of the original bush before removing (Fig 10). This will provide a guideline when fitting a new bush.

## Pivot Bush Removal

1. Lower the landing gear.
2. Support the REAR of the trailer frame.
3. Set the parking brake.
4. Exhaust air pressure from the suspension air springs.
5. Support the axle and remove the wheel/(s) to access the pivot bolts.

NOTE: Although It is not necessary to remove the road wheels when replacing the pivot bushes on SINGLE wheel axle configurations, the procedure may be easier with the wheels removed.

6. Remove the bottom shock absorber bolts from both hanger brackets. This allows the trailing arm to articulate down when the pivot bolts are removed.
7. Remove the pivot bolts and alignment bosses from the hanger bracket (Fig 12).

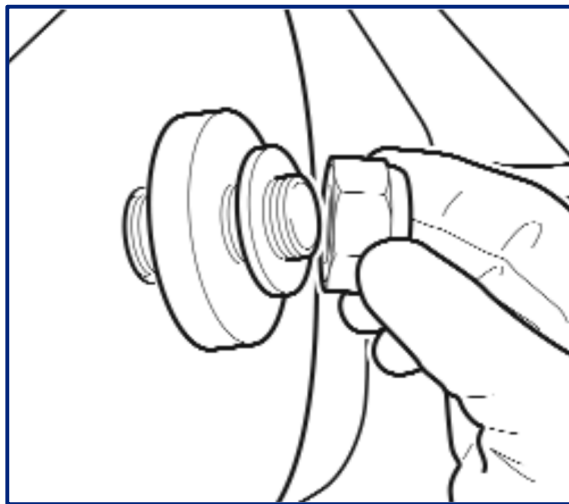


Fig 12

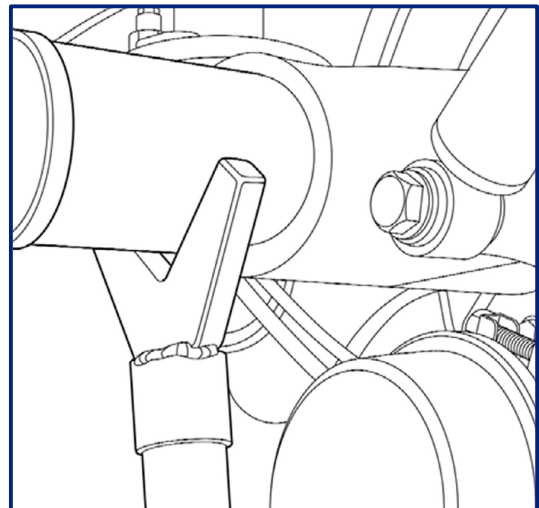


Fig 13



**WARNING:** Ensure that the axle support is secure during this operation as the arcuate motion may cause the axle to move backwards (Fig 13).

8. Carefully rotate the trailing arm until clear of the hanger bracket (Fig 14). DO NOT lever off the brake chamber as shown (Fig 15).

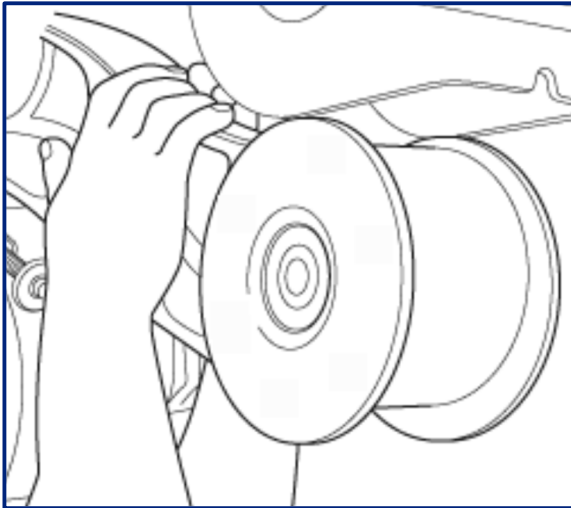


Fig 14

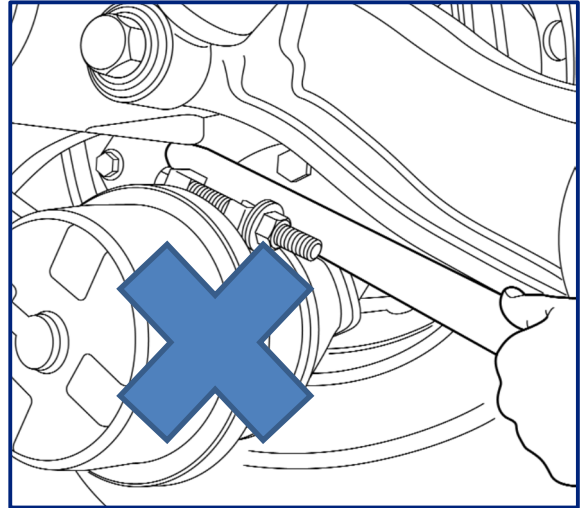


Fig 15

9. Remove the wear washers and the steel inner sleeves from the pivot bushes (Figs 16 & 17).

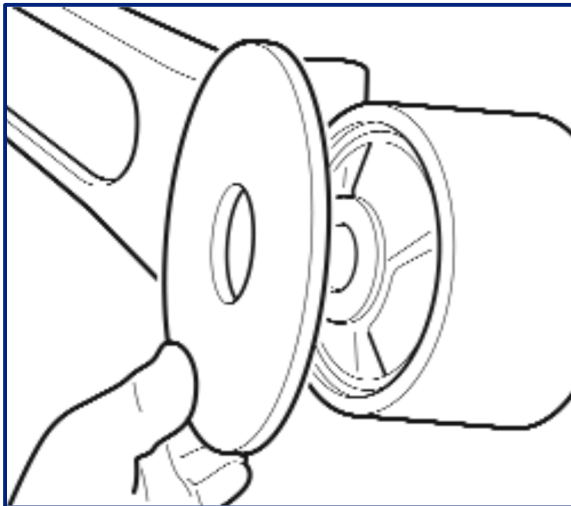


Fig 16

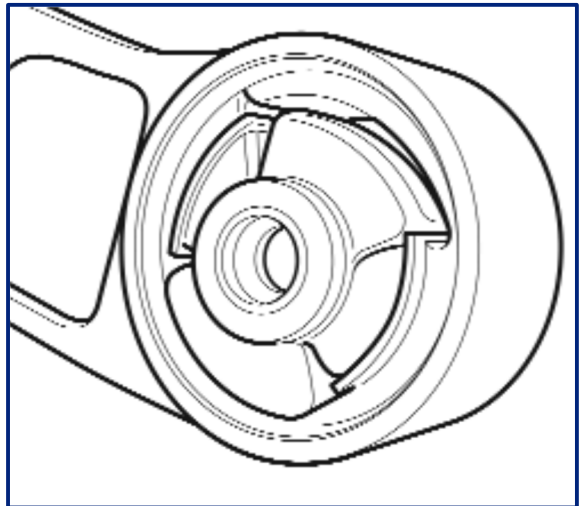


Fig 17

10. Using the Assali Stefen service tool G0106008800A, replace the pivot bushes as described in the following paragraphs.
11. Press the Front Bush Tool (FBT) "C" against the pivot bush and insert the threaded bar "G". Fit washer "H" and nut "A" to draw bar and secure to FBT "C" (Fig 18).

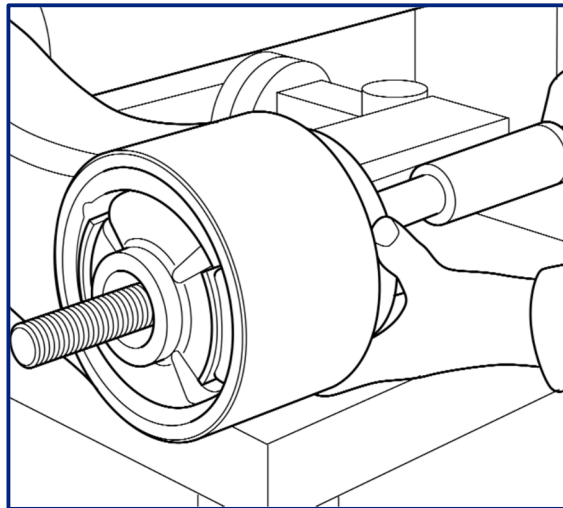


Fig 18

12. Push funnel "D" onto the trailing arm outer tube opposite the FBT "C" (Recess facing towards pivot bush) (Fig 19).
13. Attach the Rear Bush Tool (RBT) "F" to the funnel "D" and secure in place with the bearing cups, bearing race "B" and nut "A" (Fig 19 & 20)

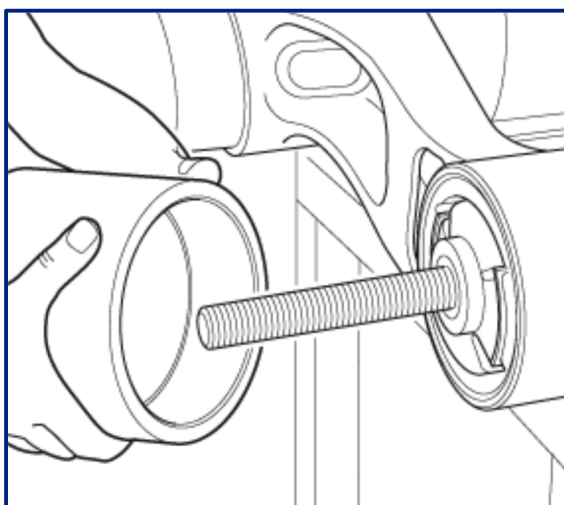


Fig 19

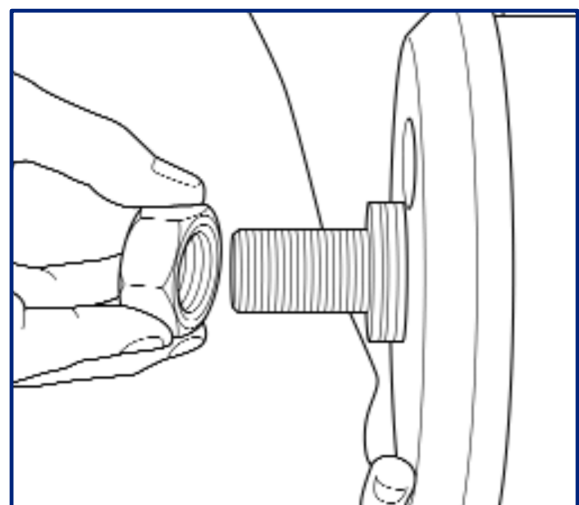


Fig 20

14. Apply turning moment to the nut "A" at the bearing end, continue turning the nut until the pivot bush is drawn completely into the funnel "D" (Fig 21).

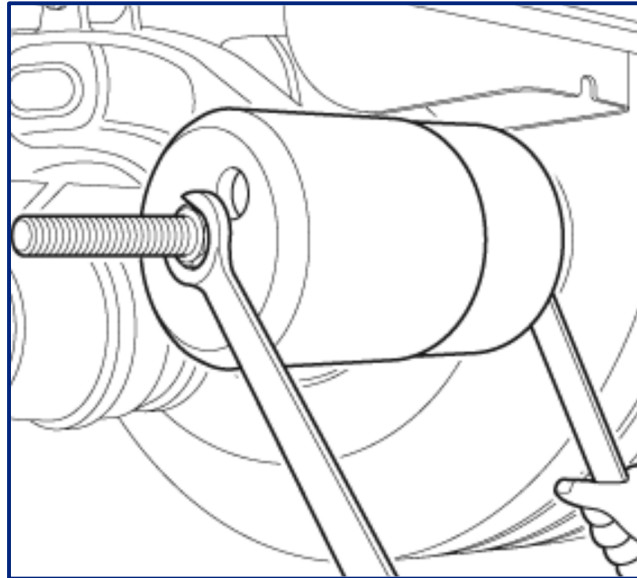


Fig 21

15. Dismantle the tooling and remove the pivot bush from the funnel "D" (Fig 22).

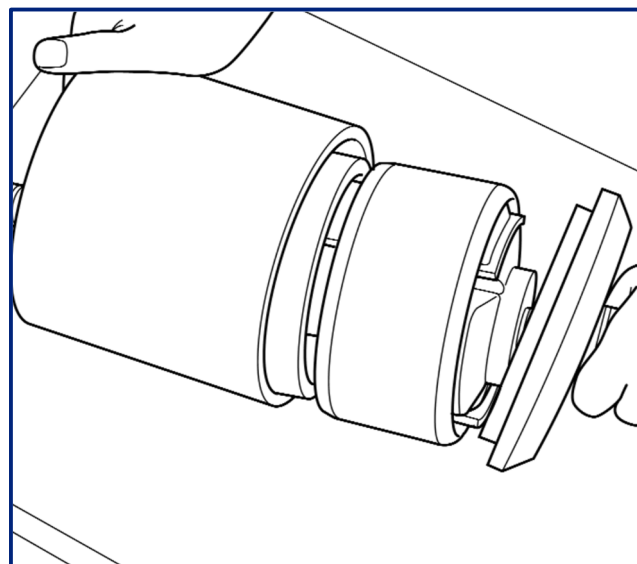


Fig 22

16. Remove any debris that may be left from the trailing arm outer tube.

## Pivot Bush Replacement

1. Apply P-80 gel solution to all surfaces and edges of the pivot bush, as shown (Fig 23). Also apply the solution to the funnel "D" (Fig 24) and trailing arm outer tube (Fig 25).

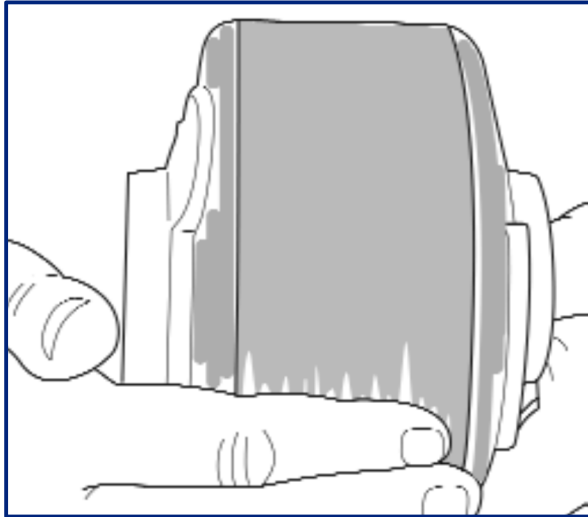


Fig 23

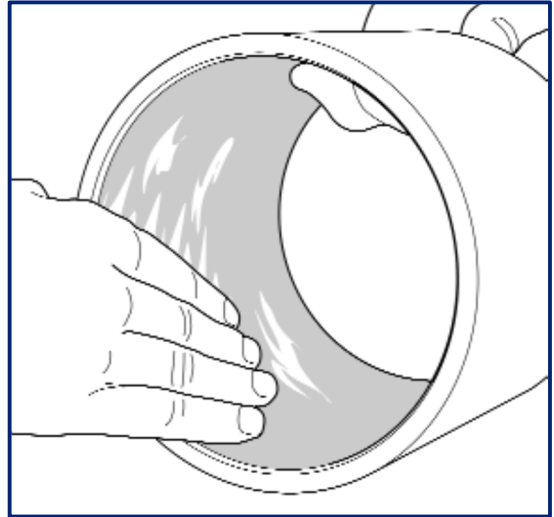


Fig 24

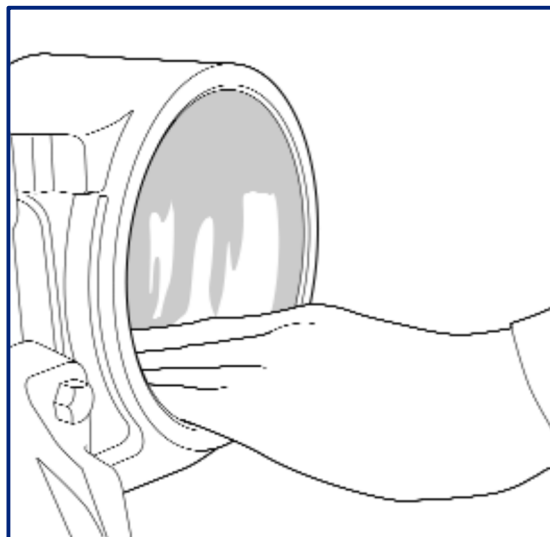


Fig 25



2. Insert the replacement pivot bush into the funnel "D" and align the dots on the pivot bush with the marked line on the funnel (Fig 26).

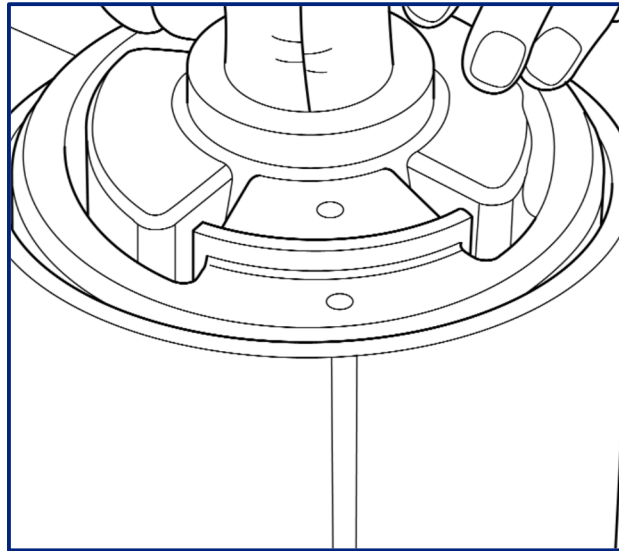


Fig 26

3. Fit bush tool to trailing arm as shown (Fig 27).

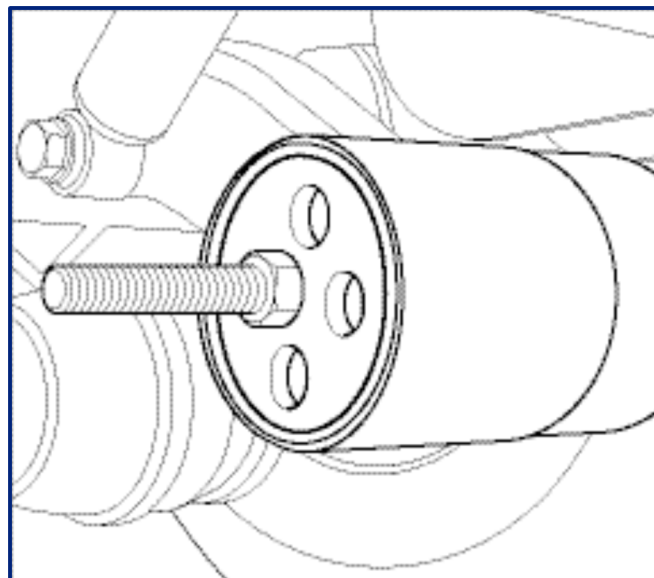


Fig 27

4. Insert inner sleeve "E" into the pivot bush central tube.
5. Press the Rear Bush Tool (RBT) "F" against the trailing arm outer tube and insert the threaded bar "G". Fit washer "H" and nut "A" to draw bar and secure to RBT "F".
6. Push funnel "D" onto the trailing arm outer tube opposite the RBT "F" (Recess facing towards outer tube). Attach the FBT "C" to the funnel "D" and secure in place with the bearing cups, bearing race "B" and nut "A".
7. Rotate the funnel "D" so that the mark is aligned to the mark on the trailing arm (Fig 28).

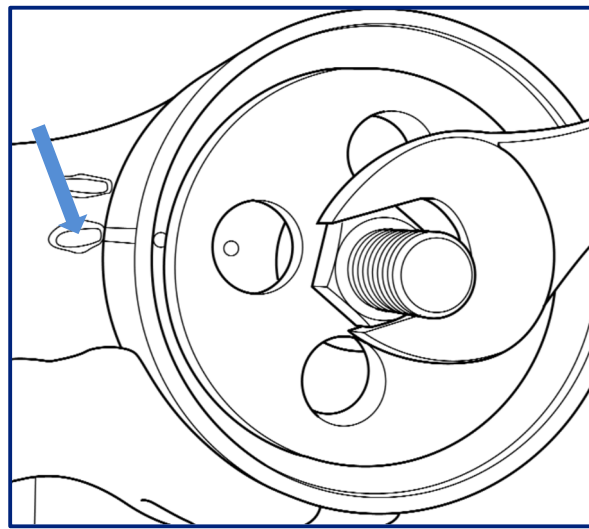


Fig 28

8. Apply turning moment to the nut "A" at the bearing "B" end. Continue turning the nut until the pivot bush is drawn completely into the trailing arm outer tube. The turning action will lock out when the pivot bush mates up with the RBT "F".
9. Back off the nut and dismantle the pivot bush tooling. Check for any damage to the membrane of the pivot bush.
10. Insert steel inner sleeve "X" into the pivot bush central tube. Fit the replacement wear washers "Y" to either side of the pivot bush (Fig 29).

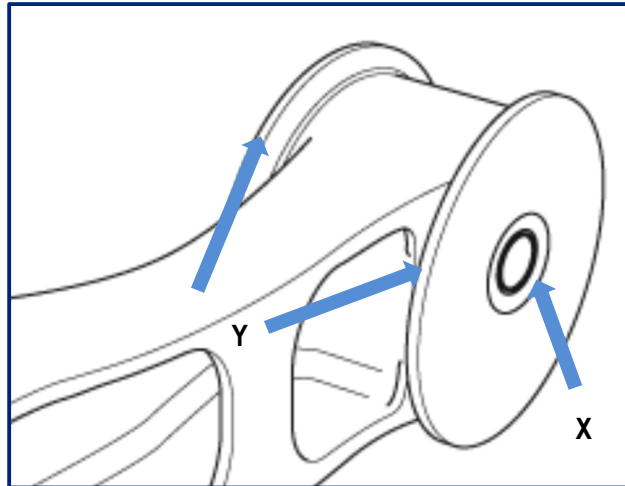


Fig 29

11. Refit the trailing arm to the hanger bracket (Fig 30) and insert new pivot bolts.

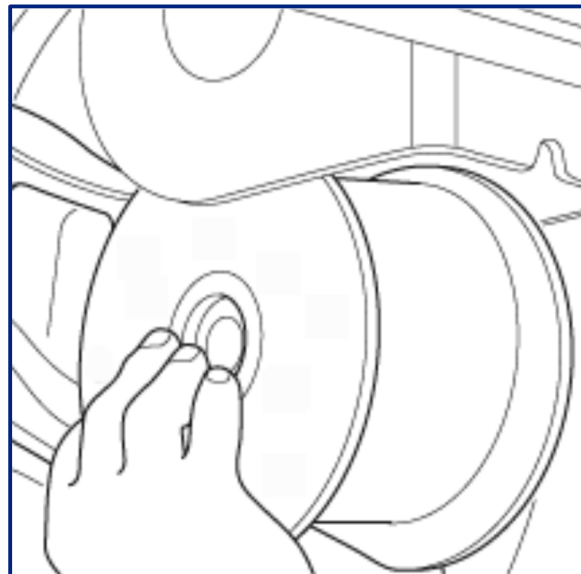


Fig 30

Do not torque the pivot nuts to final torque until the axle is aligned and the trailer is at the ride height with the wheels on. See **Axle Alignment** and refer to the **Ride Height Adjustment** details.

12. Refit the shock absorber. Do not torque the shock absorber nuts to final torque until the axle is aligned and the trailer is at the ride height with the wheels on.
13. Refit the wheel (s), where applicable, pressurize the air springs and set ride height.
14. Torque all nuts and bolts to final tightening torque.



## Axle Alignment

This section provides details on how to re-align suspensions if their settings are changed due to other works.

All Assali Stefen SL9 models are available with the patented pivot eye tracking facility. This is re-usable and does not require welding, and offers +/- 7 mm of fore and aft movement.

It is recommended that tracking is performed before painting, and that no debris is left in the clamped faces of the joint.

### Before you align the axle

1. The trailer must be on a level surface and un-laden.
2. Adjust the trailer landing gear. The height of the king pin should be the same as when the trailer is connected.
3. Support the chassis on suitable axle stands
4. Expel all air from the system.
5. Remove the road wheels.

### Front Axle

1. Verify that the suspension is at the correct ride height.
2. Measure the distance between the king pin and each end of the first axle (measurements DR and DL). To obtain a correct alignment, the dimensions DR and DL must be within +/- 3mm at both ends of the axle (Figs 32, 33 & 34). Rotate the hub backwards and forwards to ensure that the measurement is the maximum possible.  
If adjustment is required, proceed to step 3 below. If adjustment is not required, proceed to 'Rear Axle' in this section.
3. Before you align an axle, ensure the pivot bolt is free to move in the adjustment slot.  
Using a 36 mm spanner and suitable wrench, loosen the pivot bolts on both sides. Place 36 mm spanner on an outboard boss (eccentric boss) (Fig 31), and rotate in desired direction to give an equal measurement on either of the axle to the kingpin. For a correct alignment, the dimensions DR and DL must be within +/- 3mm at both ends of the axle (Figs 32, 33 & 34).  
Repeat the procedure on the other pivot bolt if required.

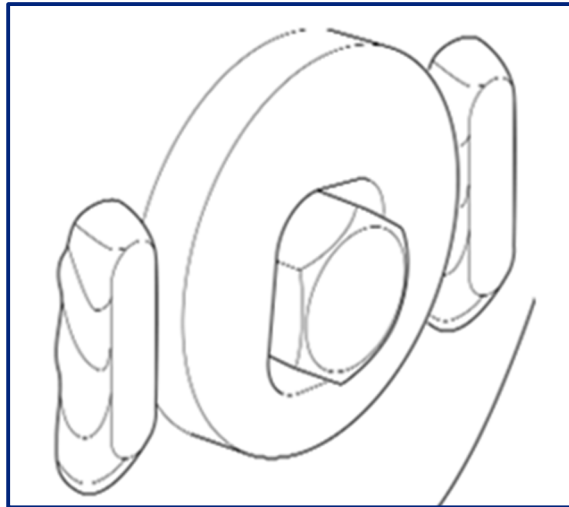


Fig 31

## Rear Axle

1. Check the dimension from the centerline of the front axle to the centerline of the rear axle (measurements AR and AL). For a correct alignment, the dimensions must be within  $\pm 3$  mm at both ends of the axle (Figs 32, 33 & 34). If adjustment is required, proceed to step 3 below. If adjustment is not required, proceed to step 4.
2. Before you align an axle, ensure the pivot bolt is free to move in the adjustment slot.  
Using a 36 mm spanner and suitable wrench, loosen the pivot bolts on both sides. Place 36 mm spanner on an outboard boss (eccentric boss) (Fig 31), and rotate in desired direction to give an equal measurement on either of the axle to the kingpin. Align the axle so that measurement AR equals measurement AL within  $\pm 3$  mm (Figs 32, 33 & 34). Repeat the procedure on the other pivot bolt if required.

## After you align the axle

When the desired measurements have been achieved:

1. Tighten pivot bolts to 800 Nm.
2. Refit the road wheels.
3. Charge the system with air.
4. Apply the parking brake.
5. Remove the chassis stands.

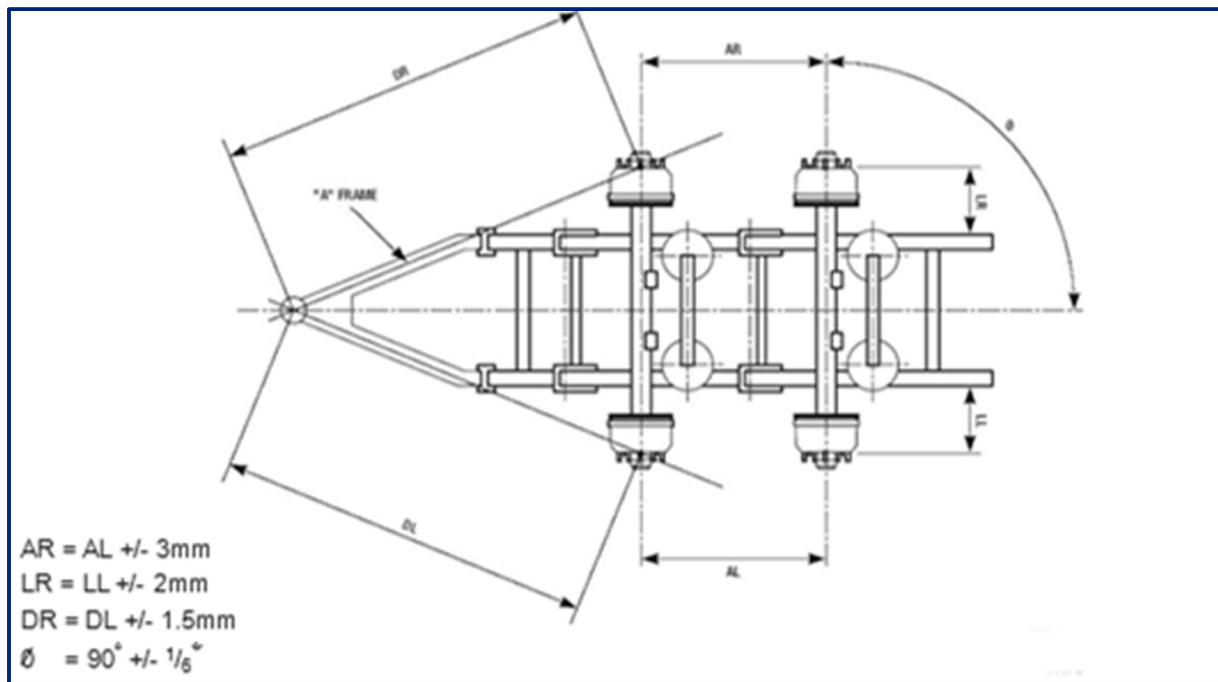


Fig 32

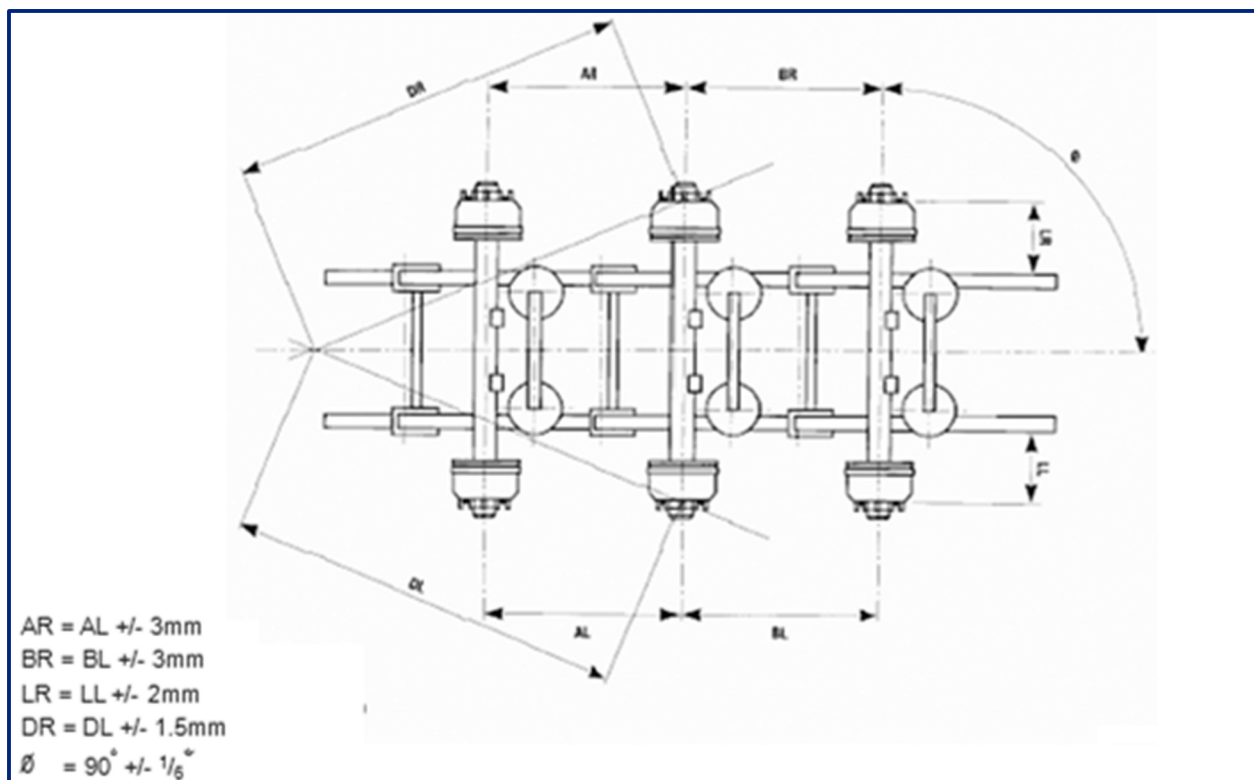


Fig 33

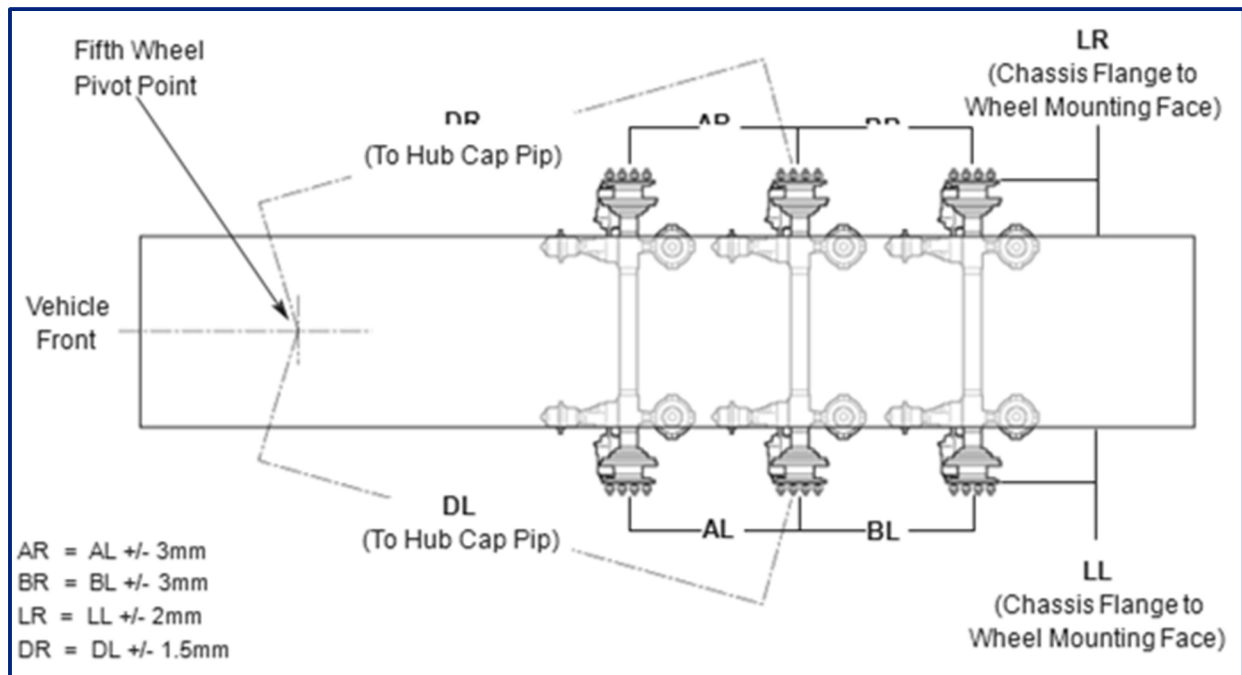


Fig 34



## Maintenance Schedules & Torque Values

### Maintenance Schedules

#### After First 1,000 KM

- Check all fastener torques and tighten where required according to the values in the table in this section.
- Examine all valves and air hose joints for leaks or signs of pipe work rubbing against the chassis or suspension components.
- Check the suspension ride height.
- Inspect the shock absorbers for evidence of oil leaks.
- If an axle lift is fitted, check that it is functioning correctly.
- Check the operation of all optional equipment and test for air leaks on air system equipment. Individual service manuals should be referred to if required.
- Check arms and welds for cracks in all inspection intervals stated.

#### After First 10,000 KM & Subsequent 10,000 KM Intervals

- Inspect the shock absorbers for evidence of oil leaks and inspect the shock absorber bushes for signs of rubber extrusion or damage.
- Check the airsprings for signs of leakage and examine the rubber bellows for signs of damage from road debris or internal bump stop failure.
- Check all pipe joints for signs of leakage and ensure that no valves are fouled with road dirt such that their operation may be impaired. This is especially relevant to the levelling valve. This is particularly important if the trailer has been operated in a harsh environment e.g. coal, dust, quarries etc.
- If an axle lift is fitted, check it is operating correctly.
- Check the operation of all optional equipment and test for air leaks on air system equipment. Individual service manuals should be referred to if required.
- Examine tyres for uneven wear. If there is any, check the pivot bushes for damage and re-check the axle alignment. If damage is found then the trailing arms should be removed and replacement of the bush and possibly of the wear plates is advised. Failure to do so may result in tyre wear or structural damage.
- Check all fastener torques and tighten them where required according to the values in the table in this section.
- If an axle lift assembly is fitted, ensure it is operating correctly.
- Check that the extra air springs (if fitted) are operating as the axle is being raised.
- Check arms and welds for cracks in all inspection intervals stated.



### Every 100,000 KM

- Check the shock absorbers for oil leaks along their body. Lever between the shock absorber eye ends (top and bottom) and close bracketry to ensure no excessive lateral movement exists indicating bush failure or loose bolts.
- Check the airsprings for air leaks and signs of damage especially to the rubber bellows.
- Uncouple the levelling valve arm/axle rubber joint and raise and lower the arm to check that the valve is passing air in and out of the suspension system.
- Clean under the suspension inside the hanger brackets and around the trailing arm pivots. Check between the wear plates on the inside faces of the hanger brackets and the trailing arms for signs of excessive wear or damage to the rubber pivot bushes.
- Check arms and welds for cracks in all inspection intervals stated.

All torques must be within  $\pm 5\%$  of stated values.



#### WARNING

Check fastener torque values, tighten loose fasteners and replace damaged fasteners. Loose, damaged or missing fasteners can cause loss of vehicle control, death, serious personal injury and damage to components.

## Table of Torques

<i>Fastener Description</i>	<i>Torque (Nm) +/- 5%</i>
Pivot Nut (M24 – Gr. 10.9)	800*
Shock Absorber Nut (M24 – Gr. 8.8)	500*
Lower Shock Absorber Bolt-Head	650*
Shock Absorber Nut (M20 – Gr. 8.8)	400*
Air spring Nut (M12 – Gr. 8.8)	41
Air spring Nut (M20 – Gr. 8.8)	41

NOTE: \* Do not torque the Pivot Nut or Shock Absorber nuts to final torque until the axle is aligned and the trailer is at the ride height with the wheels on.

## Fault Finding & Diagnostics

This section is intended to give a guide to the trailer operator to enable him to assess problems. The range of problems, possible causes and recommended actions are by no means complete, however they intend to provide a solution to the most commonly encountered difficulties.

### How to use this section

The faults are listed under five main headings, namely

1. BRAKING PROBLEMS
2. TYRE WEAR
3. EXCESSIVE ROLL
4. AIR PROBLEMS

Listed under each of these headings are the potential problems, each followed by a check procedure which should highlight the cause of the problem. If the problem cannot be solved after working through the relevant check list, further information should be obtained from ASSALI STEFEN.

### Braking Problems

If brakes are not functioning correctly:

- Check that there is at least 6.5 bar at coupling head, and the correct ratio of air is delivered to the brake chamber.
- Check slack adjusters are correctly adjusted.
- Ensure all brake system valves are functioning correctly.

If the problem persists, see the general Service Manual for the full brake service procedure.

## Tyre Wear

If tyre wear is excessive:

- Check axle alignment is correct.
- Check wheels are parallel (i.e. zero camber and toe in/out).
- Inspect the trailing arm pivot bushes for damage, and replace if necessary.
- Check shock absorber for oil leaks.
- Inspect shock absorber bushes for damage.
- Ensure ride height is set correctly.
- Check application, operation and route.
- Ensure no axle is lifted when trailer is fully loaded.

## Excessive Roll

If the trailer is rolling excessively:

- Check pivot bolt torque is correct.
- Check pivot bush condition.
- Check axle and suspension trailing arms for cracks.
- Is the centre of gravity excessive?
- Ensure ride height is set correctly.
- If vehicle is load sensed, check that a shuttle valve is fitted to prevent cross coupling. Fit if necessary.

## Air Problems

If the suspension does not inflate:

- Check that the levelling valve is connected to the axle.
- Ensure the brake air reservoir pressure is more than 6.5 bar.
- Ensure the suspension air reservoir pressure is at least 6.5 bar.
- Check the setting of the pressure protection valve and clean the air filter.
- Check the axle load is not greater than the available pressure.
- Check all pipework and fittings for leaks using soapy water.
- Check the airsprings for leaks using soapy water.
- Check levelling valve for leakage at the exhaust port and, if necessary, replace the valve.

## Fault Diagnostic Table

Condition	Possible Cause		Recommended Action
All air springs flat	1	Insufficient air pressure to suspension air springs.	Build air pressure to 6.5 Bar, or more. Check compressor for correct function. Check all air lines and fittings for leaks.
	2	Defective pressure protection valve.	Check and replace valve if necessary.
	3	Height control valve supply or delivery fitting clogged.	Inspect height control valve supply & delivery fittings for restrictions.
	4	Air leak in system	Inspect entire system for leaks. Repair or replace if necessary.
	5	Suspension overloaded.	Review load to suspension rated capacity.
Air springs fully raised but do not exhaust	1	Height control valve delivery port or exhaust port plugged.	Inspect port for restrictions. Repair or replace as necessary.
	2	Height control linkage broken	Replace linkage.
Vehicle body incorrect ride height during operation	1	Height control valve not adjusted properly	Inspect and adjust as necessary.
	2	Height control lever bent or broken	Straighten or replace lever.
	3	Insufficient air pressure to the suspension system.	Check air compressor and pressure protection valve for proper operation. Inspect system for leaks. Repair and replace as necessary.
Main air pressure drops to 6.5 Bar	1	Ruptured air spring	Inspect air springs and replace if necessary.
	2	Leaking air lines	Inspect air lines and repair or replace as necessary.
Hard Ride	1	Improper ride height or air springs flat	Check and adjust ride height. See first condition
Suspension ride height not maintained during operation	1	Clogged air filters	Inspect and clean or replace as necessary.
	2	Moisture in air tank	Drain air tank and evacuate air system from moisture.
	3	Clogged filter screens in height control valve	Inspect and clean or replace as necessary.



	4	Damaged linkage or incorrect valve mounting	Replace, repair or adjust as necessary.
Incorrect tyre clearance in full bounce	1	Incorrect tyre size	Replace tires with the recommended tyre size.
Trailer not pulling straight	1	Trailer axles out of alignment	Realign axles
	2	Loose alignment bosses or pivot bolt	Align axles and tighten pivot bolts to the correct torque.
Trailer wandering or unusual rattling	1	Worn bushings	Inspect bushings and replace as Needed
Broken Shock Absorbers	1	Trailer fitted with manual raise/lower valve. Driver forgets to set to ride height	Fit auto raise/lower device. Driver education.
	2	Auto reset fitted, check function of EBS tractor is compatible	Check operation
	3	Is trailer towed on sit with Dock spotter etc.	Check operation
	4	Incorrect King pin height	Set Kingpin height to recommended values from trailer plate details or contact manufacturer
Air spring bump stop broken	1	Trailer driven with no air in the suspension	Driver education
Damage to lifter in red emergency coupling at headboard of trailer	1	Dirt in air system.	Check operation. Replace worn lifter in coupling
	2	General wear and tear	

## Warranty

For SL9 Air Suspension warranty terms and conditions, please refer to the "General Terms and Conditions of Sale" in the download section of our website [www.assalistefen.com](http://www.assalistefen.com)

Descriptions and specifications were in effect at the time of this publication and are subject to change without notice or liability. Assali Stefen reserve the right to make design improvements, change or discontinue parts at any time.

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